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A NEW
Dictionary of Arts, Sciences, &c.

G.

G,
Gabara.

G, THE ſeventh letter, and fifth conſonant, of our alphabet; tho' in the alphabets of all the oriental languages, the Hebrew, Phœnician, Chaldee, Syriac, Samaritan, Arabic, and even Greek, *G* is the third letter. See LETTER.

The Hebrews call it *ghimel*, or *gimel*, *q. d.* "camel;" by reaſon it reſembles the neck of that animal; and the ſame appellation it bears in the Samaritan, Phœnician, and Chaldee: in the Syriac it is called *gamel*, in Arabic *giim*, and in Greek *gamma*.

The letter G is of the mute kind, and cannot be any way ſounded without the help of a vowel. It is formed by the reflexion of the air againſt the palate, made by the tongue as the air paſſes out of the throat: which Martianus Capella expreſſes thus, G *ſpiritus cum palato*; ſo that G is a palatal letter.

The form of our *G* is taken from that of the Latins, who borrowed it from the Greeks; the Latin *G* being certainly a corruption of the Greek gamma, Γ, as might eaſily be ſhewn, had our Printers all the characters and forms of this letter which we meet withal in the Greek and Latin MSS thro' which the letter paſſed from Γ to *G*.

In Engliſh it has a hard and ſoft ſound: hard, as in the words *game, gun,* &c.; and ſoft, as in the words *geſture, giant,* &c. At the end of words, *gh* is pronounced like *ff*, as in the words *rough, tough,* &c. The letter *g* is alſo uſed in many words where the ſound is not perceived, as in *ſign, reign,* &c.

As a numeral, G was anciently uſed to denote 400; and with a daſh over it thus $\overline{G}$, 40,000. In muſic, it is the character or mark of the treble cleff; and from its being placed at the head, or marking the firſt ſound, in Guido's ſcale, the whole ſcale took the name *gamut*. See the articles CLEFF and GAMUT.

As an abbreviature, G. ſtands for *Gaius, Gellius, gens, genius,* &c. G. G. for *gemina, geſſit, geſſerunt,* &c. G. C. for *genio civitatis* or *Cæſaris*. G. L. for *Gaius libertus*, or *genio loci*. G. V. S. for *genio urbis ſacrum*. G. B. for *genio bono*. And G. T. for *genio tutelari*.

GABARA, or GABBARA, in antiquity, the dead bodies which the Egyptians embalmed, and kept in their houſes, eſpecially thoſe of ſuch of their friends as died with the reputation of great piety and holineſs, or as martyrs. See EMBALMING, and MUMMY.

Gabel
‖
Gad.

GABEL, (*Gabella, Gablum, Gablagium*), in French *Gabelle*, i. e. *Vectigal*, hath the ſame ſignification among the ancient Engliſh writers, that *gabelle* hath in France. It is a tax; but hath been variouſly uſed, as for a rent, cuſtom, ſervice, &c. And where it was a payment of rent, thoſe who payed it were termed *gablatores*. When the word *gabel* was formerly mentioned without any addition to it, it ſignified the tax on ſalt, though afterwards it was applied to all other taxes.

GABIONS, in fortification, baſkets made of ozier-twigs, of a cylindrical form, ſix feet high, and four wide; which, being filled with earth, ſerve as a ſhelter from the enemy's fire.

GABLE, or GABLE-*End* of a houſe (from *gaval*, Welſh), is the upright triangular end, from the cornice or eaves, to the top of the houſe.

GABRIEL, the name of one of the principal angels in heaven. It ſignifies *the ſtrength of God*. There are a few events, in which this exalted being was concerned, recorded in ſcripture. He was ſent to the prophet Daniel, to explain to him the viſion of the ram and goat, and the myſtery of the ſeventy weeks, which had been revealed to him. He was ſent to Zacharias, to declare to him the future birth of John the baptiſt. Six months after, he was ſent to Nazareth, to the Virgin Mary, to warn her of the birth of Jeſus Chriſt.

The Orientaliſts add ſeveral particulars to what the ſcriptures inform us concerning the angel Gabriel. The Mahometans call him the *faithful ſpirit*; and the Perſians, by way of metaphor, the *peacock of heaven*. We read, in the ſecond chapter of the Koran, that *whoſoever is an enemy to Gabriel, ſhall be confounded*. It was Gabriel, they believe, who brought to Mahomet, their falſe prophet, the revelations which he publiſhed; and it was he, who conducted him to heaven mounted upon the animal Borak.

GAD, among miners, a ſmall punch of iron, with a long wooden handle, uſed to break up the ore.

One of the miners holds this in his hand, directing the point to a proper place, while the other drives it into the vein, by ſtriking it with a ſledge-hammer.

GAD-*Bee*, or *Gad-fly*, in natural hiſtory, the common name for a winged inſect, called alſo the *dun-fly* or *ox-fly*; a creature very troubleſome to cows, horſes, &c. This creature examined by the microſcope hath ſome peculiarities worthy of obſervation. It has, like the gnat, a long proboſcis, with a ſharp dart or two darts ſheathed within it; the uſe of theſe darts is to penetrate the fleſh of animals for the ſucking their blood, whereas the proboſcis can only ſerve to ſuck the dews from flowers, &c.

The eggs of this fly are laid in the waters, and there produce a very remarkable ſort of maggot. It is a brown one of a long flatted figure, with a pencil of down-hairs at its tail, which it ſpreads into a circular form on the ſurface of the water, while its head is ſunk down in ſearch of food. When the creature would deſcend towards the bottom, theſe hairs are made to approach one another in an oval form; and in this ſtate they incloſe a bubble of air, by means of which it is able to riſe again; and if this bubble by any accident eſcapes, the creature immediately ſqueezes out of its own body another to ſupply its place. The ſnout of this maggot hath three diviſions; whence are thruſt out three little pointed bodies like ſerpents tongues. Theſe maggots are very common on the ſurface of ditch-water; and the motion of their inteſtines is very ſingular and obſervable.

GADUS, in ichthyology, a genus of fiſhes belonging to the order of jugulares. The head is ſmooth; there are ſeven cylindrical rays in the branchioſtege membrane; the body is oblong, with deciduous ſcales; the whole fins are covered with the common ſkin of the fiſh; the rays of the back-fins are blunt, and thoſe of the breaſt are ſharp. There are 17 ſpecies, principally diſtinguiſhed by their cirri and the number of back-fins. The moſt remarkable are,

The Cod.

1. The *morhua*, or COMMON COD, is found only in the northern parts of the world; it is, as Rondeletius calls it, an ocean fiſh, and never met with in the Mediterranean ſea. It affects cold climates, and ſeems confined between the latitudes 66° and 50°: what are caught north and ſouth of thoſe degrees being either few in quantity or bad in quality. The Geenland fiſh are ſmall, and emaciated through want of food; being very voracious, and having in thoſe ſeas a ſcarcity of proviſion. This locality of ſituation is common to many other ſpecies of this genus, moſt of them being inhabitants of the cold ſeas, or ſuch as lie within regions that can juſt claim the title of *temperate*. There are nevertheleſs certain ſpecies found near the Canary-iſlands, called *cherny*, of which we know no more than the name; but which, according to Captain Glaſs, are better taſted than the Newfoundland kind.

The great rendezvous of the cod-fiſh is on the banks of Newfoundland, and the other ſand-banks that lie off the coaſts of Cape Breton, Nova Scotia, and New England. They prefer thoſe ſituations, by reaſon of the quantity of worms produced in thoſe ſandy bottoms, which tempt them to reſort there for food: but another cauſe of the particular attachment the fiſh have to theſe ſpots, is their vicinity to the polar ſeas, where they return to ſpawn: there they depoſit their roes in full ſecurity; but want of food forces them, as ſoon as the firſt more ſouthern ſeas are open, to repair thither for ſubſiſtence. Few are taken north of Iceland, but on the ſouth and weſt coaſts they abound: they are again found to ſwarm on the coaſts of Norway, in the Baltic, off the Orkney and the Weſtern iſles; after which their numbers decreaſe, in proportion as they advance towards the ſouth, when they ſeem quite to ceaſe before they reach the mouth of the Straits of Gibraltar.

Before the diſcovery of Newfoundland, the greater fiſheries of cod were on the ſeas of Iceland, and off our Weſtern Iſles, which were the grand reſort of ſhips from all the commercial nations; but it ſeems that the greateſt plenty was met with near Iceland. The Engliſh reſorted thither before the year 1415: for we find that Henry V. was diſpoſed to give the king of Denmark ſatisfaction for certain irregularities committed on thoſe ſeas by his ſubjects. In the reign of Edward IV. the Engliſh were excluded from the fiſhery by treaty; and forbidden to reſort there under pain of forfeiture of life and goods. Notwithſtanding this, that monarch afterwards gave licence to a ſhip of Hull to ſail to Iceland, and there relade fiſh and other goods, without regard to any reſtrictions to the contrary. The right of the Engliſh in latter times was far from being confirmed: for we find queen Elizabeth condeſcending to aſk permiſſion to fiſh in thoſe ſeas from Chriſtian IV. of Denmark; yet afterwards ſhe ſo far repented her requeſt, as to inſtruct her ambaſſadors at that court to inſiſt on the right of a free and univerſal fiſhery. In the reign of her ſucceſſor, however, they had not fewer than 150 ſhips employed in the Iceland fiſhery; which indulgence might ariſe from the marriage of James with a princeſs of Denmark. But the Spaniſh, the French, and the Bretons, had much the advantage of the Engliſh in all fiſheries at the beginning, as appears by the ſtate of that in the ſeas of Newfoundland in the year 1578, when the number of ſhips belonging to each nation ſtood thus:

Spaniards, 100, beſides 20 or 30 that came from Biſcay to take whale for train, being about five or ſix thouſand tons.
Portugueſe 50, or three thouſand tons.
French and Bretons 150, or ſeven thouſand tons.
Engliſh, from 30 to 50.

The increaſe of ſhipping that reſort to thoſe fertile banks, is now unſpeakable. Britain ſtill enjoys the greateſt ſhare; which ought to be eſteemed our chiefeſt treaſure, as it brings wealth to individuals, and ſtrength to the ſtate. See FISHERY.

All this immenſe fiſhery is carried on by the hook and line only. We have been informed that they fiſh from the depth of 16 to 60 fathoms, according to the inequality of the bank, which is repreſented as a vaſt mountain, under water, above 500 miles long, and near 300 broad; and that ſeamen know when they approach it by the great ſwell of the ſeas and the thick miſts that impend over it. The bait is herring, a ſmall fiſh called a *capelin*, a ſhell-fiſh called *clams*, and bits of ſea-fowl; and with theſe are caught fiſh ſufficient to find employ for near 15,000 Britiſh ſeamen, and to afford ſubſiſtance to a much more numerous body of people at home, who are engaged in the various manufactures which ſo vaſt a fiſhery demands.

The food of the cod is either ſmall fiſh, worms, teſtaceous or cruſtaceous animals, ſuch as crabs, large whelks, &c.; and their digeſtion is ſo powerful, as to diſſolve the greateſt part of the ſhells they ſwallow. They are very voracious, and catch at any ſmall body they perceive moved by the water, even ſtones and pebbles, which are often found in their ſtomachs.

The Cod.

Fiſhermen are well acquainted with the uſe of the air-bladder or ſound of the cod; and are very dexterous in perforating this part of a live fiſh with a needle, in order to diſengage the incloſed air: for without this operation it could not be kept under water in the well-boats, and brought freſh to market. The ſounds of the cod ſalted is a delicacy often brought from Newfoundland. Iſinglaſs is alſo made of this part by the Iceland fiſhermen: a proceſs which deſerves the attention of the natives of the north of Scotland, where theſe fiſh are plentiful. It is given under the article ICHTHYOCOLLA.

Providence hath kindly ordained, that this fiſh, ſo uſeful to mankind, ſhould be ſo very prolific as to ſupply more than the deficiencies of the multitudes annually taken. Leuwenhoeck counted 9,384,000 eggs in a cod-fiſh of a middling ſize; a number, ſure, that will baffle all the efforts of man, or the voracity of the inhabitants of the ocean, to exterminate, and which will ſecure to all ages an inexhauſtible ſupply of grateful proviſion.

In our ſeas they begin to ſpawn in January, and depoſite their eggs in rough ground, among rocks. Some continue in roe till the beginning of April. The cod-fiſh in general recover quicker after ſpawning than any other fiſh, therefore it is common to take ſome good ones all the ſummer. When they are out of ſeaſon, they are thin-tailed and louſy; and the lice chiefly fix themſelves on the inſide of their mouths.

The fiſh of a middling ſize are moſt eſteemed for the table; and are choſen by their plumpneſs and roundneſs, eſpecially near the tail, by the depth of the ſulcus or pit behind the head, and by the regular undulated appearance of the ſides, as if they were ribbed. The glutinous parts about the head loſe their delicate flavour after it has been 24 hours out of the water, even in winter, in which theſe and other fiſh of this genus are in higheſt ſeaſon.

The largeſt that we ever heard of taken on our coaſts, weighed 78 pounds: the length was five feet eight inches; and the girth round the ſhoulders, five feet. It was taken at Scarborough in 1755, and was ſold for one ſhilling. But the general weight of theſe fiſh in the Yorkſhire ſeas, is from 14 to 40 pounds. This ſpecies is ſhort in proportion to its bulk, the belly being very large and prominent.

The jaws are of an equal length, and at the end of the lower is a ſmall beard; the teeth are diſpoſed in the palate as well as in the jaws.

The colour of this fiſh is cinereous on the back and ſides, and commonly ſpotted with yellow: the belly is white; but they vary much, not only in colour but in ſhape, particularly that of the head. The ſide line is white and broad, ſtraight till it reaches oppoſite the vent, when it bends towards the tail. Codlings are often taken of a yellow, orange, and even red colour, while they remain among the rocks; but, on changing their place, aſſume the colour of other cod-fiſh.

2. The *Egleſinus*, or HADDOCK. Large haddocks begin to be in roe in the middle of November, and continue ſo till the end of January; from that time till May they are very thin tailed, and much out of ſeaſon. In May they begin to recover; and ſome of the middling-ſized fiſh are then very good, and continue improving till the time of their greateſt perfection. The ſmall ones are extremely good from May till February, and ſome even in February, March, and April, viz. thoſe which are not old enough to breed.

The Haddock.

The fiſhermen aſſert, that in rough weather haddocks ſink down into the ſand and ooze in the bottom of the ſea, and ſhelter themſelves there till the ſtorm is over; becauſe in ſtormy weather they take none, and thoſe that are taken immediately after a ſtorm are covered with mud on their backs.

In ſummer they live on young herrings and other ſmall fiſh; in winter, on the ſtone-coated worms *, which the fiſhermen call *haddock-meat*.

The grand ſhoal of haddocks comes periodically on the Yorkſhire coaſts. It is remarkable that they appeared in 1766 on the 10th of December, and exactly on the ſame day in 1767: theſe ſhoals extended from the ſhore near three miles in breadth, and in length from Flamborough-head to Tinmouth-caſtle, and perhaps much farther northwards. An idea may be given of their numbers by the following fact: Three fiſhermen, within the diſtance of a mile from Scarborough harbour, frequently loaded their coble or boat with them twice a-day, taking each time about a ton of fiſh: when they put down their lines beyond the diſtance of three miles from the ſhore, they caught nothing but dog-fiſh, which ſhows how exactly theſe fiſh keep their limits.

The beſt haddocks were ſold from eightpence to a ſhilling *per* ſcore; and the poor had the ſmaller ſort at a penny and ſometimes a halfpenny *per* ſcore.

The large haddocks quit the coaſt as ſoon as they go out of ſeaſon, and leave behind great plenty of ſmall ones. It is ſaid that the large ones viſit the coaſts of Hamburgh and Jutland in the ſummer.

It is no leſs remarkable than providential, that all kinds of fiſh (except mackrel) which frequent the Yorkſhire coaſt, approach the ſhore, and as it were offer themſelves to us, generally remaining there as long as they are in high ſeaſon, and retire from us when they become unfit for uſe. It is the commoneſt ſpecies in the London markets. They do not grow to a great bulk, one of 14 pounds being of an uncommon ſize, but thoſe are extremely coarſe; the beſt for the table weighing from two to three pounds.

The body of the haddock is long: the head ſlopes down to the noſe: the ſpace between the hind-part of the firſt dorſal-fin is rigid: on the chin is a ſhort beard. On the back are three fins reſembling thoſe of the common cod-fiſh: on each ſide beyond the gills is a large black ſpot. Superſtition aſſigns this mark to the impreſſion St Peter left with his finger and thumb when he took the tribute out of the mouth of a fiſh of this ſpecies, which has been continued to the whole race of haddocks ever ſince that miracle. The lateral line is black: the tail is forked. The colour of the upper part of the body is duſky or brown; the belly and lower part of the ſides ſilvery.

3. The *Barbatus*, or POUT, never grows to a large ſize, ſeldom exceeding a foot in length. It is diſtinguiſhed from all others by its great depth; one of the ſize abovementioned being near four inches deep

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* a ſpecies of *Serpula*.

in the broadeſt part. The back is very much arched, and carinated: the colour of the fins and tail are black: at the bottom of the pectoral fins is a black ſpot. The lateral line is white, broad, and crooked. The tail is even at the end, and of a duſky colour. The colour of the body is white, but more obſcure on the back than the belly, and tinged with yellow.—It is called at Scarborough a *kleg*, and is a very delicate fiſh.

The Poor-fiſh.

4. The *Minutus*, or POOR, is the only ſpecies of cod-fiſh with three dorſal fins that we (at this time) are aſſured is found in the Mediterranean ſea. It is taken near Marſeilles, and ſometimes in ſuch quantities as to become a nuſance; for no other kinds of fiſh are taken during their ſeaſon. It is eſteemed good, but incapable of being ſalted or dried: Belon ſays, that when it is dried in the ſun, it grows as hard as horn. It is the ſmalleſt ſpecies yet diſcovered, being little more than ſix inches long. On the chin is a ſmall beard: the eyes are covered with a looſe membrane: on the gill-covers and the jaws, there are, on each ſide, nine punctures. The colour on the back is a light brown; on the belly a dirty white.—We owe the diſcovery of this kind in our ſeas to the Reverend Mr Jago.

The Coal-fiſh.

5. The *Carbonarius*, or COAL-FISH, takes its name from the black colour that it ſometimes aſſumes. Belon calls it the *colfiſch*, imagining that it was ſo named by the Engliſh, from its producing the Ichthyocolla; but Geſner gives the true etymology. Theſe fiſh are common on moſt of our rocky and deep coaſts, but particularly thoſe of the north of Great Britain. They ſwarm about the Orkneys, where the fry are the great ſupport of the poor. The young begin to appear on the Yorkſhire coaſt the beginning of July in vaſt ſhoals, and are at that time about an inch and an half long. In Auguſt they are from three to five inches in length, and are taken in great numbers with the angling rod: they are then eſteemed a very delicate fiſh; but grow ſo coarſe when they are a year old, that few people will eat them. Fiſh of that age are from eight to fifteen inches long, and begin to have a little blackneſs near the gills and on the back, and the blackneſs increaſes as they grow older,

The fry is known by different names in different places: they are called at Scarborough *parrs*, and when a year old, *billets*. About nine or ten years ago ſuch a glut of parrs viſited that part, that for ſeveral weeks it was impoſſible to dip a pail into the ſea without taking ſome.

Though this fiſh is ſo little eſteemed when freſh, yet it is ſalted and dried for ſale. It is of a more elegant form than the cod-fiſh: they generally grow to the length of two feet and an half, and weigh about 28 or 30 pounds at moſt. The head is ſmall; the under-jaw a little longer than the upper: the tail is broad and forked. They vary in colour: ſome have their back, noſe, dorſal fins, and tail, of a deep black: the gill-covers, ſilver and black; the ventral and anal fins, white; the belly of the ſame colour. Others are duſky, others brown; but, in all, the lateral line is ſtraight and white, and the lower part of the ventral and anal fins white.

The Pollack.

6. The *Pollachius*, or POLLACK, is common on many of our rocky coaſts: during ſummer they are ſeen in great ſhoals frolicking on the ſurface of the water, and flinging themſelves into a thouſand forms. They are at that time ſo wanton as to bite at any thing that appears on the top of the waves, and are often taken with a gooſe-feather fixed to the hook. They are very ſtrong, being obſerved to keep their ſtation at the feet of the rocks in the moſt turbulent and rapid ſea. They are a good eating fiſh. They do not grow to a very large ſize; at leaſt the biggeſt ſeldom exceed ſix or ſeven pounds: but ſome have been taken in the ſea near Scarborough, which they frequent during winter, that weighed near 28 pounds. They are there called *leets*.

The under jaw is longer than the upper; the head and body riſes pretty high, as far as the firſt dorſal fin. The ſide line is incurvated, riſing towards the middle of the back, then ſinking and running ſtraight to the tail; it is broad, and of a brown colour. The colour of the back is duſky, ſometimes inclining to green: the ſides beneath the lateral line marked with lines of yellow; the belly white.

The Whiting.

7. The *merlangus*, or WHITING. Theſe fiſh appear in vaſt ſhoals in our ſeas in the ſpring, keeping at the diſtance of about half a mile to that of three from the ſhore. They are caught in vaſt numbers by the line, and afford excellent diverſion. They are the moſt delicate, as well as the moſt wholeſome, of any of the genus: but they do not grow to a large ſize, the biggeſt not exceeding 20 inches; and even that is very uncommon, the uſual length being 10 or 12; tho' it is ſaid, that whitings, from four to eight pounds in weight, have been taken in the deep water at the edge of the Dogger-Bank.—It is a fiſh of an elegant make: the upper jaw is the longeſt; the eyes large, the noſe ſharp; the teeth of the upper jaw long, and appear above the lower when cloſed. The colour of the head and back is a pale brown; the lateral line white, and crooked; the belly and ſides ſilvery, the laſt ſtreaked lengthwiſe with yellow.

The Hake.

8. The *merlucius*, or HAKE, is found in vaſt abundance on many of our coaſts, and of thoſe of Ireland. There was formerly a vaſt ſtationary fiſhery of hake on the Nymph Bank off the coaſt of Waterford, immenſe quantities appearing there twice a-year; the firſt ſhoal coming in June, during the mackrel-ſeaſon; the other in September, at the beginning of the herring-ſeaſon, probably in purſuit of thoſe fiſh: it was no unuſual thing for ſix men with hooks and lines to take a thouſand hake in one night, beſides a conſiderable quantity of other fiſh. Theſe were ſalted and ſent to Spain, particularly to Bilboa. We are at this time uninformed of the ſtate of this fiſhery; but find that Mr Smith, who wrote the hiſtory of the county of Waterford, complains even in his time (1746) of its decline. Many of the gregarious fiſh are ſubject to change their ſituations, and deſert their haunts for numbers of years, and then return again. Mr Smith inſtances the loſs of the haddock on the Waterford ſhores, where they uſed to ſwarm; and we can bring the capriciouſneſs of the herrings, which ſo frequently quit their ſtations, as another example.—Sometimes the irregular migration of fiſh is owing to their being followed and haraſſed by an unuſual number of fiſh of prey, ſuch as the ſhark-kind; ſometimes to deficiency of the ſmaller fiſh, which ſerved them as food; and laſtly, in many places to the cuſtom of trawling, which not only demoliſhes a quantity of

their ſpawn, which is depoſited in the ſand, but alſo deſtroys or drives into deeper waters numberleſs worms and inſects, the repaſt of many fiſh.—The hake is in England eſteemed a very coarſe fiſh, and is ſeldom admitted to table either freſh or ſalted. When cured, it is known by the name of *Poor John*. Theſe fiſh are from a foot and an half to near twice that length: they are of a ſlender make, of a pale aſh-colour on their backs, and of a dirty white on their bellies.

The Ling.

10. The *molva*, or LING, takes its Engliſh name from its length, being corrupted from the word *long*. It abounds about the Scilly Iſles, on the coaſts of Scarborough, and thoſe of Scotland and Ireland, and forms a conſiderable article of commerce. This branch of trade was conſiderable ſo long ago as the reign of Edward III. an act for regulating the price of lob, *ling*, and cod, being made in his 31ſt year.

In the Yorkſhire ſeas they are in perfection from the beginning of February to the beginning of May, and ſome till the end of that month. In June they ſpawn, depoſiting their eggs in the ſoft ouzy ground of the mouth of the Tees: at that time the males ſeparate from the females, and reſort to ſome rocky ground near Flamborough-head, where the fiſhermen take great numbers without ever finding any of the female or roed fiſh among them.

While a ling is in ſeaſon its liver is very white, and abounds with a fine-flavoured oil; but as ſoon as the fiſh goes out of ſeaſon, the liver becomes red as that of a bullock, and affords no oil. The ſame happens to the cod and other fiſh in a certain degree, but not ſo remarkably as in the ling. When the fiſh is in perfection, a very large quantity of oil may be melted out of the liver by a ſlow fire; but if a violent ſudden heat be uſed for that purpoſe, they yield very little. The oil, which nature hoards up in the cellular membranes of the fiſhes, returns into their blood, and ſupports them in the engendering ſeaſon, when they purſue the buſineſs of generation with ſo much eagerneſs as to neglect their food.

Vaſt quantities of ling are ſalted for exportation, as well as for home-conſumption. When it is cut or ſplit for curing, it muſt meaſure 26 inches or upwards from the ſhoulder to the tail: if leſs than that, it is not reckoned a ſizeable fiſh, and conſequently not entitled to the bounty on exportation; ſuch are called *drizzles*, and are in ſeaſon all ſummer.

The uſual ſize of a ling is from three to four feet; but they have been heard of ſeven feet long. The body is very ſlender; the head flat; the upper jaw the longeſt; the teeth in that jaw ſmall and very numerous; in the lower, few, ſlender, and ſharp: on the chin is a ſmall beard. They vary in colour, ſome being of an olive hue on the ſides and back, others cinereous; the belly white. The ventral fins white: the dorſal and anal edged with white. The tail marked near the end with a tranſverſe black bar, and tipt with white.

The Burbot.

11. The *lota*, or BURBOT, is found in the Trent; but in greater plenty in the river Witham, and in the great eaſt fen in Lincolnſhire. It is a very delicate fiſh for the table, though of a diſguſting appearance when alive. It is very voracious, and preys on the fry and leſſer fiſh. It does not often take a bait, but is generally caught in weels. It abounds in the lake of Geneva, where it is called *lota*; and it is alſo met with in the Lago Magiore, and Lugano. The largeſt taken in our waters weigh between two and three pounds, but abroad they are ſometimes found of double that weight. Their body has ſome reſemblance to that of an eel, only ſhorter and thicker; and its motions alſo reſemble thoſe of that fiſh: they are beſides very ſmooth, ſlippery, and ſlimy. The head is very ugly, being flat, and ſhaped like that of a toad: the teeth are very ſmall, but numerous. On the end of the noſe are two ſmall beards; on the chin another. The colour varies: ſome are duſky, others are of a dirty green, ſpotted with black, and oftentimes with yellow; and the belly in ſome is white; but the real colours are frequently concealed by the ſlime.

12. The *muſtela*, or FIVE-BEARDED COD, very much reſembles the former.

The beards on the upper jaw are four, viz. two at the very end of the noſes and two a little above them: on the end of the lower jaw is a ſingle one. The fiſh are of a deep olive brown, their belly whitiſh. They grow to the ſame ſize as the former.—The Corniſh fiſhermen are ſaid to whiſtle, and make uſe of the words *bod, bod, vean*, when they are deſirous of taking this fiſh, as if by that they facilitated the capture. In the ſame manner the Sicilian fiſhermen repeat their *mamaſſu di pajanu*, &c. when they are in purſuit of the ſword-fiſh.

The Tuſk.

13. The TORSK, or, as it is called in the Shetlands, *tuſk* and *briſmak*, is a northern fiſh; and as yet undiſcovered lower than about the Orkneys, and even there it is rather ſcarce. In the ſeas about Shetland, it ſwarms, and forms (barrelled or dried) a conſiderable article of commerce. The length is about 20 inches, the greateſt depth four and a half. The head is ſmall; the upper jaw a little longer than the lower; both jaws furniſhed with multitudes of ſmall teeth: on the chin is a ſmall ſingle beard: from the head to the dorſal fin is a deep furrow. The colour of the head is duſky: the back and ſides yellow; belly white; edges of the dorſal, anal, and caudal fins, white; the other parts duſky; the pectoral-fins brown.

GAFF, a ſort of boom or pole, frequently uſed in ſmall ſhips, to extend the upper edge of the mizen; and always employed for the ſame purpoſe on thoſe ſails whoſe foremoſt edges are joined to the maſt by hoops or lacings, and which are uſually extended by a boom below. Such are the main-ſails of all ſloops, brigs, and ſchooners.

GAFFAREL (James), a French divine, and very learned writer, born about 1601. He acquired great ſkill in the oriental and ſeveral other languages; and was particularly verſant in the cabbaliſtic and occult ſciences, which he learnedly expoſed and refuted. Cardinal Richlieu made choice of him for his library-keeper, and ſent him into Italy to collect the beſt manuſcripts and books. He publiſhed a book, intitled *Curioſitez Innouies*, i. e. Unheard-of Curioſities. It is ſaid the cardinal deſigned to employ him in his grand project for the re-union of religions. He died in 1681, aged 80. He had been labouring for many years, and had almoſt finiſhed, a hiſtory of the ſubterranean world; containing an accout of the caves, grottoes, vaults, catacombs, and mines, he had met with in 30 years travels.

GAGATES, or Jet. See Jet.

GAGE, in our ancient cuſtoms, ſignifies a pledge, or pawn, given by way of ſecurity. The word is only properly uſed in ſpeaking of moveables; for immoveables, *hypotheca* is uſed.

If the gage periſh, the perſon who received it is not to anſwer for it, but only for extreme negligence. &c.

Gage, is alſo uſed for a challenge, to combat: See Cartel. In which ſenſe, it was a pledge, which the accuſer or challenger caſt on the ground, and the other took up as accepting the challenge: it was uſually a glove, gauntlet, chaperoon, or the like. See Combat, and Duel.

Gage is only now retained as a ſubſtantive. As a verb, the *G* is changed into *W*, and of *gage* is formed *wage*; as, to wage law; to wage deliverance, *q. d.* to give ſecurity a thing ſhall be delivered. See Wage.

If a perſon who has diſtrained be ſued for not having delivered what he had taken by diſtreſs, he ſhould wage, or gage, or gager, deliverance; that is, put in ſurety that he will deliver them.

Mort-Gage, is that which is left in the hands of the proprietor, ſo that he reaps the fruits thereof.

In oppoſition to *vif-gage*, where the fruits or revenues are reaped by the creditor, and reckoned on the foot of the debt, which diminiſhes in proportion thereto. The ſecond acquits or diſcharges itſelf; the firſt does not.

Gage, in the ſea-language. When one ſhip is to windward of another, ſhe is ſaid to have the weather-gage of her. They likewiſe call the number of feet that a veſſel ſinks in the water, the ſhip's *gage*: this they find by driving a nail into a pike near the end, and putting it down beſide the rudder till the nail catch hold under it; then as many feet as the pike is under water, is the ſhip's gage.

Gage, among letter-founders, a piece of box, or other hard wood, variouſly notched; the uſe of which is to adjuſt the dimenſions, ſlopes, &c. of the different ſorts of letters. See Foundery.

Sliding-Gage, a tool uſed by mathematical inſtrument-makers, for meaſuring and ſetting off diſtances.

Sea-Gage, an inſtrument invented by Dr Hales and Dr Deſaguliers, for finding the depth of the ſea; the deſcription whereof is this. AB (Plate CXV. fig. 1. n° 1.) is the gage-bottle, in which is cemented the gage-tube *Ff* in the braſs cap at G. The upper end of tube F is hermetically ſealed, and the open lower end *f* is immerſed in mercury, marked C, on which ſwims a ſmall thickneſs or ſurface of treacle. On the top of the bottle is ſcrewed a tube of braſs HG, pierced with ſeveral holes to admit the water into the bottle AB. The body K is a weight hanging by its ſhank L, in a ſocket N, with a notch on one ſide at *m*, in which is fixed the catch *l* of the ſpring S, and, paſſing through the hole L, in the ſhank of the weight K, prevents its falling out when once hung on. On the top, in the upper part of the braſs tube at H, is fixed a large empty ball, or full-blown bladder, I, which muſt not be ſo large, but that the weight K may be able to ſink the whole under water.

The inſtrument, thus conſtructed, is uſed in the following manner. The weight K being hung on, the gage is let fall into deep water, and ſinks to the bottom: the ſocket N is ſomewhat longer than the ſhank L; and therefore, after the weight K comes to the bottom, the gage will continue to deſcend, till the lower part of the ſocket ſtrikes againſt the weight: this gives liberty to the catch to fly out of the hole L, and let go the weight K: when this is done, the ball or bladder I, inſtantly buoys up the gage to the top of the water. While the gage is under water, the water having free acceſs to the treacle and mercury in the bottle, will by its preſſure force it up into the tube F*f*, and the height to which it has been forced by the greateſt preſſure, viz. that at the bottom, will be ſhewn by the mark in the tube which the treacle leaves behind it, and which is the only uſe of the treacle. This ſhews into what ſpace the whole air in the tube F*f* is compreſſed; and conſequently the height or depth of the water which by its weight produced that compreſſion, which is the thing required.

If the gage-tube F*f* be of glaſs, a ſcale might be drawn on it with the point of a diamond, ſhewing, by inſpection, what height the water ſtands above the bottom. But the length of 10 inches is not ſufficient for fathoming depths at ſea, ſince that, when all the air in ſuch a length of tube is compreſſed into half an inch, the depth of water is no more than 634 feet, which is not half a quarter of a mile.

If, to remedy this, we make uſe of a tube 50 inches long, which for ſtrength may be a muſket-barrel, and ſuppoſe the air compreſſed into an hundredth part of half an inch; then by ſaying, as 1 : 99 : : 400 : 39600 inches, or 3300 feet; even this is but little more than half a mile, or 2640 feet. But ſince it is reaſonable to ſuppoſe the cavities of the ſea bear ſome proportion to the mountainous parts of the land, ſome of which are more than three miles above the earth's ſurface; therefore, to explore ſuch great depths, the doctor contrived a new form for his ſea-gage, or rather for the gage-tube in it, as follows. BCDF (*ibid.* n° 2.) is a hollow metalline globe communicating on the top with a long tube AB, whoſe capacity is a ninth part of that globe. On the lower part at D, it has alſo a ſhort tube DE, to ſtand in the mercury and treacle. The air contained in the compound gage-tube is compreſſed by the water as before; but the degree of compreſſion, or height to which the treacle has been forced, cannot there be ſeen through the tube; therefore, to anſwer that end, a ſlender rod of metal or wood, with a knob on the top of the tube AB, will receive the mark of the treacle, and ſhew it when taken out.

If the tube AB be 50 inches long, and of ſuch a bore that every inch in length ſhould be a cubic inch of air, and the contents of the globe and tube together 500 cubic inches; then, when the air is compreſſed within an hundredth part of the whole, it is evident the treacle will not approach nearer than 5 inches of the top of the tube, which will agree to the depth of 3300 feet of water as above. Twice this depth will compreſs the air into half that ſpace nearly, viz. $2\frac{1}{2}$ inches, which correſpond to 6600, which is a mile and a quarter. Again, half that ſpace, or $1\frac{1}{4}$ inch, will ſhew double the former depth, viz. 13200 feet, or $2\frac{1}{2}$ miles; which is probably very nearly the greateſt depth of the ſea.

Wind-Gage, an inſtrument for meaſuring the force of the wind upon any given ſurface. It was invented by Dr Lind, who gives the following deſcription of it, Phil. Tranſ. Vol. LXV.

Pl. CXLII. fig. 1.

This inſtrument conſiſts of two glaſs tubes AB, CD, of five or ſix inches in length. Their bores, which are ſo much the better for being equal, are about four tenths of an inch in diameter. They are connected together like a ſiphon by a ſmall bent glaſs-tube *a b*, the bore of which is about one tenth of an inch in diameter. On the upper end of the leg AB there is a tube of latten braſs, which is kneed, or bent perpendicularly outwards, and has its mouth open towards F. On the other leg CD, is a cover with a round hole G in the upper part of it, two tenths of an inch in diameter. This cover and the kneed tube are connected together by a ſlip of braſs *ed*, which not only gives ſtrength to the whole inſtrument, but alſo ſerves to hold the ſcale HI. The kneed tube and cover, are fixed on with hard cement or ſealing wax. To the ſame tube is ſoldered a piece of braſs *e*, with a round hole in it to receive the ſteel ſpindle KL; and at *f* there is juſt ſuch another piece of braſs ſoldered to the braſs-hoop *gh*, which ſurrounds both legs of the inſtrument. There is a ſmall ſhoulder on the ſpindle at *f*, upon which the inſtrument reſts, and a ſmall nut at *i*, to prevent it from being blown off the ſpindle by the wind. The whole inſtrument is eaſily turned round upon the ſpindle by the wind, ſo as always to preſent the mouth of the kneed tube towards it. The end of the ſpindle has a ſcrew on it; by which it may be ſcrewed into the top of a poſt or a ſtand made on purpoſe. It has alſo a hole at L, to admit a ſmall lever for ſcrewing it into wood with more readineſs and facility. A thin plate of braſs *k* is ſoldered to the kneed tube, about half an inch above the round hole G, ſo as to prevent rain from falling into it. There is likewiſe a a crooked tube A B (fig. 2.) to be put occaſionally upon the mouth of the kneed tube F, in order to prevent rain from being blown into the mouth of the wind-gage when it is left out all night, or expoſed in the time of rain.

The force or momentum of the wind may be aſcertained by the aſſiſtance of this inſtrument, by filling the tubes half full of water, and puſhing the ſcale a little up or down, till the 0 of the ſcale, when the inſtrument is held up perpendicularly, be on a line with the ſurface of the water in both legs of the wind-gage. The inſtrument being thus adjuſted, hold it up perpendicularly, and, turning the mouth of the kneed tube towards the wind, obſerve how much the water is depreſſed by it in the one leg, and raiſed in the other. The ſum of the two is the height of a column of water, which the wind is capable of ſuſtaining at that time; and every body that is oppoſed to that wind will be preſſed upon by a force equal to the weight of a column of water, having its baſe equal to the altitude of the column of water ſuſtained by the wind in the wind-gage. Hence the force of the wind upon any body where the ſurface oppoſed to it is known, may be eaſily found; and a ready compariſon may be made betwixt the ſtrength of one gale of wind and that of another.

The force of the wind may be likewiſe meaſured with this inſtrument, by filling it until the water runs out at the hole G. For if we then hold it up to the wind as before, a quantity of water will be blown out; and if both legs of the inſtrument are of the ſame bore, the height of the column ſuſtained will be equal to double the column of water in either leg, or the ſum of what is wanting in both legs. But if the legs are of unequal bores, neither of theſe will give the true height of the column of water which the wind ſuſtained. But the true height may be obtained by the following formulæ.

Suppoſe that after a gale of wind which had blown the water from A to B (fig. 3.) forcing it at the ſame time through the other tube out at E, the ſurface of the water ſhould be found ſtanding at ſome level D G, and it were required to know what was the height of the column E F or A B, which the wind ſuſtained. In order to obtain this, it is only neceſſary to find the height of the columns D B or G F, which are conſtantly equal to one another; for either of theſe added to one of the equal columns A D, E G, will give the true height of the column of water which the wind ſuſtained.

1. Let the diameters A C, E H, of the tubes, be reſpectively repreſented by $c\,d$; and let a=A D, or E G, and x=D B, or G F: Then it is evident that the column D B, is to the column E G, as c^2x to d^2a. But theſe columns are equal. Therefore $c^2x=d^2a$; and conſequently, $x=\frac{d^2a.}{c^2}$

2. But if at any inſtant of time whilſt the wind was blowing, it was obſerved, that, when the water ſtood at E, the top of the tube out of which it is forced, it was depreſſed in the other to ſome given level B F, the altitude at which it would have ſtood in each had it immediately ſubſided, may be found in the following manner.—Let b=A B or E F. Then it is evident that the column D B, is equal to the difference of columns E F, G F. But the difference of theſe columns is as d^2b-d^2x; and conſequently $x=\frac{d^2b}{c^2+d^2}$.

For the caſes when the wind blows in at the narrow leg of the inſtrument: Let AB=EF=b, EG, or AD=a, GF=DB=x, and the diameters E H, G A, reſpectively =d, c, as before. Then it is evident, that the column A D, is to the column G F as ac^2 to d^2x. But theſe columns are equal; therefore $d^2x=ac^2$; and conſequently $x=\frac{ac^2}{d^2}$. It is alſo evident, that the column A D is equal to the difference of the columns A B, D B; but the difference of theſe columns is as bc^2-c^2x. Therefore $d^2x=bc^2-c^2x$. Whence we get $x=\frac{bc^2}{d^2+c^2}$.

The uſe of the ſmall tube of communication *ab* (fig. 1.), is to check the undulation of the water, ſo that the height of it may be read off from the ſcale with eaſe and certainty. But it is particularly deſigned to prevent the water from being thrown up to a much greater or leſs altitude, than the true height of the column which the wind is able at that time to ſuſtain, from its receiving a ſudden impulſe whilſt it is vibrating either in its aſcent or deſcent.—As in ſome caſes the water in this inſtrument might be liable to freeze, and thus break the tubes, Dr Lind recommends a ſaturated ſolution of ſea-ſalt to be uſed inſtead of it, which does not freeze till Fahrenheit's thermometer falls to 0.

GAIETA, an ancient, handſome, and ſtrong town of Italy, in the kingdom of Naples, and in the Terra di Lavoro, with a fort, citadel, harbour, and biſhop's ſee. It was taken by the Auſtrians in 1707, and by the Spaniards in 1734. It is ſeated at the foot of a mountain near the ſea, in E. Long. 13. 37. N. Lat. 41. 30.

GAINSBOROUGH, a town of Lincolnſhire in England, ſeated on the river Trent near the ſea. It is a large well built town, with a pretty good trade, and has the title of an earldom. W. Long. 0. 40. N. Lat. 53. 26.

GALACTITES, in the hiſtory of foſſils, a ſubſtance much reſembling the morochthus or French chalk, in many reſpects; but different from it in colour. The ancients found it in the Nile, and in ſome rivers in Greece, and uſed it in medicine as an aſtringent, and for defluxions and ulcers of the eyes. At preſent it is common in Germany, Italy, and ſome parts of France, and is wholly overlooked, being eſteemed a worſe kind of morochthus. See Morochthus.

GALANGALS, in the materia medica. See Kæmpferia.

GALANTHUS, the Snow-drop; a genus of the monogynia order, belonging to the hexandria claſs of plants. There is but one ſpecies, viz. the nivalis; which is a bulbous-rooted flowery perennial, riſing but a few inches in height, and adorned at top with ſmall tripetalous flowers of a white colour. There are three varieties, viz. the common ſingle flowered ſnow-drop, the ſemi-double ſnow-drop, and the double ſnow-drop. They are beautiful little plants; and are much valued on account of their early appearance, often adorning the gardens in January or February, when ſcarce any other flower is to be ſeen. They frequently burſt forth when the ground is covered with ſnow, and continue very often till the beginning of March, making a very ornamental appearance, eſpecially when diſpoſed in cluſters towards the fronts of the borders, &c. The ſingle kind comes firſt into bloom, then the ſemidouble, and after that the double. They will ſucceed any where, and multiply exceedingly by off-ſets from the roots.

GALATA, a great ſuburb belonging to Conſtantinople, oppoſite to the ſeraglio, on the other ſide of the harbour. It is here the Greeks, Armenians, Franks, Chriſtians, and Jews inhabit, and are allowed the exerciſe of their reſpective worſhips.

GALATEA, in fabulous hiſtory, a nymph and marine deity, the daughter of Nereus and Doris. She was beloved by Polyphemus, whom ſhe deſpiſed for the ſhepherd Acis; at which that Cyclops was ſo enraged, that he cruſhed Acis to pieces with a rock. See Acis.

GALATIA, the ancient name of a province of Aſia Minor, now called *Amaſia*. It was bounded on the eaſt by Cappadocia, on the weſt by Bithynia, on the ſouth by Pamphylia, and on the north by the Euxine Sea. It was reduced under the ſubjection of the Romans in the time of Auguſtus, and is now in the hands of the Turks. Here St. Paul founded a church, to which he directed that epiſtle which is ſtill known by the name of the *Epiſtle to the Galatians*, and was written to reclaim them from the obſervation of Jewiſh ordinances, into which they had been ſeduced by ſome falſe teachers.

GALAXY, in aſtronomy, that long, white, luminous track, which ſeems to encompaſs the heavens like a ſwath, ſcarf, or girdle: and which is eaſily perceivable in a clear night, eſpecially when the moon does not appear. The Greeks call it Γαλαξιας, *Galaxy*, of Γαλα, γαλακτος, *Milk*; on account of its colour and appearance: the Latins, for the ſame reaſons, call it *via lactea*; and we, the *milky way*. It paſſes between Sagittary and Gemini, and divides the ſphere into two parts; it is unequally broad; and in ſome parts is ſingle, in others double.

The ancient poets, and even philoſophers, ſpeak of the *Galaxy*, as the road, or way, by which the heroes went to heaven.

Ariſtotle makes it a kind of meteor, formed of a crowd of vapours, drawn into that part by certain large ſtars diſpoſed in the region of the heavens anſwering hereto.

Others, finding that the *Galaxy* was ſeen all over the globe, that it always correſponded to the ſame fixed ſtars, and that it tranſcended the height of the higheſt planets, ſet aſide Ariſtotle's opinion, and placed the *Galaxy* in the firmament, or region of the fixed ſtars, and concluded it to be nothing but an aſſemblage of an infinite number of minute ſtars.

Since the invention of the teleſcope, this opinion has been abundantly confirmed. By directing a good teleſcope to any part of the milky way; where, before, we only ſaw a confuſed whiteneſs, we now deſcry an innumerable multitude of little ſtars, ſo remote, that a naked eye confounds them. See Astronomy, n° 28.

GALBANUM, in pharmacy, a gum iſſuing from the ſtem of an umbelliferous plant growing in Perſia and many parts of Africa.

It is ſometimes met with in the ſhops, in looſe granules, called *drops* or *tears*; and ſometimes in large maſſes, formed of a number of theſe blended together; but in theſe maſſes ſome accidental foulneſs is often mixed with the gum. The ſingle drops uſually approach to a roundiſh, oblong, pear-like form. Galbanum is ſoft like wax, and, when freſh drawn, white; but it afterwards becomes yellowiſh or reddiſh: it is of a ſtrong ſmell, of an acrid and bitteriſh taſte; it is inflammable in the manner of a reſin, and ſoluble in water like a gum.

In medical virtue, and ſenſible qualities, it reſembles the gum ammoniacum; but is leſs efficacious than it in aſthmas, though more efficacious in hyſteric diſorders. When aſſa fetida is too ſtrong, galbanum may be tried; and, if it diſagrees, give ammoniacum.

A mixture of ſpirit of wine two parts, with one part water, diſſolves all but the impurities, which are commonly in conſiderable quantities.

Great part of the virtue of galbanum conſiſts in its eſſential oil, and is carried up in diſtillation either with water or with ſpirit, whence great care is required in purifying it. For making of plaſters, and ſuch like inferior purpoſes, the beſt method is to expoſe it in winter to a ſharp froſt, and whilſt it is brittle to powder it; thus the impurities may in ſome meaſure be ſeparated in the ſearce: for internal uſes, it is beſt managed by including it in a bladder, and keeping it in hot water, until it is ſoft enough to be ſtrained by preſſure through an hempen cloth.

Beſides the eſſential oil yielded by diſtillation with water, an empyreumatic oil is obtained by diſtilling in a retort without mixture. This empyreumatic oil is of a fine blue colour, but changes in the air to a purple.

GALE, in the ſea language, a term of various import. When the wind blows not ſo hard but that a ſhip may carry her top-ſails a-trip, (that is, hoiſted up to to the higheſt) then they ſay it is a loom-gale. When it blows very ſtrong, they ſay it is a ſtiff, ſtrong, or freſh gale. When two ſhips are near one another at ſea, and there being but little wind blowing, one of them finds more of it than the other, they ſay that the one ſhip gales away from the other.

Gale (Dr John), an eminent and learned miniſter among the Baptiſts, was born at London in 1680. He ſtudied at Leyden, where he diſtinguiſhed himſelf very early, and afterwards at Amſterdam, under Dr Limborch. He was choſen miniſter of the Baptiſt congregation at Barbican; where his preaching, being chiefly practical, was greatly reſorted to by people of all perſuaſions. Four volumes of his ſermons were publiſhed after his death, which happened in 1721. His *Reflections on Dr Wall's Hiſtory of Infant-baptiſm*, is the beſt defence of the Baptiſts ever publiſhed, and the reading of that performance induced the learned Mr William Whiſton and Dr Foſter to become Baptiſts.

Gale (Theophilus), an eminent nonconformiſt miniſter, born in 1628. He was invited to Wincheſter in 1657; and continued a ſtated preacher there, until the re-eſtabliſhment of the church by Charles II. when he rather choſe to ſuffer the penalties of the act of conformity, than ſubmit to it contrary to his conſcience. He was afterwards engaged by Philip lord Wharton as tutor to his ſons, whom he attended to an academy at Caen in Normandy; and when this duty was fulfilled, he became paſtor over a congregation of private conventiclers in Holborn. He died in 1678; and is principally known by an elaborate work, entitled, the *Court of the Gentiles*, calculated to ſhew, that the Pagan philoſophers derived their moſt ſublime ſentiments from the Scriptures.

Gale (Dr Thomas), a learned divine, born at Scruton in Yorkſhire, in the year 1636, was educated at Cambridge, and at length became profeſſor of the Greek language in that univerſity. He was afterwards choſen head maſter of St Paul's ſchool, London; and was employed by the city in writing thoſe elegant inſcriptions on the monument erected in memory of the conflagration in 1666. In 1676 he was collated to a prebend in the cathedral of St Paul's; and was likewiſe elected a fellow of the Royal Society, to which he preſented a Roman urn with its aſhes. About the year 1697, he gave to the new library of Trinity college, in Cambridge, a great number of Arabic manuſcripts; and in 1697, was admitted dean of York. He died in that city, in 1702; and was interred in the cathedral, where a monument, with a Latin inſcription, was erected to his memory. He was a learned divine, a great hiſtorian, one of the beſt Greek ſcholars of his age, and maintained a correſpondence with the moſt learned men abroad as well as at home. He publiſhed, 1. *Hiſtoriæ Poeticæ Antiqui Scriptores*, octavo. 2. *Opuſcula Mythologica, Ethica, & Phyſica*, in Greek and Latin, octavo. 3. *Herodoti Hiſtoria*, folio. 4. *Hiſtoricæ Anglicanæ Scriptores quinque*, in folio. *Hiſtoriæ Britannicæ, Saxonicæ, Anglo-Danicæ, Scriptores quindecim*, in folio. 6. *Rhetores Selecti*, &c.

GALEASSE, a large low-built veſſel, uſing both ſails and oars, and the biggeſt of all the veſſels that make uſe of the latter. It may carry twenty guns, and has a ſtern capable of lodging a great number of marines. It has three maſts, which are never to be lowered or taken down. It has alſo thirty-two benches of rowers; and to each bench ſix or ſeven ſlaves, who ſit under cover. This veſſel is at preſent uſed only by the Venetians.

GALEN (Claudius), in Latin, *Galenus*, prince of the Greek phyſicians, after Hippocrates, was born at Pergamus in the Leſſer Aſia, about the year 131. His father was poſſeſſed of a conſiderable fortune; was well verſed in polite literature, philoſophy, aſtronomy, and geometry; and was alſo well ſkilled in architecture. He himſelf inſtructed his ſon in the firſt rudiments of learning, and afterwards procured him the greateſt maſters of the age in philoſophy and eloquence. Galen having finiſhed his ſtudies under their care, choſe phyſic for his profeſſion, and chiefly ſtudied the works of Hippocrates. Having at length exhauſted all the ſources of literature that were to be found at home, he reſolved to travel, in order to converſe with the moſt able phyſicians in all parts, intending at the ſame time to take every opportunity of inſpecting on the ſpot the plants and drugs of the countries through which he paſſed. With this view he went to Alexandria, and ſtaid ſome years in that metropolis of Egypt: from thence he travelled through Cilicia; paſſed through Paleſtine; viſited the iſles of Crete and Cyprus; and made two voyages to Lemnos, in order to examine the Lemnian earth, which was then eſteemed an admirable medicine. With the ſame view he went into the Lower Tyria, in order to obtain a thorough inſight into the nature of the opobalſamum, or balm of Gilead; and having completed his deſign, returned home by the way of Alexandria.

Galen had been four years at Pergamus, where his practice was attended with extraordinary applauſe, when ſome ſeditious commotions induced him to go to Rome, where he reſolved to ſettle: but the proofs he gave of his ſuperior ſkill, added to the reſpect ſhewn him by ſeveral perſons of very high rank, created him ſo many enemies among his brethren of the faculty, that he was obliged to quit the city, after having reſided there four or five years. But he had not long returned to Pergamus, when he was recalled by the emperors Aurelius and Verus. After their death, he retired to his native country; where he died, about the year 200. He wrote in Greek; and is ſaid to have compoſed two hundred volumes, which were unhappily burnt in the temple of Peace. The beſt editions of thoſe that remain, are, that printed at Baſil, in 1538, in five volumes, and that of Venice, in 1625, in ſeven volumes. Galen was of a weak and delicate conſtitution, as he himſelf aſſerts: but he nevertheleſs, by his temperance and ſkill in phyſic, arrived to a great age; for it was his maxim, always to riſe from table with ſome degree of appetite. He is juſtly conſidered as the greateſt phyſician of antiquity, next to Hippocrates; and he performed ſuch ſurpriſing cures, that he was accuſed of magic.

GALENIC, or **GALENICAL**, in pharmacy; a manner of treating diſeaſes, founded on the principles of Galen.

The diſtinction of *galenical* and *chemical*, was occaſioned by a diviſion of the practitioners of medicine into two ſects, which happened on the introduction of chemiſtry into medicine. Then the chemiſts, arrogating to themſelves every kind of merit and ability, ſtirred up an oppoſition to their pretenſions, founded on the invariable adherence of the other party to the ancient practice. And though this diviſion into the two ſects of galeniſts and chemiſts has long ceaſed, yet the diſtinction of medicines, which reſulted from it, is ſtill retained.

Galenical medicines are thoſe which are formed by the eaſier preparations of herbs, roots, *&c.* by infuſion, decoction, *&c.* and by combining and multiplying ingredients; while thoſe of chemiſtry draw their more intimate and remote virtues by means of fire and elaborate preparations, as calcination, digeſtion, fermentation, *&c.*

GALEON. See GALLION.

GALICIA, a province of Spain, bounded on the north and weſt by the ocean, on the ſouth by Portugal, and on the eaſt by Aſturias and the kingdom of Leon. The air is temperate along the coaſt; but, in other places, it is cold and moiſt. It is but thin of people, and the produce is wine, flax, and citrons; here alſo are good paſtures, copper, and lead; the foreſts yield wood for building of ſhips. St. Jago di Compoſtella is the capital town.

GALILEE, once a province of Judea, now of Turky in Aſia, was bounded by mount Lebanon on the north, by the river Jordan and the ſea of Galilee on the eaſt, by the Chiſon on the ſouth, and by the Mediterranean on the weſt. It was the ſcene of many of our Saviour's miracles; but the bounds of the country are not now well known, nor yet the places where many of the towns ſtood.

GALILEANS, a ſect of the Jews. Their founder was one Judas, a native of Galilee, from which place they derived their name. Their chief, eſteeming it an indignity for the Jews to pay tribute to ſtrangers, raiſed up his countrymen againſt the edict of the emperor Auguſtus, which had ordered a taxation or enrolment of all the ſubjects of the Roman empire.

They pretended that God alone ſhould be owned as Maſter and Lord, and in other reſpects were of the opinion of the Phariſees; but, as they judged it unlawful to pray for infidel princes, they ſeparated themſelves from the reſt of the Jews, and performed their ſacrifices apart.

GALILEO (Galilei), the famous mathematician and aſtronomer, was the ſon of a Florentine nobleman, and born in the year 1564. He had from his infancy a ſtrong inclination to philoſophy and the mathematics; and made prodigious progreſs in theſe ſciences. In 1592, he was choſen profeſſor of mathematics at Padua; and during his abode there he *invented*, it is ſaid, the teleſcope; or, according to others, improved that inſtrument, ſo as to make it fit for aſtronomical obſervations: (See ASTRONOMY, p. 749, col. 1.) In 1611, Coſmo II. grand duke of Tuſcany ſent for him to Piſa, where he made him profeſſor of mathematics, with a handſome ſalary; and ſoon after inviting him to Florence, gave him the office and title of *principal philoſopher and mathematician to his highneſs.*

He had been but a few years at Florence, before he was convinced by ſad experience, that Ariſtotle's doctrine, however ill-grounded, was held too ſacred to be called in queſtion. Having obſerved ſome ſolar ſpots in 1612, he printed that diſcovery the following year at Rome; in which, and in ſome other pieces, he ventured to aſſert the truth of the Copernican ſyſtem, and brought ſeveral new arguments to confirm it. For theſe he was cited before the inquiſition; and, after ſome months impriſonment, was releaſed upon a ſimple promiſe, that he would renounce his heretical opinions, and not defend them by word or writing. But having afterwards, in 1632, publiſhed at Florence his "Dialogues of the two greateſt ſyſtems of the world, the Ptolemaic and Copernican," he was again cited before the inquiſition, and committed to the priſon of that eccleſiaſtical court at Rome. In June 32d N. S. that year, the congregation convened; and in his preſence pronounced ſentence againſt him and his books, obliging him to abjure his errors in the moſt ſolemn manner; committed him to the priſon of their office during pleaſure; and enjoined him, as a ſaving penance, for three years to come and repeat once a-week the ſeven penitential pſalms: reſerving to themſelves, however, the power of moderating, changing, or taking away altogether or in part, the abovementioned puniſhment and penance. On this ſentence, he was detained a priſoner till 1634; and his "Dialogues of the ſyſtem of the world" were burnt at Rome.

He lived ten years after this, ſeven of which were employed in making ſtill further diſcoveries with his teleſcope. But by the continual application to that inſtrument, added to the damage he received in his ſight from the nocturnal air, his eyes grew gradually weaker, till he became totally blind in 1639. He bore this calamity with patience and reſignation, worthy of a great philoſopher. The loſs neither broke his ſpirit, nor hindered the courſe of his ſtudies. He ſupplied the defect by conſtant meditation; whereby he prepared a large quantity of materials, and began to dictate his own conceptions; when, by a diſtemper of three months continuance, waſting away by degrees, he expired at Arcetti near Florence, in January 1642, N. S. in the 78th year of his age.

Among various uſeful inventions of which Galileo was the author, is that of the ſimple pendulum, which he had made uſe of in his aſtronomical experiments. He had thoughts of applying it to clocks; but did not execute it: the glory of that invention was reſerved for Vicenzio his ſon, who made the experiment at Venice in 1649; and M. Huygen's afterwards carried this invention to perfection.—He wrote a great number of treatiſes, ſeveral of which were publiſhed in a collection by Signor Mendeſſi, under the title of *L'opera di Galileo Galilei Lynceo*. Some of theſe, with others of his pieces, were tranſlated into Engliſh and publiſhed by Thomas Saliſbury, Eſq; in his mathematitical collections, &c. in two volumes folio. A volume alſo of his letters to ſeveral learned men, and ſolutions of ſeveral problems, were printed at Bologna in quarto. Beſides theſe, he wrote many others, which were unfortunately loſt through his wife's devotion; who, ſolicited by her confeſſor, gave him leave to peruſe her huſband's manuſcripts, of which he tore and took away as many as he ſaid were not fit to be publiſhed.

GALL, in the animal œconomy. See BILE.

A great number of experiments have been made upon the gall of different animals, but few concluſions can be drawn from them with any certainty. Dr Percival, however, hath ſhewn, that putrid bile may be perfectly corrected and ſweetened by an admixture of the vegetable acids, vinegar and juice of lemons. Theſe, he obſerves, have this effect much more completely than the mineral ones: and hence, he thinks, ariſes the great uſefulneſs of the vegetable acids in autumnal diſeaſes; which are always attended with a putreſcent diſpoſition of the bile, owing to the heat of the preceding ſummer. On this occaſion he takes notice of a common miſtake among phyſicians, who frequently preſcribe elixir of vitriol in thoſe diſeaſes, where vinegar or lemon juice would be much more effectual.

From this effect of acids on the gall, he alſo thinks, we may ſee why the immoderate uſe of acids is ſo pernicious to digeſtion. It is neceſſary to health that the gall ſhould be in ſome degree acrid and alkaleſcent: but as acids have the property of rendering it perfectly mild and ſweet, they muſt be proportionably pernicious to the due concoction and aſſimilation of the food; which without an acrid bile cannot be accompliſhed. Hence the body is deprived of its proper nouriſhment and ſupport, the blood becomes vapid and watery, and a fatal cachexy unavoidably enſues. This hath been the caſe with many unfortunate perſons, who, in order to reduce their exceſſive corpulency, have indulged themſelves in the too free uſe of vinegar. From the mild ſtate of the gall in young children, Dr Percival alſo thinks it is, that they are ſo much troubled with acidities.

GALL-*Bladder*. See ANATOMY, n° 358.

GALL, in natural hiſtory, denotes any protuberance or tumour produced by the puncture of inſects on plants and trees of different kinds.

Theſe galls are of various forms and ſizes, and no leſs different with regard to their internal ſtructure. Some have only one cavity, and others a number of ſmall cells communicating with each other. Some of them are as hard as the wood of the tree they grow on, whilſt others are ſoft and ſpongy; the firſt being termed *gall-nuts*, and the latter *berry-galls* or *apple-galls*.

The general hiſtory of the gall is this. An inſect of the fly kind is inſtructed by nature to take care for the ſafety of her young, by lodging her eggs in a woody ſubſtance, where they will be defended from all injuries: ſhe for this purpoſe wounds the leaves or tender branches of a tree; and the lacerated veſſels, diſcharging their contents, ſoon form tumours about the holes thus made. The external coat of this excreſcence is dried by the air; and grows into a figure which bears ſome reſemblance to the bow of an arch, or the roundneſs of a kernel. This little ball receives its nutriment, growth, and vegetation, as the other parts of the tree, by ſlow degrees, and is what we call the *gall-nut*. The worm that is hatched under this ſpacious vault, finds in the ſubſtance of the ball, which is as yet very tender, a ſubſiſtence ſuitable to its nature; gnaws and digeſts it till the time comes for its transformation to a nymph, and from that ſtate of exiſtence changes into a fly. After this, the inſect, perceiving itſelf duly provided with all things requiſite, diſengages itſelf ſoon from its confinement, and takes its flight into the open air. The caſe, however, is not ſimilar with reſpect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its incloſure. The nut falls with the leaves: and although you may imagine that the fly which lies within is loſt, yet in reality it is not ſo; on the contrary, its being covered up ſo cloſe, is the means of its preſervation. Thus it ſpends the winter in a warm houſe, where every crack and cranny of the nut is well ſtopped up; and lies buried as it were under a heap of leaves, which preſerves it from the injuries of the weather. This apartment, however, though ſo commodious a retreat in the winter, is a perfect priſon in the ſpring. The fly, rouſed out of its lethargy by the firſt heats, breaks its way through, and ranges where it pleaſes. A very ſmall aperture is ſufficient, ſince at this time the fly is but a diminutive creature. Beſides, the ringlets whereof its body is compoſed, dilate and become pliant in the paſſage.

Oak-galls put, in a very ſmall quantity, into a ſolution of vitriol in water, though but a very weak one, give it a purple or violet colour: which, as it grows ſtronger, becomes black; and on this property depends the art of making our writing-ink, as alſo the arts of dying and dreſſing leather, and other manufactures. See INK.

GALLS are very ſtrong aſtringents, and give out their aſtringent virtue very readily both to water and ſpirit. From two ounces of galls, 14 drachms of aſtringent extract were obtained by water, and between 12 and 13 with ſpirit. In medicine they are rarely uſed.

GALL (St), a conſiderable town in Swiſſerland, and in the Upper Thurgow, with a rich and celebrated abbey, whoſe abbot is a prince of the empire. This place has for ſome time been a republic, in alliance with the Cantons. It is not very large; but is well built, neat, populous. It contains about 10,000 inhabitants, who are chiefly employed in the linen manufacture; and make annually, it is ſaid, 40,000 pieces of linen, of 200 ells each; which renders it one of the richeſt towns in Swiſſerland. The inhabitants are Proteſtants; for which reaſon there are often great conteſts between them and the abbey, about religious affairs. It is ſeated in a narrow barren valley, between two mountains, and upon two ſmall ſtreams. E. Long. 29. 5. N. Lat. 47. 38.

GALLAND (Athony), a learned antiquarian, member of the Academy of Inſcriptions, and profeſſor of Arabic in the Royal College of Paris, was born of poor parents at Rollo, a village in Picardy. Having ſtudied at the Sorbonne and other univerſities, he travelled into the eaſt; where he acquired great ſkill in the Arabic tongue, and in the manners of the Mahometans. He wrote ſeveral works; the principal of which are, 1. An account of the death of Sultan Oſman,

man, and the coronation of the ſultan Muſtapha. 2. A collection of maxims, drawn from the works of the Orientals. 3. A treatiſe on the origin of coffee. 4. The Arabian nights entertainments, &c.

GALLANT, or Galant, a French term adopted into our language, and ſignifying polite, civil, and well-bred, with a diſpoſition to pleaſe, particularly the ladies. It alſo ſignifies brave or courageous.

GALLERY, in architecture, a covered place in a houſe, much longer than broad, and uſually in the wings of a building; its uſe being chiefly to walk in.

GALLERIES, in gardening, are certain ornaments made with trees of different kinds; which are very common in all the French gardens, but are ſeldom introduced into the Britiſh ones, eſpecially ſince the taſte for clipped trees has been exploded. For thoſe, however, who may ſtill chooſe to have them, Mr Miller gives the following directions.

In order to make a gallery in a garden with porticoes and arches, a line muſt firſt be drawn of the length you deſign the gallery to be; which being done, it is to be planted with hornbeam, as the foundation of the gallery. The management of galleries is not difficult. They require only to be digged round about; and ſheared a little when there is occaſion. The chief curioſity required is in the ordering the forepart of the gallery, and in forming the arches. Each pillar of the porticoes or arches ought to be four feet diſtant from another, and the gallery 12 feet high and 10 feet wide, that there may be room for two or three perſons to walk abreaſt. When the hornbeams are grown to the height of three feet, the diſtance of the pillars well regulated, and the ground-work of the gallery finiſhed, the next thing to be done is to form the frontiſpiece; to perform which, you muſt ſtop the hornbeam between two pillars for that purpoſe, which forms the arch. As it grows, you muſt with your ſheers cut off thoſe boughs which outſhoot the others. In time they will grow ſtrong, and may be kept in form by the ſheers. Portico-galleries may be covered with lime-trees.

Gallery, in fortification, a covered walk a-croſs the ditch of a town, made of ſtrong beams, covered over with planks, and loaded with earth: ſometimes it is covered with raw hides, to defend it from the artificial fires of the beſieged.

Gallery *of a Mine*, is a narrow paſſage or branch of a mine carried on under ground to a work deſigned to be blown up. See Mine.

Gallery, in a ſhip, that beautiful frame, which is made in the form of a balcony, at the ſtern of a ſhip without board; into which there is a paſſage out of the admiral's or captain's cabbin, and is for the ornament of the ſhip.

GALLEY, a kind of low flat-built veſſel, furniſhed with one deck, and navigated with ſails and oars, particularly in the Mediterranean. By the Greek authors under the eaſtern empire, this kind of veſſel was called γωλαια and γπλεια; and by the Latin authors of the ſame time, *galea*; whence, according to ſome, the modern denomination. Some ſay it was called *galea*, on account of a caſk or helmet which it carried on its prow, as Ovid atteſts, *de Triſtib.* The French call it *galere;* by reaſon, they ſay, that the top of the maſts is uſually cut in the form of a hat, which the Italians call *galero.* Others derive both *galea*, and *galere*, from a fiſh by the Greeks called γαλιωτης, or ξιφιας, and by us the *ſword-fiſh*, which this veſſel reſembles. Laſtly, others derive the *galley*, *galea*, *galere*, *galeaſſe*, &c. from the Syriac and Chaldee *gaul*, and *gallin*, a man expoſed on the water in a veſſel of wood.

The largeſt ſort of theſe veſſels is employed only by the Venetians. They are commonly 162 feet long above, and 133 feet by the keel; 32 feet wide, with 23 feet length of ſtern-poſt. They are furniſhed with three maſts, and 32 banks of oars; every bank containing two oars, and every oar being managed by ſix or ſeven ſlaves, who are uſually chained thereto. In the fore part they have three little batteries of cannon, of which the loweſt is of two 36 pounders, the ſecond of two 24 pounders, and the uppermoſt of two 2 pounders: three 18 pounders are alſo planted on each quarter. The complement of men for one of theſe galleys is 1000 or 1200. They are eſteemed extremely convenient for bombarding or making a deſcent upon an enemy's coaſt, as drawing but little water; and having by their oars frequently the advantage of a ſhip of war, in light winds or calms, by cannonading the latter near the ſurface of the water; by ſcouring her whole length with their ſhot, and at the ſame time keeping on her quarter or bow, ſo as to be out of the direction of her cannon.

The galleys next in ſize to theſe, which are alſo called *half-galleys*, are from 120 to 130 feet long, 18 feet broad, and 9 or 10 feet deep. They have two maſts, which may be ſtruck at pleaſure; and are furniſhed with two large lateen ſails, and five pieces of cannon. They have commonly 25 banks of oars, as deſcribed above. A ſize ſtill leſs than theſe are called *quarter-galleys*, carrying from 12 to 16 banks of oars. There are very few galleys now beſides theſe in the Mediterranean, which are found by experience to be of little utility except in fine weather; a circumſtance which renders their ſervice extremely precarious. They generally keep cloſe under the ſhore, but ſometimes venture out to ſea to perform a ſummer cruiſe.

Galley-*Worm*, in zoology, an inſect known by moſt writers under the name of *Iülus*. It is a land-inſect, with a long body, compoſed of a great number of rings, and furniſhed with many feet. It is found very frequently in gardens; and, when touched, has the power of rolling itſelf up into a ball. This animal is very common among us, and is by ſome referred to the ſcolopendræ, but improperly: for though they agree in the great number of legs, ours is a harmleſs animal; whereas the ſcolopendræ are miſchievous creatures, armed with dangerous forceps. It is ſuppoſed by Liſter, that this ſort of animal, common with us, would on diſtillation yield the ſame ſort of animal-acid that is procured from the ant. The reaſon of the conjecture is, that the ant and this creature agree in emitting a ſharp and pungent ſmell on being bruiſed; but theſe are not eaſily procured in ſufficient plenty to make the experiment, as they are not gregarious like the ants.

GALLI, in antiquity, the prieſts of the goddeſs Cybele. They were eunuchs; and took their name from Gallus, a river in Phrygia.

When a youth was to be initiated into this order, the cuſtom was to throw off his cloaths, to run crying aloud into the midſt of the troop, and then drawing a ſword to caſtrate himſelf: after this, he ran about the ſtreets, carrying in his hands the marks of his mutilation; which he was to throw into a houſe, and in that houſe to put on a woman's dreſs.

GALLICAN, any thing belonging to France: thus the term *Gallican church* denotes the church of France, or the aſſembly of the clergy of that kingdom.

GALLICISM, a mode of ſpeech peculiar to the French language, and contrary to the rules of grammar in other languages.

GALLINÆ, in ornithology, an order of birds. See Zoology.

GALLINACIOUS, an appellation given to the birds of the order of the gallinæ.

GALLING, or **Excoriation**, in medicine. See Excoriation.

Galling *of a Horſe's back;* a diſorder occaſioned by heat, and the chafing or pinching of the ſaddle.

In order to prevent it, ſome take a hind's ſkin well garniſhed with hair, and fit it neatly under the pannel of the ſaddle, ſo that the hairy ſide may be next the horſe.

When a horſe's back is galled upon a journey, take out a little of the ſtuffing of the pannel over the ſwelling, and ſew a piece of ſoft white leather on the inſide of the pannel: anoint the part with ſalt butter, and every evening wipe it clean, rubbing it till it grow ſoft, anointing it again with butter, or, for want of that, with greaſe: waſh the ſwelling, or hurt, every evening with cold water and ſoap; and ſtrew it with ſalt, which ſhould be left on till the horſe be ſaddled in the morning.

GALLION, or **Galleon**, in naval affairs, a ſort of ſhips employed in the commerce of the Weſt Indies. The Spaniards ſend annually two fleets; the one for Mexico, which they call the *flota;* and the other for Peru, which they call the *gallions* See Flota.

By a general regulation made in Spain, it has been eſtabliſhed, that there ſhould be twelve men of war, and five tenders, annually fitted out for the armada or galleons; eight ſhips of ſix hundred tons burden each, and three tenders, one of an hundred tons, for the iſland Margarita, and two of eighty each, to follow the armada; for the New Spain fleet, two ſhips of ſix hundred tons each, and two tenders of eighty each; and for the Honduras fleet, two ſhips of five hundred tons each: and, in caſe no fleet happened to ſail any year, three gallions and a tender ſhould be ſent to New Spain for the plate.

They are appointed to ſail from Cadiz in January, that they may arrive at Porto-Bello about the middle of April; where, the fair being over, they may take aboard the plate, and be at Havannah with it about the middle of June; where they are joined by the flota, that they may return to Spain with the greater ſafety.

GALLIOT, a ſmall galley deſigned only for chace, carrying but one maſt and two pattereroes; it can both ſail and row, and has 16 or 20 oars. All the ſeamen on board are ſoldiers, and each has a muſket by him on quitting his oar.

GALLIPOLI, a ſea-port town of Italy, in the kingdom of Naples, and in the Terra-di-Otranto, with a biſhop's ſee, a fort, and a harbour. It is ſeated on a rock, ſurrounded by the ſea, and which is joined to the firm land by a bridge. E. Long. 18. 10. N. Lat. 40. 20.

Gallipoli, a ſea-port town of Turky in Europe, in the province of Romania, ſeated at the mouth of the ſea of Marmora, with a good harbour, and a biſhop's ſee. It contains about 10,000 Turks, 3500 Greeks, beſides a great number of Jews. The bazar, or bezeſtein, the place where merchandizes are ſold, is a handſome ſtructure, with domes covered with lead. It is an open place, and has no other defence than a paltry ſquare caſtle. The houſes of the Greeks and Jews have doors not above three feet and a half high, to prevent the Turks riding into their houſes. E. Long. 26. 59. N. Lat. 40. 30.

GALLIUM, lady's bed-straw; a genus of the monogynia order, belonging to the tetrandria claſs of plants. There are a great many ſpecies, of which the moſt remarkable is the verum, or yellow lady's bed-ſtraw. It grows commonly in dry ground, and on road-ſides. The flowers will coagulate boiling milk; and the beſt Cheſhire cheeſe is ſaid to be prepared with them. The French preſcribe them in hyſteric and epileptic caſes. Boiled in alum-water, they tinge wool yellow. The roots dye a red not inferior to madder; for which purpoſe they are uſed in the iſland of Jura.—In the Edinburgh medical commentaries we have accounts of ſome violent ſcorbutic complaints being cured by the juice of this plant.—Sheep and goats eat the plant; horſes and ſwine refuſe it; cows are not fond of it.

GALLO, an iſland of the South Sea, near the ſea-coaſt of Peru, in South America, which was the firſt place poſſeſſed by the Spaniards when they attempted the conqueſt of Peru; it is alſo the place where the bucaneers uſed to come for wood and water, and to refit their veſſels, when they were in theſe parts. W. Long. 50. 0. N. Lat. 2. 30.

GALLOIS (John), born at Paris in 1632, was an univerſal ſcholar; but chiefly noted for having been, in conjunction with M. de Sallo who formed the plan, the firſt publiſher of the *Journal des Sçavans*. The firſt journal was publiſhed January 5th 1665; but theſe gentlemen criticiſed new works ſo rigorouſly, that the whole tribe of authors united and cried it down. De Sallo declined entirely after the publication of the third number: but Gallois ventured to ſend out a fourth, on January 4th 1666; though not without a moſt humble advertiſement at the beginning, wherein it was declared, that the author "would not preſume to criticiſe, but ſimply give an account of the books." This, with the protection of Mr Colbert, who was greatly taken with the work, gradually reconciled the public to it: and thus began literary journals, which have been continued from that time to this, under various titles, and by various writers. Gallois continued his journal to the year 1674, when more important occupations obliged him to turn it over to other hands. M. Colbert had taken him into the houſe to teach him Latin; and when he loſt his patron in 1683, he was firſt made librarian to the king, and then Greek profeſſor in the royal college. He died in 1707.

GALLON, a meaſure of capacity both for dry and liquid things, containing four quarts. But theſe quarts, and conſequently the gallon itſelf, are different, according to the quality of the thing meaſured: For inſtance, the wine-gallon contains 231 cubic inches, and holds eight pounds averdupois of pure water; the beer and ale gallon contains 281 ſolid inches, and holds ten pounds three ounces and a quarter averdupois of water; and the gallon for corn, meal, &c. 272¼ cubic inches, and holds nine pounds thirteen ounces of pure water.

GALLOWAY, a county of Scotland, which gives the title of earl to a branch of the noble family of Stuart. It is divided into two diſtricts; the weſtern, called *Upper Galloway*, being the ſame with Wigtonſhire; and the eaſtern, or ſtewartry of Kirkudbright, called *Lower Galloway*. See KIRCUDBRIGHT and WIGTONSHIRE.

GALWAY, or GALLOWAY, a county of Ireland, which is 82 miles in length, and 42 in breadth, bounded by the counties of Clare, Tipperary, King's County, Roſcommon, and the ſea. The river Shannon waſhes the frontiers of the eaſt and ſouth-eaſt, and forms a lake ſeveral miles in length. There is another great lake, called *Corbis*, or *Carib*, which is near 20 miles long, and five broad. The county contains 15,420 houſes, 136 pariſhes, 17 baronies, and 13 boroughs; and ſends eight members to parliament. The capital town is of the ſame name.

GALWAY, a town of Ireland, in the county of the ſame name, and province of Connaught, of which it is the capital. It is ſurrounded with ſtrong walls, has large ſtraight ſtreets, and the houſes are generally well built with ſtone. It has a good trade into foreign parts, on account of its harbour, which is defended by a fort. It is ſeated on the bay of Galway on the weſtern ocean, 30 miles weſt of Athlone, and 100 weſt of Dublin. W. Long. 9. 10. N. Lat. 53. 12.

GALLOWS, an inſtrument of puniſhment, whereon perſons convicted capitally of felony, &c. are executed by hanging.

Among our anceſtors it was called *furca*, "fork;" a name by which it is ſtill denominated abroad, particularly in France and Italy. In this latter country, the reaſon of the name ſtill ſubſiſts; the gallows being a real fork drove into the ground, acroſs the legs whereof is laid a beam, to which the rope is tied. See FURCA.

GALLUS (Cornelius), an ancient Roman poet, born at Forum Julium, now called *Frejus*, in France. He was a particular favourite with Auguſtus Cæſar, who made him governor of Egypt: but his maladminiſtration there occaſioned his baniſhment, and the loſs of his eſtate; for grief of which he put an end to his own life. He wrote four books of love-elegies; and Virgil has complimented him in many places.

GALLUS, or *Cock*, in ornithology. See PHASIANUS.

GALLY, in printing, a frame into which the compoſitor empties the lines out of his compoſing-ſtick, and in which he ties up the page when it is completed.

The gally is formed of an oblong ſquare board, with a ledge on three ſides, and a groove to admit a falſe bottom called a *gally-ſlice*.

GAMA (Vaſco de), a Portugueſe admiral, celebrated for his diſcovery of the Eaſt Indies by the Cape of Good Hope, was born at Synes; and, in 1497, was ſent to the Indies by king Emanuel: he returned in 1502, and ſailed thither again with 13 veſſels richly laden. He was made viceroy of the Indies by king John III.; and died at Cochin, on the 24th of December 1525. Don Stephen and Don Chriſtopher de Gama, his ſons, were alſo viceroys of the Indies, and celebrated in hiſtory.

GAMBIA, a large river of Negroeland in Africa, generally ſuppoſed to be a branch of the Niger. See NILE, NIGER, and SENEGAL.

GAMBOGE, is a concreted vegetable juice, the produce of two trees, both called by the Indians *caraeapulli*, and is partly of a gummy and partly of a reſinous nature. It is brought to us either in form of orbicular maſſes, or of cylindrical rolls of various ſizes; and is of a denſe, compact, and firm texture, and of a beautiful yellow. It is chiefly brought to us from Cambaja, in the Eaſt Indies, called alſo *Cambodja*, and *Cambogia*; and from thence it has obtained its names of *cambadium*, *cambogium*, and *gambogium*.

As a pigment, it makes a beautiful yellow, which is much uſed by the painters. Dr Lewis ſays, that it makes a beautiful and durable citron-yellow ſtain upon marble, whether rubbed in ſubſtance on the hot ſtone, or applied, as dragon's-blood ſometimes is, in form of a ſpirituous tincture. When it is applied on cold marble, the ſtone is afterwards to be heated, to make the colour penetrate.

Gamboge is commonly called a *gum*, but improperly. It appears to be wholly reſinous or ſulphureous; ſince ſpirit of wine diſſolves it almoſt entirely, and water, though it ſeparates its parts and keeps them ſuſpended, yet does not diſſolve them at all, nor is by any means a ſolvent for it. It is alſo very inflammable, and melts with a very gentle heat. If mixed with an equal quantity of ſalt of tartar, it readily diſſolves in common water by a few hours digeſtion. This ſolution, if kept over the fire, ſoon becomes a ſort of ſmooth glue or jelly. This is ſometimes done with a view to correct the deleterious qualities of gamboge taken inwardly, in which caſe it occaſions violent vomitings and purgings. But the moſt effectual method of correcting this and other reſinous purgatives, is by triturating them well with three or four times their weight of white ſugar, by which means they are rendered ſoluble in water, and incapable of adhering to the villous coats of the inteſtines.

GAME, in general, ſignifies any diverſion, or ſport, that is performed with regularity, and reſtrained to certain rules. See GAMING.

Games are uſually diſtinguiſhed into thoſe of exerciſe and addreſs, and thoſe of hazard. To the firſt belong cheſs, tennis, billiards, &c. and to the latter thoſe performed with cards or dice, as back-gammon, ombre, picquet, whiſt, &c. See BACK-*Gammon*, &c.

GAMES, in antiquity, were public diverſions, exhibited on ſolemn occaſions. Such, among the Greeks, were the Olympic, Pythian, Iſthmian, Nemean, &c. games; and, among the Romans, the Apollinarian, Circenſian, Capitoline, &c. games. See OLYMPIC, PYTHIAN, &c.

GAME, in law, ſignifies birds, or prey, taken or killed by fowling or hunting.

The property of ſuch animals *feræ naturæ* as are known under the denomination of *game*, with the right of purſuing, taking, and deſtroying them, is veſted in the king alone, and from him derived to ſuch of his ſubjects as have received the grants of a chace, a park, or a free warren.

Blackſt. Comment. By the law of nature, indeed, every man, from the prince to the peaſant, has an equal right of purſuing, and taking to his own uſe, all ſuch creatures as are *feræ naturæ*, and therefore the property of nobody, but liable to be ſeiſed by the firſt occupant. But it follows from the very end and conſtitution of ſociety, that this natural right, as well as many others belonging to man as an individual, may be reſtrained by poſitive laws enacted for reaſons of ſtate, or for the ſuppoſed benefit of the community. This reſtriction may be either with reſpect to the *place* in which this right may, or may not, be exerciſed; with reſpect to the *animals* that are the ſubjects of this right; or with reſpect to the *perſons* allowed or forbidden to exerciſe it. And, in conſequence of this authority, we find that the municipal laws of many nations have exerted ſuch power of reſtraint; have in general forbidden the entering on another man's grounds, for any cauſe, without the owner's leave; have extended their protection to ſuch particular animals as are uſually the objects of purſuit; and have inveſted the prerogative of hunting and taking ſuch animals, in the ſovereign of the ſtate only, and ſuch as he ſhall authorize. Many reaſons have concurred for making theſe conſtitutions: as, 1. For the encouragement of agriculture and improvement of lands, by giving every man an excluſive dominion over his own ſoil. 2. For the preſervation of the ſeveral ſpecies of theſe animals, which would ſoon be extirpated by a general liberty. 3. For prevention of idleneſs and diſſipation in huſbandmen, artificers, and others of lower rank; which would be the unavoidable conſequence of univerſal licence. 4. For prevention of popular inſurrections and reſiſtance to the government, by diſarming the bulk of the people: which laſt is a reaſon oftener meant than avowed, by the makers of foreſt or game laws. Nor, certainly, in theſe prohibitions is there any *natural* injuſtice, as ſome have weakly enough ſuppoſed: ſince, as Puffendorf obſerves, the law does not hereby take from any man his preſent property, or what was already his own; but barely abridges him of one means of acquiring a future property, that of occupancy; which indeed the law of nature would allow him, but of which the laws of ſociety have in moſt inſtances very juſtly and reaſonably deprived him.

Yet, however defenſible theſe proviſions in general may be, on the footing of reaſon, or juſtice, or civil policy, we muſt, notwithſtanding, acknowledge, that, in their preſent ſhape, they owe their immediate original to ſlavery. It is not till after the irruption of the northern nations into the Roman empire, that we read of any other prohibitions, than that natural one of not ſporting on any private grounds without the owner's leave.

With regard to the riſe and original of our preſent civil prohibitions, it will be found, that all foreſt and game laws were introduced into Europe at the ſame time, and by the ſame policy, as gave birth to the feodal ſyſtem; when thoſe ſwarms of barbarians iſſued from their northern hive, and laid the foundation of moſt of the preſent kingdoms of Europe, on the ruins of the weſtern empire. For when a conquering general came to ſettle the œconomy of a vanquiſhed country, and to part it out among his ſoldiers or feudatories, who were to render him military ſervice for ſuch donations; it behoved him, in order to ſecure his new acquiſitions, to keep the *ruſtici* or natives of the country, and all who were not his military tenants, in as low a condition as poſſible, and eſpecially to prohibit them the uſe of arms. Nothing could do this more effectually than a prohibition of hunting and ſporting: and therefore it was the policy of the conqueror to reſerve this right to himſelf, and ſuch on whom he ſhould beſtow it; which were only his capital feudatories, or greater barons. And, accordingly, we find, in the feudal conſtitutions, one and the ſame law prohibiting the *ruſtici* in general from carrying arms, and alſo proſcribing the uſe of nets, ſnares, or other engines for deſtroying the game. This excluſive privilege well ſuited the martial genius of the conquering troops, who delighted in a ſport which in its purſuit and ſlaughter bore ſome reſemblance to war. *Vita omnis* (ſays Cæſar, ſpeaking of the ancient Germans) *in venationibus atque in ſtudiis rei militaris conſiſtit.* And Tacitus in like manner obſerves, that *quoties bella non inuent, multum venatibus, plus per otium tranſigunt.* And indeed, like ſome of their modern ſucceſſors, they had no other amuſement to entertain their vacant hours; they deſpiſing all arts as effeminate, and having no other learning, than was couched in ſuch rude ditties as were ſung at the ſolemn carouſals which ſucceeded theſe ancient huntings. And it is remarkable, that, in thoſe nations where the feodal policy remains the moſt uncorrupted, the foreſt or game laws continue in their higheſt rigour. In France, all game is properly the king's; and in ſome parts of Germany it is death for a peaſant to be found hunting in the woods of the nobility.

With us in Britain, alſo, hunting has ever been eſteemed a moſt princely diverſion and exerciſe. The whole iſland was repleniſhed with all ſorts of game in the times of the Britons; who lived in a wild and paſtoral manner, without incloſing or improving their grounds; and derived much of their ſubſiſtence from the chaſe, which they all enjoyed in common. But, when huſbandry took place under the Saxon government, and lands began to be cultivated, improved, and encloſed, the beaſts naturally fled into the woody and deſart tracts; which were called the *foreſts*, and, having never been diſpoſed of in the firſt diſtribution of lands, were therefore held to belong to the crown. Theſe were filled with great plenty of game, which our royal ſportſmen reſerved for their own diverſion, on pain of a pecuniary forfeiture for ſuch as interfered with their ſovereign. But every freeholder had the full liberty of ſporting upon his own territories, provided he abſtained from the king's foreſts.

However, upon the Norman conqueſt, a new doctrine took place; and the right of purſuing and taking all beaſts of chaſe or *venary*, and ſuch other animals as were accounted *game*, was then held to belong to the king, or to ſuch only as were authoriſed under him. And this, as well upon the principles of the feodal law, that the king is the ultimate proprietor of all the lands in the kingdom, they being all held of him as the chief lord, or lord paramount of the fee;

and that therefore he has the right of the univerſal ſoil, to enter thereon, and to chaſe and take ſuch creatures at his pleaſure: as alſo upon another maxim of the common law, that theſe animals are *bona vacantia*, and, having no other owner, belong to the king by his prerogative. As therefore the former reaſon was held to veſt in the king a *right* to purſue and take them any where; the latter was ſuppoſed to give the king, and ſuch as he ſhould authorize, a *ſole* and *excluſive* right.

This right, thus newly veſted in the crown, was exerted with the utmoſt rigour, at and after the time of the Norman eſtabliſhment; not only in the ancient foreſts, but in the new ones which the conqueror made, by laying together vaſt tracts of country, depopulated for that purpoſe, and reſerved ſolely for the king's royal diverſion; in which were exerciſed the moſt horrid tyrannies and oppreſſions, under colour of foreſt-law, for the ſake of preſerving the beaſts of chaſe; to kill any of which, within the limits of the foreſt, was as penal as the death of a man. And, in purſuance of the ſame principle, king John laid a total interdict upon the *winged* as well as the *fourfooted* creation: *capturam avium per totam Angliam interdixit* *. The cruel and inſupportable hardſhips, which theſe foreſt-laws created to the ſubject, occaſioned our anceſtors to be as zealous for their reformation, as for the relaxation of the feodal rigours and the other exactions introduced by the Norman family; and accordingly we find the immunities of *carta de foreſta* as warmly contended for, and extorted from the king with as much difficulty, as thoſe of *magna carta* itſelf. By this charter, confirmed in parliament †, many foreſts were diſafforeſted, or ſtripped of their oppreſſive privileges, and regulations were made in the regimen of ſuch as remained; particularly killing the king's deer was made no longer a capital offence, but only puniſhed by a fine, impriſonment, or abjuration of the realm. And by a variety of ſubſequent ſtatutes, together with the long aquieſcence of the crown without exerting the foreſt-laws, this prerogative is now become no longer a grievance to the ſubject.

But, as the king reſerved to himſelf the *foreſts* for his own excluſive diverſion, ſo he granted out from time to time other tracts of lands to his ſubjects under the names of *chaſes* or *parks*; or gave them licence to make ſuch in their own grounds; which indeed are ſmaller foreſts in the hands of a ſubject, but not governed by the foreſt-laws; and by the common law no perſon is at liberty to take or kill any beaſts of chaſe, but ſuch as hath an ancient chaſe or park; unleſs they be alſo beaſts of prey.

As to all inferior ſpecies of game, called *beaſts and fowls of warren*; the liberty of taking or killing them is another franchiſe or royalty, derived likewiſe from the crown, and called *free-warren*; a word which ſignifies preſervation or cuſtody: as the excluſive liberty of taking and killing fiſh in a public ſtream or river is called a *free fiſhery*; of which, however, no new franchiſe can at preſent be granted, by the expreſs proviſion of *magna carta*, c. 16. The principal intention of granting a man theſe franchiſes or liberties was in order to protect the game, by giving him a ſole and excluſive power of killing it himſelf, provided he prevented other perſons. And no man, but he who has a chaſe or free warren, by grant from the crown, or preſcription, which ſuppoſes one, can juſtify hunting or ſporting upon another man's ſoil; nor indeed, in thorough ſtrictneſs of common law, either hunting or ſporting at all.

However novel this doctrine may ſeem, it is a regular conſequence from what has been before delivered; that the ſole right of taking and deſtroying game belongs excluſively to the king. This appears, as well from the hiſtorical deduction here made, as becauſe he may grant to his ſubjects an excluſive right of taking them; which he could not do, unleſs ſuch a right was firſt inherent in himſelf. And hence it will follow, that no perſon whatever, but he who has ſuch derivative right from the crown, is by common law entitled to take or kill any beaſts of chaſe, or other game whatſoever. It is true, that, by the acquieſcence of the crown, the frequent grants of free-warren in ancient times, and the introduction of new penalties of late by certain ſtatutes for preſerving the game, this excluſive prerogative of the king is little known or conſidered; every man, that is exempted from theſe modern penalties, looking upon himſelf as at liberty to do what he pleaſes with the game: whereas the contrary is ſtrictly true, that no man, however well *qualified* he may vulgarly be eſteemed, has a right to encroach on the royal prerogative by the killing of game, unleſs he can ſhew a particular grant of free-warren; or a preſcription, which preſumes a grant; or ſome authority under an act of parliament. As for the latter, there are but two inſtances wherein an expreſs permiſſion to kill game was ever given by ſtatute; the one by 1 Jac. I. *c.* 27. altered by 7 Jac. I. *c.* 11. and virtually repealed by 22 and 23 Car. II. *c.* 25. which gave authority, ſo long as they remained in force, to the owners of free-warren, to lords of manors, and to all freeholders having 40 *l. per annum* in lands of inheritance, or 80 *l.* for life or lives, or 400 *l.* perſonal eſtate, (and their ſervants), to take partridges and pheaſants upon their own, or their maſter's, free-warren, inheritance, or freehold: the other by 5 Ann. *c.* 14. which empowers lords and ladies of manors to appoint gamekeepers, to kill game for the uſe of ſuch lord or lady; which with ſome alteration ſtill ſubſiſts, and plainly ſuppoſes ſuch power not to have been in them before. The truth of the matter is, that theſe game-laws do indeed *qualify* nobody, except in the inſtance of a gamekeeper, to kill game: but only to ſave the trouble and formal proceſs of an action by the perſon injured, who perhaps too might remit the offence, theſe ſtatutes inflict *additional* penalties, to be recovered either in a regular or ſummary way, by any of the king's ſubjects, from certain perſons of inferior rank who may be found offending in this particular. But it does not follow that perſons, excuſed from theſe additional penalties, are therefore *authoriſed* to kill game. The circumſtance of having 100 *l. per annum*, and the reſt, are not properly qualifications, but exemptions. And theſe perſons, ſo exempted from the penalties of the game-ſtatutes, are not only liable to actions of treſpaſs by the owners of the land; but alſo, if they kill game within the limits of any royal franchiſe, they are liable to the actions of ſuch who may have the right of chaſe or free-warren therein.

Upon the whole, it appears, that the king, by his prerogative, and ſuch perſons as have, under his authority, the royal FRANCHISE OF CHACE, PARK, or *Free*-WARREN *, are the *only* perſons who may acquire any property, however fugitive and tranſitory, in theſe animals *feræ naturæ*, while living; which is ſaid to be veſted in them *propter privilegium*. And it muſt alſo be obſerved, that ſuch perſons as may thus lawfully hunt, fiſh, or fowl, *ratione privilegii*, have only a qualified property in theſe animals: it not being abſolute or permanent, but laſting only ſo long as the creatures remain within the limits of ſuch reſpective franchiſe or liberty, and ceaſing the inſtant they voluntarily paſs out of it. It is held indeed, that if a man ſtarts any game within his own grounds, and follows it into another's, and kills it there, the property remains in himſelf. And this is grounded on reaſon and natural juſtice: for the property conſiſts in the poſſeſſion; which poſſeſſion commences by the finding it in his own liberty, and is continued by the immediate purſuit. And ſo, if a ſtranger ſtarts game in one man's chaſe or free-warren, and hunts it into another liberty, the property continues in the owner of the chaſe or warren; this property ariſing from privilege, and not being changed by the act of a mere ſtranger. Or if a man ſtarts game on another's private grounds, and kills it there, the property belongs to him in whoſe ground it was killed, becauſe it was alſo ſtarted there; this property ariſing *ratione ſoli*. Whereas if, after being ſtarted there, it is killed in the grounds of a third perſon, the property belongs not to the owner of the firſt ground, becauſe the property is local; nor yet to the owner of the ſecond, becauſe it was not ſtarted in his ſoil; but it veſts in the perſon who ſtarted and killed it, tho' guilty of a treſpaſs againſt both the owners. See the article *Game*-LAWS.

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* M. Paris, 303.

† 9 Hen. III.

GAME-*Cock*, a fighting cock, or one kept for ſport; a barbarous practice, which is a diſgrace to any civilized nation. See COCK-*Fighting*.

GAMELIA, in Grecian antiquity, a nuptial feaſt, or rather ſacrifice, held in the ancient Greek families on the day before a marriage; thus called, from a cuſtom they had of ſhaving themſelves on this occaſion, and preſenting their hair to ſome deity to whom they had particular obligations.

GAMELION, in the ancient chronology, was the eighth month of the Athenian year, containing 29 days, and anſwering to the latter part of our January and beginning of February. It was thus called, as being, in the opinion of the Athenians, the moſt proper ſeaſon of the year for marriage.

GAMING, the art of playing or practiſing any game, particularly thoſe of hazard; as cards, dice, tables, &c.

Gaming has at all times been looked upon as a thing of pernicious conſequence to the commonwealth; and is therefore ſeverely prohibited by law. It is conſidered as a practice generally intended to ſupply, or retrieve, the expences occaſioned by LUXURY: it being a kind of tacit confeſſion, that the company engaged therein do, in general, exceed the bounds of their reſpective fortunes; and therefore they caſt lots to determine upon whom the ruin ſhall at preſent fall, that the reſt may be ſaved a little longer. But, taken in any light, it is an offence of the moſt alarming nature; tending, by neceſſary conſequence, to promote public idleneſs, theft, and debauchery, among thoſe of a lower claſs; and, among perſons of a ſuperior rank, it hath frequently been attended with the ſudden ruin and deſolation of ancient and opulent families, an abandoned proſtitution of every principle of honour and virtue, and too often hath ended in ſelf-murder. To reſtrain this pernicious vice among the inferior ſort of people, the ſtatute 33 Hen. VIII. *c.* 9. was made; which prohibits, to all but gentlemen, the games of tennis, tables, cards, dice, bowls, and other unlawful diverſions there ſpecified, unleſs in the time of Chriſtmas, under pecuniary pains and impriſonment. And the ſame law, and alſo the ſtatute 30 Geo. II. *c.* 24. inflict pecuniary penalties, as well upon the maſter of any public houſe wherein ſervants are permitted to game, as upon the ſervants themſelves who are found to be gaming there. But this is not the principal ground of modern complaint: it is the gaming in high life, that demands the attention of the magiſtrate; a paſſion to which every valuable conſideration is made a ſacrifice, and which we ſeem to have inherited from our anceſtors the ancient Germans; whom Tacitus deſcribes to have been bewitched with the ſpirit of play to a moſt exorbitant degree. "They addict themſelves, (ſays he,) "to dice (which is wonderful) when ſober, and as a ſerious employment; with ſuch a mad deſire of winning or loſing, that, when ſtript of every thing elſe, they will ſtake at laſt their liberty, and their very ſelves. The loſer goes into a voluntary ſlavery; and, though younger and ſtronger than his antagoniſt, ſuffers himſelf to be bound and ſold. And this perſeverance in ſo bad a cauſe they call the point of honour: *ea eſt in re prava pervicacia, ipſi fidem vocant*." One would almoſt be tempted to think Tacitus was deſcribing a modern Engliſhman. When men are thus intoxicated with ſo frantic a ſpirit, laws will be of little avail: becauſe the ſame falſe ſenſe of honour, that prompts a man to ſacrifice himſelf, will deter him from appealing to the magiſtrate. Yet it is proper that laws ſhould be, and be known publicly, that gentlemen may conſider what penalties they wilfully incur, and what a confidence they repoſe in ſharpers; who, if ſucceſsful in play, are certain to be paid with honour, or, if unſucceſsful, have it in their power to be ſtill greater gainers by informing. For, by ſtat. 16 Car. II. *c.* 7. if any perſon by playing or betting ſhall loſe more than 100 *l.* at one time, he ſhall not be compellable to pay the ſame; and the winner ſhall forfeit treble the value, one moiety to the king, the other to the informer. The ſtatute 9 Ann. *c.* 14. enacts, that all bonds and other ſecurities, given for money won at play, or money lent at the time to play withal, ſhall be utterly void: that all mortgages and incumbrances of lands, made upon the ſame conſideration, ſhall be and enure to the heir of the mortgager: that, if any perſon at one time loſes 10 l. at play, he may ſue the winner, and recover it back by action of debt at law; and, in caſe the loſer does not, any other perſon may ſue the winner for treble the ſum ſo loſt; and the plaintiff in either caſe may examine the defendant himſelf upon oath: and that in any of theſe ſuits no privilege of parliament ſhall be allowed. The ſtatute farther enacts, that if any perſon cheats at play, and at one time wins more than 10 l. or any valuable thing, he may be indicted thereupon, and ſhall forfeit five times the value, ſhall be deemed infamous, and ſuffer ſuch corporal puniſhment as in caſe of wilful perjury. By ſeveral ſtatutes of the reign of king George II. all private lotteries by tickets, cards, or dice, (and particularly the games of faro, baſſet, ace of hearts, hazard, paſſage, rolly polly, and all other games with dice, except backgammon) are prohibited under a penalty of 200 l. for him that ſhall erect ſuch lotteries, and 50 l. a-time for the players. Public lotteries, unleſs by authority of parliament, and all manner of ingenious devices, under the denomination of *ſales* or otherwiſe, which in the end are equivalent to lotteries, were before prohibited by a great variety of ſtatutes under heavy pecuniary penalties. But particular deſcriptions will ever be lame and deficient, unleſs all games of mere chance are at once prohibited; the invention of ſharpers being ſwifter than the puniſhment of the law, which only hunts them from one device to another. The ſtat. 13 Geo. II. *c.* 19. to prevent the multiplicity of horſe-races, another fund of gaming, directs, that no plates or matches under 50 l. value ſhall be run, upon penalty of 200 l. to be paid by the owner of each horſe running, and 100 l. by ſuch as advertiſe the plate. By ſtatute 18 Geo. II. *c.* 34. the ſtatute 9 Ann. is farther enforced, and ſome deficiencies ſupplied: the forfeitures of that act may now be recovered in a court of equity; and, moreover, if any man be convicted, upon information or indictment, of winning or loſing at any ſitting 10 l. or 20 l. within 24 hours, he ſhall forfeit five times the ſum. Thus careful has the legiſlature been to prevent this deſtructive vice: which may ſhew that our laws againſt gaming are not ſo deficient, as ourſelves and our magiſtrates in putting thoſe laws in execution.

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* See theſe articles.

Chance, or Hazard, in GAMING. Hazard, or chance, is a matter of mathematical conſideration, becauſe it admits of more and leſs. Gameſters either ſet out upon an equality of chance, or are ſuppoſed to do ſo. This equality may be altered in the courſe of the game, by the greater good-fortune or addreſs of one of the gameſters, whereby he comes to have a better chance, ſo that his ſhare in the ſtakes is proportionably better than at firſt. This more and leſs runs thro' all the ratios between equality and infinite difference, or from an infinitely little difference till it come to an infinite great one, whereby the game is determined. The whole game, therefore, with regard to the iſſue of it, is a chance of the proportion the two ſhares bear to each other.

The probability of an event is greater or leſs, according to the number of chances by which it may happen, compared with the number of all the chances by which it may either happen or fail.

M. de Moivre, in a treatiſe *de Menſura Sortis*, has computed the variety of chances in ſeveral caſes that occur in gaming, the laws of which may be underſtood by what follows.

Suppoſe p the number of caſes in which an event may happen, and q the number of caſes wherein it may not happen, both ſides have the degree of probability, which is to each other as p to q.

If two gameſters, A and B, engage on this footing, that, if the caſes p happen, A ſhall win; but if q happen, B ſhall win, and the ſtake be a; the chance of A will be $\frac{pa}{q+p}$, and that of B $\frac{qa}{p+q}$; conſequently, if they ſell the expectancies, they ſhould have that for them reſpectively.

If A and B play with a ſingle die, on this condition, that, if A throw two or more aces at eight throws, he ſhall win; otherwiſe B ſhall win; What is the ratio of their chances? Since there is but one caſe wherein an ace may turn up, and five wherein it may not, let $a=1$, and $b=5$. And, again, ſince there are eight throws of the die, let $n=8$; and, you will have $\overline{a+b})^n - b^n - nab^n - 1$, to $b^n + nab^n - 1$: that is, the chance of A will be to, that of B, as 663991 to 10156525, or nearly as 2 to 3.

A and B are engaged at ſingle quoits; and, after playing ſome time, A wants 4 of being up, and B 6; but B is ſo much the better gameſter, that his chance againſt A upon a ſingle throw would be as 3 to 2; What is the ratio of their chances? Since A wants 4, and B 6, the game will be ended at nine throws; therefore, raiſe $a+b$ to the ninth power, and it will be $a^9+9a^8b+36a^7bb+84a^6b^3+126a^5b^4+126a^4b^5$, to $84a^3b^6+36aab^7+6ab^3+b^9$: call a 3, and b 2, and you will have the ratio of chances in numbers, viz. 1759077 to 194048.

A and B play at ſingle quoits, and A is the beſt gameſter, ſo that he can give B 2 in 3: What is the ratio of their chances at a ſingle throw? Suppoſe the chances as z to 1, and raiſe $z+1$ to its cube, which will be z^3+3z^2+3z+1. Now ſince A could give B 2 out of 3, A might undertake to win three throws running; and, conſequently, the chances in this caſe will be as z^3 to $3z^2+3z+1$. Hence $z^3=3z^2+3z+1$; or $2z^3=z^3+3z^2-3z+1$. And, therefore, $z\sqrt[3]{2}=z+1$; and, conſequently, $z=\frac{1}{\sqrt[3]{2}-1}$. The chances, therefore, are $\frac{1}{\sqrt[3]{2}-1}$, and 1, reſpectively.

Again, ſuppoſe I have two wagers depending, in the firſt of which I have 3 to 2 the beſt of the lay, and in the ſecond 7 to 4; What is the probability I win both wagers?

1. The probability of winning the firſt is $\frac{3}{5}$, that is the number of chances I have to win, divided by the number of all the chances: the probability of winning the ſecond is $\frac{7}{11}$: therefore, multiplying theſe two fractions together, the product will be $\frac{21}{55}$, which is the probability of winning both wagers. Now, this fraction being ſubtracted from 1, the remainder is $\frac{34}{55}$, which is the probability I do not win both wagers: therefore the odds againſt me are 34 to 21.

2. If I would know what the probability is of winning the firſt, and loſing the ſecond, I argue thus: the probability of winning the firſt is $\frac{3}{5}$, the probability of loſing the ſecond is $\frac{4}{11}$: therefore multiplying $\frac{3}{5}$ by $\frac{4}{11}$, the product $\frac{12}{55}$ will be the probability of my winning the firſt, and loſing the ſecond; which being ſubtracted from 1, there will remain $\frac{43}{55}$, which is the probability I do not win the firſt, and at the ſame time loſe the ſecond.

3. If I would know what the probability is of winning the ſecond, and at the ſame time loſing the firſt, I ſay thus: The probability of winning the ſecond is $\frac{7}{11}$; the probability of loſing the firſt is $\frac{2}{5}$: therefore, multiplying theſe two fractions together, the product $\frac{14}{55}$ is the probability I win the ſecond, and alſo loſe the firſt.

4. If I would know what the probability is of loſing both wagers, I ſay, the probability of loſing the firſt is $\frac{2}{5}$, and the probability of loſing the ſecond $\frac{4}{11}$: therefore the probability of loſing them both is $\frac{8}{55}$; which, being ſubtracted from 1, there remains $\frac{47}{55}$: therefore, the odds of loſing both wagers is 47 to 8.

This way of reaſoning is applicable to the happening or failing of any events that may fall under conſideration. Thus if I would know what the probability is of miſſing an ace four times together with a die, this I conſider as the failing of four different events. Now the probability of miſſing the firſt is $\frac{5}{6}$, the ſecond is alſo $\frac{5}{6}$, the third $\frac{5}{6}$, and the fourth $\frac{5}{6}$; therefore the probability of miſſing it four times together is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{625}{1296}$; which being ſubtracted from 1, there will remain $\frac{671}{1296}$ for the probability of throwing it once or oftener in four times: therefore the odds of throwing an ace in four times, is 671 to 625.

But if the flinging of an ace was undertaken in three times, the probability of miſſing it three times would be $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{216}$; which being ſubtracted from 1, there will remain $\frac{91}{216}$ for the probability of throwing it once or oftener in three times: therefore the odds againſt throwing it in three times are 125 to 91. Again, ſuppoſe we would know the probability of throwing an ace once in four times, and no more: ſince the probability of throwing it the firſt time is $\frac{1}{6}$, and of miſſing it the other three times, is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}$, it follows, that the probability of throwing it the firſt time, and miſſing it the other three ſucceſſive times, is $\frac{1}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{1296}$; but becauſe it is poſſible to hit it every throw as well as the firſt, it follows, that the probability of throwing it once in four throws, and miſſing it the other three, is $\frac{4\times125}{1296}=\frac{500}{1296}$; which being ſubtracted from 1, there will remain $\frac{796}{1296}$ for the probability of throwing it once, and no more, in four times. Therefore, if one undertake to throw an ace once, and no more, in four times, he has 500 to 796 the worſt of the lay, or 5 to 8 very near.

Suppoſe two events are ſuch, that one of them has twice as many chances to come up as the other; what is the probability, that the event, which has the greater number of chances to come up, does not happen twice before the other happens once, which is the caſe of flinging 7 with two dice before 4 once? Since the number of chances is as 2 to 1, the probability of the firſt happening before the ſecond is $\frac{2}{3}$, but the probability of its happening twice before it is but $\frac{2}{3}\times\frac{2}{3}$ or $\frac{4}{9}$: therefore it is 5 to 4 ſeven does not come up twice before four once.

But, if it were demanded, what muſt be the proportion of the facilities of the coming up of two events, to make that which has the moſt chances come up twice, before the other comes up once? The anſwer is, 12 to 5 very nearly: whence it follows, that the probability of throwing the firſt before the ſecond is $\frac{12}{17}$, and the probability of throwing it twice is $\frac{12}{17}\times\frac{12}{17}$, or $\frac{144}{289}$; therefore the probability of not doing it is $\frac{145}{289}$: therefore the odds againſt it are as 145 to 144, which comes very near an equality.

Suppoſe there is a heap of thirteen cards of one colour, and another heap of thirteen cards of another colour; What is the probability, that, taking one card at a venture out of each heap, I ſhall take out the two aces?

The probability of taking the ace out of the firſt heap is $\frac{1}{13}$, the probability of taking the ace out of the ſecond heap is $\frac{1}{13}$; therefore the probability of taking out both aces is $\frac{1}{13}\times\frac{1}{13}=\frac{1}{169}$, which being ſubtracted from 1, there will remain $\frac{168}{169}$: therefore the odds againſt me are 168 to 1.

In caſes where the events depend on one another, the manner of arguing is ſomewhat altered. Thus, ſuppoſe that out of one ſingle heap of thirteen cards of one colour I ſhould undertake to take out firſt the ace; and, ſecondly, the two: though the probability of taking out the ace be $\frac{1}{13}$, and the probability of taking out the two be likewiſe $\frac{1}{13}$: yet, the ace being ſuppoſed as taken out already, there will remain only twelve cards in the heap, which will make the probability of taking out the two to be $\frac{1}{12}$; therefore the probability of taking out the ace, and then the two, will be $\frac{1}{13}\times\frac{1}{12}$.

In this laſt queſtion the two events have a dependence on each other, which conſiſts in this, that one of the events being ſuppoſed as having happened, the probability of the other's happening is thereby altered. But the caſe is not ſo in the two heaps of cards.

If the events in queſtion be n in number, and be ſuch as have the ſame number a of chances by which they may happen, and likewiſe the ſame number b of chances by which they may fail, raiſe $a+b$ to the power n. And if A and B play together, on condition that if either one or more of the events in queſtion happen, A ſhall win, and B loſe, the probability of A's winning will be $\frac{\overline{a+b}|^{n}-b^{n}}{\overline{a+b}|^{n}}$; and that of B's winning will be $\frac{b^{n}}{\overline{a+b}|}$; for when $a+b$ is actually raiſed to the power n, the only term in which a does not occur is the laſt b^{n}: therefore all the terms but the laſt are favourable to A.

Thus if $n=3$, raiſing $a+b$ to the cube $a^{3}+3a^{2}b+3ab^{2}+b^{3}$, all the terms but b^{3} will be favourable to A; and therefore the probability of A's winning will be $\frac{a^{3}+3a^{2}b+3ab^{2}}{\overline{a+b}|}$, or $\frac{\overline{a+b}|^{3}-b^{3}}{\overline{a+b}|^{3}}$; and the probability of B's winning will be $\frac{b^{3}}{\overline{a+b}|^{3}}$. But if A and B play on condition, that if either two or more of the events in queſtion happen, A ſhall win; but in caſe one only happen, or none, B ſhall win; the probability of A's winning will be $\frac{\overline{a+b}|^{n}-nab^{n-1}-b^{n}}{\overline{n+b}|^{n}}$; for the only two terms in which aa does not occur, are the two laſt, *viz.* nab^{n-1} and b^{n}.

GAMMONING, among ſeamen, denotes ſeveral turns of rope taken round the bowſprit, and reeved through holes in knees of the head, for the greater ſecurity of the bowſprit.

GAMMUT, in muſic, a ſcale whereon we learn to ſound the muſical notes, *ut, re, mi, fa, ſol, la,* in their ſeveral orders and diſpoſitions. See MUSIC.

GANDER, in ornithology, the male of the gooſe-kind; one of which, it is ſaid, will ſerve five geeſe *.

GANG-

* See *Anas.*

GANG-WAY, is the ſeveral paſſages or ways from one part of the ſhip to the other; and whatſoever is laid in any of thoſe paſſages, is ſaid to lie in the gang-way.

GANGANELLI. See CLEMENT XIV.

GANGES, a large and celebrated river of India. It has its ſource in the mountains which border on Little Thibet, in 96 degrees of longitude, and 35. 45. of latitude. It croſſes ſeveral kingdoms, running from north to ſouth; and falls into the bay of Bengal, by ſeveral mouths. The waters are loweſt in April and May, and higheſt before the end of September. It overflows yearly like the Nile; and renders the kingdom of Bengal as fruitful as that of the Delta in Egypt. The people in theſe parts hold the water of this river in high veneration; and it is viſited annually by a prodigious number of pilgrims from all parts of India. The Engliſh have ſeveral ſettlements on this river, which will be taken notice of in their proper places. The greateſt happineſs that many of the Indians wiſh for, is to die in this river.

GANGLION, in anatomy, denotes a knot frequently found in the courſe of the nerves, and which is not morbid; for wherever any nerve ſends out a branch, or receives one from another, or where two nerves join together, there is generally a ganglion or plexus, as may be ſeen at the beginning of all the nerves of the medulla ſpinalis, and in many other places of the body.

GANGLION, in ſurgery, a hard tubercle, generally moveable, in the external or internal part of the carpus, upon the tendons or ligaments in that part; uſually without any pain to the patient.

GANGRENE, a very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt, and put on a ſtate of putrefaction. See (the *Index* ſubjoined to) MEDICINE, and SURGERY.

GANNET, or SOLAND *Gooſe*, in ornithology. See PELICANUS.

GANTLET, or GAUNTLET, a large kind of glove made of iron, and the fingers covered with ſmall plates. It was formerly worn by the cavaliers, when armed at all points.

GANYMEDE, in the ancient mythology, ſon of a king of Troy, was the moſt beautiful boy in the world. Jupiter was charmed with him, and made him his cup-bearer in the room of Hebe. Some ſay that he cauſed him to be carried away by an eagle, and others affirm he was himſelf the raviſher under the form of that bird. He deified this youth; and, to comfort his father, made a preſent to him of ſome of thoſe very ſwift horſes that the gods rode upon.

GAOL (*Gaola*, Fr. *Geole*, i. e. *Caveola*, "a cage for birds"), is uſed metaphorically for a priſon. It is a ſtrong place or houſe for keeping of debtors, &c. and wherein a man is reſtrained of his liberty to anſwer an offence done againſt the laws: and every county hath two gaols, one for debtors, which may be any houſe where the ſheriff pleaſes; the other for the peace and matters of the crown, which is the county gaol.

If a gaol be out of repair, or inſufficient, &c. juſtices of peace, in their quarter ſeſſions, may contract with workmen for the rebuilding or repairing it; and by their warrant order the ſum agreed on for that purpoſe, to be levied on the ſeveral hundreds, and other diviſions in the county by a juſt rate, 11 & 12 Will. III. c. 19. See PRISON.

GAOL-*Delivery*. The adminiſtration of juſtice being originally in the crown, in former times our kings in perſon rode through the realm once in ſeven years, to judge of and determine crimes and offences; afterwards *juſtices in eyre* were appointed; and ſince, *juſtices of aſſiſe* and *gaol-delivery*, &c. A commiſſion of gaol-delivery, is a patent in nature of a letter from the king to certain perſons, appointing them his juſtices, or two or three of them, and authoriſing them to deliver his *gaol*, at ſuch a place, of the priſoners in it: for which purpoſe it commands them to meet at ſuch a place, at the time they themſelves ſhall appoint; and informs them, that, for the ſame purpoſe, the king hath commanded his ſheriff of the ſame county to bring all the priſoners of the goal, and their attachments, before them at the day appointed.

The juſtices of gaol-delivery are empowered by the common law to proceed upon indictments of felony, treſpaſs, &c. and to order to execution or reprieve: they may likewiſe diſcharge ſuch priſoners, as on their trials are acquitted, and thoſe againſt whom, on proclamation being made, no evidence has appeared: they have authority to try offenders for treaſon, and to puniſh many particular offences, by ſtatute 2 *Hawk.* 24. 2 *Hale's hiſt. Placit. Cor.* 35.

GAOLER, the keeper of a gaol or priſon. Sheriffs are to make ſuch gaolers for whom they will be anſwerable: but if there be any default in the gaoler, an action lies againſt him for an eſcape, &c. yet the ſheriff is moſt uſually charged; 2 *Inſt.* 592. Where a gaoler kills a priſoner by hard uſage, it is felony; 3 *Inſt.* 52. No fee ſhall be taken by gaolers, but what is allowed by law, and ſettled by the judges, who may determine petitions againſt their extortions, &c. 2 Geo. II. c. 22.

GAONS, a certain order of Jewiſh doctors, who appeared in the Eaſt, after the cloſing of the talmud. The word *Gaons* ſignifies Excellent, Sublime; as in the divinity-ſchools we formerly had Irrefragable, Sublime, Reſolute, Angelic, and Subtile doctors. The Gaons ſucceeded the Seburæans, or Opiners, about the beginning of the ſixth century. Chanan Meiſchtia was the head, and firſt of the excellents. He reſtored the academy of Pandebita, which had been ſhut up for 30 years.

GAR-FISH, HORN-*fiſh*, or *Sea-needle*. See ESOX.

GARAMOND (Claude), a very ingenious letter-founder, was born at Paris; where he began, in the year 1510, to found his printing types free from all the remains of the Gothic, or (as it is generally called) the *black letter*, and brought them to ſuch perfection, that he had the glory of ſurpaſſing all who went before him, and of being ſcarcely ever excelled by his ſucceſſors in that uſeful art. His types were prodigiouſly multiplied; both by the great number of matrices he ſtruck, and the types formed in reſemblance of his in all parts of Europe. Thus in Italy, Germany, England, and Holland, the bookſellers, by way of recommending their books, diſtinguiſhed the type by his name; and in particular the ſmall Roman was, by way of excellence, known among the printers of theſe nations by the name of *Garamond's ſmall Roman*.

By the ſpecial command of king Francis I. he founded three ſizes of Greek types for the uſe of Robert Stephens, who with them printed all his beautiful editions of the New Teſtament, and other Greek authors. He died at Paris, in 1561.

GARASSE (Francis), a remarkable jeſuitical writer, the firſt author of that irreconcilable enmity that ſtill ſubſiſts between the Jeſuits and Janſeniſts in the church of Rome, was born at Angouleſme in 1585; and entered the Jeſuits college in 1600. As he had a quick imagination, a ſtrong voice, and a peculiar turn to wit, he became a popular preacher in the chief cities of France; but not content with this honour, he diſtinguiſhed himſelf ſtill more by his writings, which were bold, licentious, and produced much controverſy. The moſt conſiderable in its conſequences, was intitled *La ſomme theologique des veritez capitales de la religion Chretienne;* which was firſt attacked by the abbot of St Cyran, who, obſerving in it a prodigious number of falſifications of the Scriptures and of the fathers, beſide many heretical and impious opinions, conceived the honour of the church required him to undertake a refutation. Accordingly he publiſhed a full anſwer to it; while Garaſſe's book was alſo under examination of the doctors of the Sorbonne, by whom it was afterwards condemned. Garaſſe replied to St Cyran; but the two parties of Jeſuits and Janſeniſts, of whom theſe were reſpectively the champions, grew to an implacable animoſity againſt each other, that is not even now likely to ſubſide. The Jeſuits were forced to remove their brother to a diſtance from Paris; where, probably weary of his inactive obſcurity, when the plague raged at Poictiers in 1631, he begged leave of his ſuperior to attend the ſick, in which charitable office he caught the diſorder, and died.

GARBE, in heraldry, a ſheaf of any kind of grain, borne in ſeveral coats of arms, and ſaid to repreſent ſummer, as a bunch of grapes does autumn.

GARBLE, a word uſed to ſignify the action of ſeparating the droſs and duſt from ſpice, drugs, &c. *Garbling* is the cleanſing and purifying the good from the bad; and may come from the Italian *garbo*, i. e. finery or neatneſs: and hence, probably, we ſay, when we ſee a man in a neat habit, that he is in handſome *garb*.

GARCILASSO (de la Vega), a celebrated Spaniſh poet, born of a noble family at Toledo, in 1500. He was educated near the emperor Charles V. who had a particular regard for him, and whom he attended in all his military expeditions; acquiring as much renown by his courage as by his poetry. In Provence he commanded a battalion; and was killed in the 36th year of his age, by a ſtone thrown at his head by a country-man from a turret. He had ſtrong natural talents for poetry; and not only extended the bounds, but introduced new beauties, into that of the Spaniſh language.—We muſt not confound this poet with another perſon of the ſame name, a native of Cuſco, who wrote in Spaniſh, a Hiſtory of Florida, and of Peru and the Incas.

GARDANT, or GUARDANT, in heraldry, denotes any beaſt full-faced, and looking right forward.

GARDEN, a plot of ground, cultivated, and properly ornamented with a variety of plants, flowers, fruits, &c. See GARDENING.

Gardens are uſually diſtinguiſhed into flower-garden, fruit-garden, and kitchen-garden: the firſt of which, being deſigned for pleaſure and ornament, is to be placed in the moſt conſpicuous part, that is, next to the back-front of the houſe; and the two latter, being deſigned for uſe, ſhould be placed leſs in ſight. But though the fruit and kitchen-gardens are here mentioned as two diſtinct gardens, yet they are now uſually in one; and that with good reaſon, ſince they both require a good ſoil and expoſure, and equally require to be placed out of the view of the houſe. See KITCHEN-*Garden*.

In the choice of a place proper for a garden, the moſt eſſential points to be conſidered are the ſituation, the ſoil, the expoſure, water, and proſpect.

1ſt, As to the ſituation, it ought to be ſuch a one as is wholeſome. and in a place neither too high nor too low; for if a garden be too high, it will be expoſed to the winds, which are very prejudicial to trees; and if it be too low, the dampneſs, the vermin, and the venomous creatures that breed in ponds and marſhy places, add much to their inſalubrity. The moſt happy ſituation is on the ſide of a hill, eſpecially if the ſlope be eaſy, and in a manner imperceptible; if a good deal of level ground be near the houſe; and if it abounds with ſprings of water: for, being ſheltered from the fury of the winds, and the violent heat of the ſun, a temperate air will be there enjoyed; and the water that deſcends from the top of the hill, either from ſprings or rain, will not only ſupply fountains, canals, and caſcades for ornament, but, when it has performed its office, will water the adjacent valleys, and, if it be not ſuffered to ſtagnate, will render them fertile and wholeſome. Indeed, if the declivity of the hill be too ſteep, and the water be too abundant, a garden on the ſide of it may frequently ſuffer, by having trees torn up by torrents and floods; and by the tumbling down of the earth above, the walls may be demoliſhed, and the walks ſpoiled. It cannot, however, be denied, that the ſituation on a plain or flat has ſeveral advantages which the higher ſituation has not: for floods and rain commit no damage; there is a continued proſpect of champaigns, interſected by rivers, ponds, and brooks, meadows, and hills covered with woods or buildings; beſides, the level ſurface is leſs tireſome to walk on, and leſs chargeable than that on the ſide of an hill, ſince terrace-walks and ſteps are not there neceſſary: but the greateſt diſadvantage of flat gardens, is the want of thoſe extenſive proſpects which riſing grounds afford.

2dly, A good earth or ſoil is next to be conſidered; for it is ſcarce poſſible to make a fine garden in a bad ſoil. There are indeed ways to meliorate ground, but they are very expenſive; and ſometimes, when the expence has been beſtowed of laying good earth three feet deep over the whole ſurface, a whole garden has been ruined, when the roots of the trees have come to reach the natural bottom. To judge of the quality of the ſoil, obſerve whether there be any heath, thiſtles, or ſuch-like weeds growing ſpontaneouſly in it; for they are certain ſigns that the ground is poor. Or if there be large trees growing thereabouts, obſerve, whether they grow crooked, ill-ſhaped, and grubby, and whether they are of a faded green, and full of moſs, or infeſted with vermin; if this be the caſe, the place is to be rejected: but, on the contrary, if it be covered with good graſs fit for paſture, you may then be encouraged to try the depth of the ſoil. To know this, dig holes in ſeveral places, ſix feet wide, and four deep; and if you find three feet of good earth, it will do very well; but leſs than two will not be ſufficient. The quality of good ground is, neither to be ſtony, nor too hard to work; neither too dry, too moiſt, nor too ſandy and light; nor too ſtrong and clayey, which is the worſt of all for gardens.

3dly, The next requiſite is water; the want of which is one of the greateſt inconveniencies that can attend a garden, and will bring a certain mortality upon whatever is planted in it, eſpecially in the greater droughts that often happen in a hot and dry ſituation in ſummer; beſides its uſefulneſs in fine gardens for making fountains, canals, caſcades, &c. which are the greateſt ornaments of a garden.

4thly, The laſt thing to be conſidered, is the proſpect of a fine country; and though this is not ſo abſolutely neceſſary as water, yet it is one of the moſt agreeable beauties of a fine garden: beſides, if a garden be planted in a low place that has no kind of proſpect, it will not only be diſagreeable, but unwholeſome.

In the laying out and planting of gardens the beauties of nature ſhould always be ſtudied; for the nearer a garden approaches to nature, the longer it will pleaſe. The area of a handſome garden, may take up thirty or forty acres, but not more; and the following rules ſhould be obſerved in the diſpoſition of it. There ought always to be a deſcent of at leaſt three ſteps from the houſe to the garden; this will render the houſe more dry and wholeſome, and the proſpect on entering the garden more extenſive. The firſt thing that ought to preſent itſelf to view, ſhould be an open lawn of graſs, which ought to be conſiderably broader than the front of the building; and if the depth be one half more than the width, it will have a better effect: if on the ſides of the lawn there are trees planted irregularly, by way of open groves, the regularity of the lawn will be broken, and the whole rendered more like nature. For the convenience of walking in damp weather, this lawn ſhould be ſurrounded with a gravel walk, on the outſide of which ſhould be borders three or four feet wide, for flowers: and from the back of theſe the proſpect will be agreeably terminated by a ſlope of ever-green ſhrubs; which, however, ſhould never be ſuffered to exclude agreeable proſpects, or the view of handſome buildings. Theſe walks may lead through the different plantations, gently winding about in an eaſy natural manner; which will be more agreeable than either thoſe long ſtraight walks, too frequently ſeen in gardens, or thoſe ſerpentine windings, that are twiſted about into ſo many ſhort turns, as to render it difficult to walk in them: and as no garden can be pleaſing where there is a want of ſhade and ſhelter, theſe walks ſhould lead as ſoon as poſſible into plantations, where perſons may walk in private, and be ſheltered from the wind. Where the borders of the gardens are fenced with walls or pales, they ſhould be concealed with plantations of flowering ſhrubs, intermxed with laurels and other ever-greens; which will have a good effect, and at the ſame time conceal the fences, which are diſagreeable when left naked and expoſed to the ſight. Groves are the moſt agreeable parts of a garden, ſo that there cannot be too many of them; only that they muſt not be too near the houſe, nor be ſuffered to block up agreeable proſpects. To accompany parterres, groves opened in compartments, quincunxes, and arbour-work with fountains, &c. are very agreeable. Some groves of ever-greens ſhould be planted in proper places, and ſome ſquares of trees of this kind may alſo be planted among the other wood.

Narrow rivulets, if they have a conſtant ſtream, and are judiciouſly led about a garden, have a better effect than many of the large ſtagnating ponds or canals, ſo frequently made in large gardens. When wilderneſſes are intended, they ſhould not be cut into ſtars and other ridiculous figures, nor formed into mazes or labyrinths, which in a great deſign appear trifling. Buildings, ſtatues, and vaſes, appear very beautiful; but they ſhould never be placed too near each other: magnificent fountains are alſo very ornamental; but they ought never to be introduced, except there be water to keep them conſtantly running. The ſame may alſo be obſerved of caſcades and other falls of water.

In ſhort, the ſeveral parts of a garden ſhould be diverſified; but in places where the eye takes in the whole at once, the two ſides ſhould be always the ſame. In the buſineſs of deſigns, the aim ſhould be always at what is natural, great, and noble. The general diſpoſition of a garden, and of its parts, ought to be accommodated to the different ſituations of the ground, to humour its inequalities, to proportion the number and ſorts of trees and ſhrubs to each part, and to ſhut out from the view of the garden no objects that may become ornamental. And before a garden is planned out, it ought ever to be conſidered, what it will be when the trees have had 20 years growth.—But for a more extended view of this ſubject, ſee the next article.

GARDENING;

1 Subjects and mat rials of dening.

THE art of *cultivating* or *planning* gardens.—Gardening, in the perfection to which it has been lately brought in Britain, is entitled to a place of conſiderable rank among the liberal arts. It is as ſuperior to landſkip-painting, as a reality to a repreſentation: it is an exertion of fancy; a ſubject for taſte; and being releaſed now from the reſtraints of regularity, and enlarged beyond the purpoſes of domeſtic convenience, the moſt beautiful, the moſt ſimple, the moſt noble ſcenes of nature, are all within its province. For it is no longer confined to the ſpots from which it takes its name; but regulates alſo the diſpoſition and embelliſhments of a park, a farm, or a riding: and the buſineſs of a gardener is to ſelect and apply whatever is great, elegant, or characteriſtic, in any of them; to diſcover and to ſhew all the advantages of the place upon which he is employed; to ſupply its defects, to correct its faults, and to improve its beauties. For all theſe operations,

perations, the objects of nature are ſtill his only materials. His firſt inquiry, therefore, muſt be into the means by which thoſe effects are attained in nature, which he is to produce; and into thoſe properties in the objects of nature, which ſhould determine him in the choice and arrangement of them.

Part I. Of the CONSTITUENT PARTS of the SCENES of NATURE.

NATURE, always ſimple, employs but four materials in the compoſition of her ſcenes; *ground*, *wood*, *water*, and *rocks*. The cultivation of nature has introduced a fifth ſpecies, the *buildings* requiſite for the accommodation of men. Each of theſe again admits of varieties in figure, dimenſions, colour, and ſituation. Every landſkip is compoſed of theſe parts only; every beauty in a landſkip depends on the application of their ſeveral varieties.

Sect. I. *Of Ground.*

The ſhape of ground muſt be either a *convex*, a *concave*, or a *plane*; in terms leſs technical called a *ſwell*, a *hollow*, and a *level*. By combinations of theſe are formed all the irregularities of which ground is capable; and the beauty of it depends on the degrees and the proportions in which they are blended.

2
Of a level.

Both the convex and the concave are forms in themſelves of more variety, and may therefore be admitted to a greater extent than a plane. But levels are not totally inadmiſſible. The preference unjuſtly ſhewn to them in the old gardens, where they prevailed almoſt in excluſion of every other form, has raiſed a prejudice againſt them. It is frequently reckoned an excellence in a piece of made ground, that every the leaſt part of it is uneven; but then it wants one of the three great varieties of ground, which may ſometimes be intermixed with the other two. A gentle concave declivity falls and ſpreads eaſily on a flat; the channels between ſeveral ſwells degenerate into mere gutters, if ſome breadth be not given to the bottoms by flattening them; and in many other inſtances, ſmall portions of an inclined or horizontal plane may be introduced into an irregular compoſition. Care only muſt be taken to keep them down as ſubordinate parts, and not to ſuffer them to become principal.

There are, however, occaſions on which a plane may be principal: a hanging level often produces effects not otherwiſe attainable. A large dead flat, indeed, raiſes no other idea than of ſafety: the eye finds no amuſement, no repoſe on ſuch a level: it is fatigued, unleſs timely relieved by an adequate termination; and the ſtrength of that termination will compenſate for its diſtance. A very wide plain, at the foot of a mountain, is leſs tedious than one of much leſs compaſs ſurrounded only by hillocks. A flat therefore of conſiderable extent may be hazarded in a garden, provided the boundaries alſo be conſiderable in proportion; and if, in addition to their importance, they become ſtill more intereſting by their beauty, then the facility and diſtinctneſs with which they are ſeen over a flat make the whole an agreeable compoſition. The greatneſs and the beauty of the boundary are not, however, alone ſufficient; the form of it is of ſtill more conſequence. A continued range of the nobleſt wood, or the fineſt hill, would not cure the inſipidity of a flat: a leſs important, a leſs pleaſing boundary, would be more effectual, if it traced a more varied outline; if it advanced ſometimes boldly forward, ſometimes retired into deep receſſes; broke all the ſides into parts, and marked even the plain itſelf with irregularity.

3
Deſcription of a lawn at Moor Park, (the ſeat of Sir Laur. Dundas, near Rickmanſworth in Hertfordſhire.)

At Moor Park, on the back-front of the houſe, is a lawn of about thirty acres, abſolutely flat; with falls below it on one hand, and heights above it on the other. The riſing ground is divided into three great parts, each ſo diſtinct and ſo different, as to have the effect of ſeveral hills. That neareſt to the houſe ſhelves gently under an open grove of noble trees which hang on the declivity, and advance beyond it on the plain. The next is a large hill preſſing forward, and covered with wood from the top to the bottom. The third is a bold ſteep, with a thicket falling down the ſteepeſt part, which makes it appear ſtill more precipitate: but the reſt of the ſlope is bare; only the brow is crowned with wood, and towards the bottom is a little groupe of trees. Theſe heights, thus finely characteriſed in themſelves, are further diſtinguiſhed by their appendages. The ſmall, compact groupe near the foot, but ſtill on the deſcent, of the farther hill, is contraſted by a large ſtraggling clump, ſome way out upon the lawn, before the middle eminence. Between this and the firſt hill, under two or three trees which croſs the opening, is ſeen to great advantage a winding glade, which riſes beyond them, and marks the ſeparation. This deep receſs, the different diſtances to which the hills advance, the contraſt in their forms, and their accompaniments, caſt the plain on this ſide into a moſt beautiful figure. The other ſide and the end were originally the flat edge of a deſcent; a harſh, offenſive termination: but it is now broken by ſeveral hillocks, not diminutive in ſize, and conſiderable by the fine clumps which diſtinguiſh them. They recede one beyond another, and the outline waves agreeably amongſt them. They do more than conceal the ſharpneſs of the edge; they convert a deformity into a beauty, and greatly contribute to the embelliſhment of this moſt lovely ſcene: a ſcene, however, in which the flat is principal; and yet a more varied, a more beautiful landſkip, can hardly be deſired in a garden.

4
Of convex or concave ſhapes of ground.

A plain is not, however, in itſelf intereſting; and the leaſt deviation from the uniformity of its ſurface changes its nature: as long as the flat remains, it depends on the objects around for all its variety, and all its beauty. But convex and concave forms are generally pleaſing, and the number of degrees and combinations into which they may be caſt is infinite: thoſe forms only in each which are perfectly regular muſt be avoided. A ſemicircle can never be tolerable: ſmall portions of large circles blended together, or lines gently curved which are not parts of any circle, a hollow ſinking but little below a level, a ſwell very much flattened at the top, are commonly the moſt agreeable figures.

In ground which lies beautifully, the concave will generally prevail; within the ſame compaſs it ſhews more ſurface than a ſwell. All the ſides of the latter are not viſible at the ſame time, except in a few particular ſituations: but it is only in a few particular ſituations, that any part of a hollow is concealed; earth ſeems to have been accumulated to raiſe the one, and taken away to ſink the other. The concave, therefore, appears the lighter, and for the moſt part it is the more elegant ſhape: even the ſlopes of a ſwell can hardly be brought down, unleſs broken now and then into hollows, to take off from the heavineſs of the the maſs. There are, however, ſituations where the convex form ſhould be preferred: a hollow juſt below the brow of a hill reduces it to a narrow ridge, which has a poor meagre appearance; and an abrupt fall will never ſeem to join with a concave form immediately above it: a ſharp edge divides them; and to connect them, that edge muſt be rounded, or at leaſt flattened; which is, in fact, to interpoſe a convex or a level.

5 Of the connection between the parts in ground.

In made ground, the connection is, perhaps, the principal conſideration. A ſwell which wants it is but a heap, a hollow but a hole, and both appear artificial: the one ſeems placed upon a ſurface to which it does not belong; the other, dug into it. On the great ſcale of nature, indeed, either may be ſo conſiderable in itſelf, as to make its relation to any other almoſt a matter of indifference: but, on the ſmaller ſcale of a garden, if the parts are disjointed, the effect of the whole is loſt; and the union of all is not more than ſufficient to preſerve an idea of greatneſs and importance, to ſpots which muſt be varied, and cannot be ſpacious. Little inequalities are beſides in nature uſually well blended together: all lines of ſeparation have, in a courſe of time, been filled up; and therefore, when in made ground they are left open, that ground appears artificial.

Even where artifice is avowed, a breach in the connection offends the eye. The uſe of a foſſe is merely to provide a fence, without obſtructing the view. To blend the garden with the country is no part of the idea: the cattle, the objects, the culture, without the ſunk fence, are diſcordant to all within, and keep up the diviſion. A foſſe may open the moſt poliſhed lawn to a corn-field, a road, or a common, though they mark the very point of ſeparation. It may be made on purpoſe to ſhew objects which cannot, or ought not to be in the garden; as a church, or a mill, a neighbouring gentleman's-ſeat, a town, or a village; and yet no conſciouſneſs of the exiſtence can reconcile us to the ſight of this diviſion. The moſt obvious diſguiſe is to keep the hither above the further bank all the way; ſo that the latter may not be ſeen at a competent diſtance. But this alone is not always ſufficient: for a diviſion appears, if an uniformly continued line, however faint, be diſcernible; that line, therefore, muſt be broken. Low but extended hillocks may ſometimes interrupt it; or the ſhape on one ſide may be continued, acroſs the ſunk fence, on the other; as when the ground ſinks in the field, by beginning the declivity in the garden. Trees too without, connected with thoſe within, and ſeeming part of a clump or a grove there, will frequently obliterate every trace of an interruption. By ſuch, or other means, the line may be, and ſhould be, hid or diſguiſed; not for the purpoſe of deception, (when all is done, we are ſeldom deceived), but to preſerve the continued ſurface entire.

If, where no union is intended, a line of ſeparation is diſagreeable, it muſt be diſguſting when it breaks the connection between the ſeveral parts of the ſame piece of ground. That connection depends on *the junction of each part to thoſe about it*, and on the *relation of every part to the whole*. To complete the former, ſuch ſhapes ſhould be contiguous as moſt readily unite; and the actual diviſion between them ſhould be anxiouſly concealed. If a ſwell deſcends upon a level; if a hollow ſinks from it, the level is an abrupt termination, and a little rim marks it diſtinctly. To cover that rim, a ſhort ſweep at the foot of the ſwell, a ſmall rotundity at the entrance of the hollow, muſt be interpoſed. In every inſtance, when ground changes its direction, there is a point where the change is effected, and that point ſhould never appear; ſome other ſhapes, uniting eaſily with both extremes, muſt be thrown in to conceal it. But there muſt be no uniformity even in theſe connections: if the ſame ſweep be carried all round the bottom of a ſwell, the ſame rotundity all round the top of a hollow, though the junction be perfect, yet the art by which it is made is apparent, and art muſt never appear. The manner of concealing the ſeparation ſhould itſelf be diſguiſed: and different degrees of cavity and rotundity; different ſhapes and dimenſions to the little parts thus diſtinguiſhed by degrees; and thoſe parts breaking, in one place more in another leſs, into the principal forms which are to be united; produce that variety with which all nature abounds, and without which ground cannot be natural.

6 Of the re tion of t parts to t whole.

The relation of all the parts to the whole, when clearly marked, facilitates their junction with each other: for the common bond of union is then perceived, before there has been time to examine the ſubordinate connections; and if theſe ſhould be deficient in ſome niceties, the defect is loſt in the general impreſſion. But any part which is at variance with the reſt, is not barely a blemiſh in itſelf: it ſpreads diſorder as far as its influence extends; and the confuſion is in proportion as the other parts are more or leſs adapted to point out any *particular direction*, or to mark any *peculiar character* in the ground.

If, in ground all deſcending one way, a piece is twiſted another, the general fall is obſtructed by it; but if all the parts incline in the ſame direction, it is hardly credible how ſmall a declivity will ſeem to be conſiderable. An appearance even of ſteepneſs may be given to a very gentle deſcent, by raiſing hillocks upon it, which ſhall lean to the point, whither all the reſt are tending: for the eye meaſures from the top of the higheſt, to the bottom of the loweſt ground; and when the relation of the parts is well preſerved, ſuch an effect from one is transfuſed over the whole.

But they ſhould not, therefore, all lie exactly in the ſame direction: ſome may ſeem to point to it directly, others to incline very much, others but little, ſome partially, ſome entirely. If the direction be ſtrongly marked on a few principal parts, great liberties may be taken with the others, provided none of them are turned the contrary way. The general idea muſt, however, be preſerved, clear even of a doubt. A hillock which only intercepts the ſight, if it does not contribute to the principal effect, is at the beſt an unneceſſary excreſcence; and even an interruption in the general tendency, tho' it hide nothing, is a blemiſh. On a deſcent, any hollow, any fall, which has not an outlet to lower ground, is a hole: the eye ſkips over it, inſtead of being continued along it; it is a gap in the compoſition.

There may indeed be occaſions, when we ſhould rather wiſh to check, than to promote, the general tendency. Ground may proceed too haſtily towards its point; and we have equal power to retard, or to accelerate, the fall. We can ſlacken the precipitancy of a ſteep, by breaking it into parts, ſome of which ſhall incline leſs, than the whole before inclined, to the principal direction; and by turning them quite away, we may even change the courſe of the deſcent. Theſe powers are of uſe in the larger ſcenes, where the ſeveral great parts often lie in ſeveral directions; and if they are thereby too ſtrongly contraſted, or led towards points too widely aſunder, every art ſhould be exerted to bring them nearer together, to aſſimilate, and to connect them. As ſcenes increaſe in extent, they become more impatient of controul: they are not only leſs manageable, but ought to be leſs reſtrained; they require more variety and contraſt. But ſtill the ſame principles are applicable to the leaſt, and to the greateſt, tho' not with equal ſeverity: neither ought to be rent to pieces; and tho' a ſmall neglect, which would diſtract the one, may not diſturb the other, yet a total diſregard of all the principles of union is alike productive of confuſion in both.

7 Of the cha-acter of round.

THE *ſtyle* alſo of every part, muſt be accommodated to the character of the whole. For every piece of ground is diſtinguiſhed by certain properties: it is either tame or bold, gentle or rude, continued or broken; and if any variety, inconſiſtent with thoſe properties, be obtruded, it has no other effect than to weaken one idea without raiſing another. The inſipidity of a flat is not taken away by a few ſcattered hillocks; a continuation of uneven ground can alone give the idea of inequality. A large, deep, abrupt break, among eaſy ſwells and falls, ſeems at the beſt but a piece left unfiniſhed, and which ought to have been ſoftened: it is not more natural, becauſe it is more rude; nature forms both the one and the other, but ſeldom mixes them together. On the other hand, a ſmall fine poliſhed form, in the midſt of rough, miſhapen ground, though more elegant than all about it, is generally no better than a patch, itſelf diſgraced, and diſfiguring the ſcene. A thouſand inſtances might be adduced to ſhew, that the prevailing idea ought to pervade every part, ſo far at leaſt indiſpenſably as to exclude whatever diſtracts it, and as much further as poſſible to accommodate the character of the ground to that of the ſcene it belongs to.

On the ſame principle, the *proportion* of the parts may often be adjuſted. For though their ſize muſt be very much governed by the extent of the place, and a feature which would fill up a ſmall ſpot may be loſt in a large one; though there are forms of a particular caſt, which appear to advantage only within certain dimenſions, and ought not therefore to be applied where they have not room enough, or where they muſt occupy more ſpace than becomes them; yet, independent of theſe conſiderations, a character of greatneſs belongs to ſome ſcenes, which is not meaſured by their extent, but raiſed by other properties, ſometimes only by the proportional largeneſs of their parts. On the contrary, where elegance characteriſes the ſpot, the parts ſhould not only be ſmall, but diverſified beſides with ſubordinate inequalities, and little delicate touches every where ſcattered about them. Striking effects, forcible impreſſions, whatever ſeems to require effort, diſturb the enjoyment of a ſcene intended to amuſe and to pleaſe.

In other inſtances, ſimilar conſiderations will determine rather the *number* than the proportion of the parts. A place may be diſtinguiſhed by its ſimplicity, which many diviſions would deſtroy; another ſpot, without any pretenſions to elegance, may be remarkable for an appearance of richneſs: a multiplicity of objects will give that appearance, and a number of parts in the ground will contribute to the profuſion. A ſcene of gaiety is improved by the ſame means; the objects and the parts may differ in ſtyle, but they muſt be numerous in both. Sameneſs is dull: the pureſt ſimplicity can at the moſt render a place compoſed of large parts placid; the ſublimeſt ideas only make it ſtriking; it is always grave; to enliven it, numbers are wanting.

8 Of variety.

BUT ground is ſeldom beautiful or natural without *variety*, or even without contraſt; and the precautions which have been given, extend no farther than to prevent variety from degenerating into inconſiſtency, and contraſt into contradiction. Within the extremes, nature ſupplies an inexhauſtibie fund; and variety thus limited, ſo far from deſtroying, improves the general effect: Each diſtinguiſhed part makes a ſeparate impreſſion; and all bearing the ſame ſtamp, all concurring to the ſame end, every one is an additional ſupport to the prevailing idea: that is multiplied, it is extended, it appears in different ſhapes, it is ſhewn in ſeveral lights, and the variety illuſtrates the relation.

But variety wants not this recommendation; it is always deſirable where it can be properly introduced; and an accurate obſerver will ſee in every *form* ſeveral circumſtances by which it is diſtinguiſhed from every other. If the ſcene be mild and quiet, he will place together thoſe which do not differ widely; and he will gradually depart from the ſimilitude. In ruder ſcenes, the ſucceſſion will be leſs regular, and the tranſitions more ſudden. The character of the place muſt determine the degree of difference between forms which are contiguous. Beſides diſtinctions in the ſhapes of ground, differences in their *ſituations* and their *dimenſions* are ſources of variety. The poſition will alter the effect, though the figure be the ſame; and for particular effects, a change only in the diſtance may be ſtriking. If that be conſiderable, a ſucceſſion of ſimilar ſhapes ſometimes occaſions a fine perſpective; but the diminution will be leſs marked, that is, the effect will be leſs ſenſible, if the forms are not nearly alike: we take more notice of one difference, when there is no other. Sometimes a very diſagreeable effect, produced by too cloſe a reſemblance of ſhapes, may be remedied only by an alteration in the ſize. If a ſteep deſcends in a ſucceſſion of abrupt falls, nearly equal, they have the appearance of ſteps, and are neither pleaſing nor wild; but if they are made to differ in height and length, the objection is removed: and at all times a difference in the dimenſions will be found to have a greater effect than in ſpeculation we ſhould be inclined to aſcribe to it, and will often diſguiſe a ſimilarity of figure.

9 Of the lines traced by the ſeveral parts in ground.

It alſo contributes, perhaps more than any other circumſtance, to the perfection of thoſe *lines*, which the eye traces along the parts of a piece of ground, when it glances over ſeveral together. No variety of form compenſates for the want of it. An undulating line compoſed of parts all elegant in themſelves, all judiciouſly contraſted, and happily united, but equal one to another, is far from the line of beauty. A long ſtraight line has no variety at all; and a little deviation into a curve, if there be ſtill a continued uniformity, is but a trifling amendment. Though ground all falling the ſame requires every attention to its general tendency, yet the eye muſt not dart down the whole length immediately in one direction, but ſhould be inſenſibly conducted towards the principal point with ſome circuity and delay. The channels between hillocks ought never to run in ſtraight, nor even regularly curved lines; but winding gently among them, and conſtantly varying in form and in dimenſions, ſhould gradually find their way. The beauty of a large hill, eſpecially when ſeen from below, is frequently impaired by the even continuation of its brow. An attempt to break it by little knoles is ſeldom ſucceſsful; they ſeem ſeparate independent hillocks artificially put on. The intended effect may indeed be produced by a large knole deſcending in ſome places lower than in others, and rooted at ſeveral points into the hill. The ſame end may be attained by carrying ſome channel or hollow on the ſide upwards, till it cut the continued line; or by bringing the brow forward in one place, and throwing it back in another; or by forming a ſecondary ridge a little way down the ſide, and caſting the ground above it into a different though not oppoſite direction to the general deſcent. Any of theſe expedients will at leaſt draw the attention off from the defect. But if the break were to divide the line into equal parts, another uniformity would be added, without removing the former: for regularity always ſuggeſts a ſuſpicion of artifice; and artifice detected, no longer deceives. Our imaginations would induſtriouſly join the broken parts, and the idea of the continued line would be reſtored.

10 Of contraſt.

Whatever break be choſen, the poſition of it muſt be oblique to the line which is to be broken. A rectangular diviſion produces ſameneſs; there is no *contraſt* between the forms it divides: but if it be oblique, while it diminiſhes the part on one ſide, it enlarges that on the other. Parallel lines are liable to the ſame objection as thoſe at right angles: though each by itſelf be the perfect line of beauty; yet if they correſpond, they form a ſhape between them, whoſe ſides want contraſt. On the ſame principle, forms will ſometimes be introduced, leſs for their intrinſic than their occaſional merit in contraſting happily with thoſe about them: each ſets off the other; and together they are a more agreeable compoſition than if they had been more beautiful, but at the ſame time more ſimilar.

One reaſon why tame ſcenes are ſeldom intereſting, is, that though they often admit of many varieties, they allow of few, and thoſe only faint, contraſts. We may be pleaſed by the number of the former, but we can be ſtruck only by the force of the latter. Theſe ought to abound in the larger and bolder ſcenes of a garden, eſpecially in ſuch as are formed by an aſſemblage of many diſtinct and conſiderable parts thrown together: as when ſeveral riſing grounds appear one beyond another; a fine ſwell ſeen above a ſlanting ſweep which runs before it, has a beautiful effect, which a nearer reſemblance would deſtroy: and (except in particular inſtances) a cloſe ſimilarity between lines which either croſs, or face, or riſe behind one another, makes a poor, uniform, diſagreeable compoſition.

11 Of extraordinary effects.

The application of any of the foregoing obſervations to the ſtill greater ſcenes of nature, would carry us at preſent too far; nor could it well be made, before the other conſtituent parts of thoſe ſcenes, wood, water, rocks, and buildings, have been taken into conſideration. The rules which have been given, are chiefly applicable to ground which may be managed by a ſpade; and even there they are only general, not univerſal: few of them are without exception; very few, which, on particular occaſions, may not be diſpenſed with. Many of the above remarks are, however, ſo far of uſe in ſcenes the fartheſt from our reach, as they may aſſiſt in directing our choice of thoſe parts which are in our power to ſhew, or to conceal, though not to alter. But in converting them to this purpoſe, a caution, which has more than once been alluded to, muſt always be had in remembrance; never to ſuffer general conſiderations to interfere with *extraordinary great effects*, which riſe ſuperior to all regulations, and perhaps owe part of their force to their deviation from them. Singularity cauſes at leaſt ſurpriſe, and ſurpriſe is allied to aſtoniſhment. Theſe effects are not, however, attached merely to objects of enormous ſize; they frequently are produced by a greatneſs of ſtyle and character, within ſuch an extent as ordinary labour may modify, and the compaſs of a garden include. The caution therefore may not be uſeleſs within theſe narrow bounds: but nature proceeds ſtill further, beyond the utmoſt verge to which art can follow; and, in ſcenes licentiouſly wild, not content with contraſt, forces even contradictions to unite. The groteſque diſcordant ſhapes which are often there confuſedly jumbled together, might ſufficiently juſtify the remark. But the caprice does not ſtop here: to mix with ſuch ſhapes a form perfectly regular, is ſtill more extravagant; and yet the effect is ſometimes ſo wonderful, that we cannot wiſh the extravagance corrected. It is not unuſual to ſee a conical hill ſtanding out from a long, irregular, mountainous ridge, and greatly improving the view: but at Ilam ſuch a hill is thrown into the midſt of the rudeſt ſcene, and almoſt fills up an abyſs, ſunk among huge, bare, miſhapen hills, whoſe unwieldy parts, and uncouth forms, cut by the tapering lines of the cone, appear more ſavage from the oppoſition: and the effect would evidently be ſtronger, were the figure more complete; for it does not riſe quite to a point, and the want of perfect regularity ſeems a blemiſh. Whether ſuch a mixture of contrarieties would for a length of time be engaging, can be known only to thoſe who are habituated to the ſpot. It certainly at firſt ſight rivets the attention. But the conical hill is the moſt ſtriking object. In ſuch a ſituation it appears more ſtrange, more fantaſtic, than the

12 Deſcripti of a hill Ilam, ne Aſhbour in Derb ſhire.

14 acte

the rude ſhapes which are heaped about it: and together they ſuit the character of the place, where nature ſeems to have delighted to bring diſtances together; where two rivers, which are ingulphed many miles aſunder, iſſue from their ſubterraneous paſſages, the one often muddy when the other is clear, within a few paces of each other: but they appear only to loſe themſelves again; for they immediately unite their ſtreams, juſt in time to fall together into another current, which alſo runs through the garden. Such whimſical wonders, however, loſe their effect, when repreſented in a picture, or mimicked in ground artificially laid. They there want that vaſtneſs which conſtitutes their force; that reality which aſcertains the caprice. As accidents they may ſurpriſe; but they are not objects of choice.

13 ffects of ood on the orm of round.

To determine the choice to its proper objects is the purpoſe of the foregoing obſervations. Some of the principles upon which they are founded will be applicable alſo, and perhaps without further explanation, to the other conſtituent parts of the ſcenes of nature: they will there be often more obvious than in ground. But this is not a place for the compariſon; the ſubject now is ground only. It is not, however, foreign to that ſubject to obſerve, that the effects which have been recommended, may ſometimes be produced by wood alone, without any alteration in the ground itſelf: a tedious continued line may by ſuch means be broken. It is uſual for this purpoſe to place ſeveral little clumps along a brow; but if they are ſmall and numerous, the artifice is weak and apparent: an equal number of trees collected into one or two large maſſes, and dividing the line into very unequal parts, is leſs ſuſpicious, and obliterates the idea of ſameneſs with more certainty. Where ſeveral ſimilar lines are ſeen together, if one be planted, and the other bare, they become contraſts to each other. A hollow in certain ſituations, has been mentioned as a diſagreeable interruption in a continued ſurface: but, filled with wood, the heads of the trees ſupply the vacancy; the irregularity is preſerved; even the inequalities of the depth are in ſome meaſure ſhewn; and a continuation of ſurface is provided. Riſing ground may, on the other hand, be in appearance raiſed ſtill higher, by covering it with wood, of humble growth towards the bottom, and gradually taller as it aſcends. An additional mark of the inclination of falling ground may alſo be obtained, by placing a few trees in the ſame direction, which will ſtrongly point out the way; whereas plantations athwart a deſcent, bolſter up the ground, and check the fall: but obliquely croſſing it, they will often divert the general tendency; the ground will in ſome meaſure aſſume their direction, and they will make a variety, not a contradiction. Hedges, or continued plantations, carried over uneven ground, render the irregularity more conſpicuous, and frequently mark little inequalities, which would otherwiſe eſcape obſervation: or if a line of trees run cloſe upon the edge of an abrupt fall, they give it depth and importance. By ſuch means a view may be improved; by ſimilar means, in more confined ſpots, very material purpoſes may be anſwered.

Sect. II. *Of Wood.*

14 acteriſtic differences in trees and ſhrubs.

In the above inſtances the ground is the principal conſideration: but previous to any inquiry into the greater effects of wood, when it is itſelf an object, an examination of the *characteriſtic differences* of trees and ſhrubs is neceſſary. We do not mean botanical diſtinctions: we mean apparent, not eſſential varieties; and theſe muſt be obvious and conſiderable, to merit regard in the diſpoſition of the objects they diſtinguiſh.

Trees and ſhrubs are of different *ſhapes*, *greens*, and *growths*.

The varieties in their ſhapes may be reduced to the following heads.

Some thick with branches and foliage have almoſt *an appearance of ſolidity*; as the beech and the elm, the lilac and ſyringa. Others thin of boughs and of leaves ſeem *light and airy*; as the aſh and the arbele, the common arbor vitæ and the tamariſk.

There is a *mean betwixt the two extremes*, very diſtinguiſhable from both; as in the bladder-nut, and the aſhen-leaved maple.

They may again be divided into thoſe whoſe *branches begin from the ground*, and thoſe which *ſhoot up in a ſtem before their branches begin*. Trees which have ſome, not much clear ſtem, as ſeveral of the firs, belong to the former claſs; but a very ſhort ſtem will rank a ſhrub, ſuch as the althæa, in the latter.

Of thoſe whoſe branches begin from the ground, ſome riſe in a *conical figure*, as the larch, the cedar of Lebanon, and the holly; ſome *ſwell out in the middle of their growth, and diminiſh at both ends*, as the Weymouth pine, the mountain aſh, and the lilac: and ſome are *irregular and buſhy* from the top to the bottom, as the evergreen oak, the Virginian cedar, and Guelder roſe.

There is a great difference, between one whoſe *baſe is very large*, and another *whoſe baſe is very ſmall*, in proportion to its height: the cedar of Lebanon, and the cypreſs, are inſtances of this difference; yet in both the branches begin from the ground.

The heads of thoſe which ſhoot up into a ſtem before their branches begin, ſometimes are *ſlender cones*, as of many firs: ſometimes are *broad cones*, as of the horſe-cheſnut; ſometimes they are *round*, as of the ſtone-pine, and moſt ſorts of fruit-trees; and ſometimes *irregular*, as of the elm. Of this laſt kind there are many conſiderable varieties.

The branches of ſome grow *horizontally*, as of the oak. In others they *tend upwards*, as in the almond, and in ſeveral ſorts of broom and of willows. In others they *fall*, as in the lime, and the acacia: and in ſome of theſe laſt they *incline obliquely*, as in many of the firs; in ſome they *hang directly down*, as in the weeping willow.

Theſe are the moſt obvious great diſtinctions in the ſhapes of trees and ſhrubs. The differences between ſhades of green cannot be ſo conſiderable; but theſe alſo will be found well deſerving of attention.

Some are of a *dark green*, as the horſe-cheſnut and the yew; ſome of a *light green*, as the lime and the laurel; ſome of a *green tinged with brown*, as the Virginian cedar; ſome of a *green tinged with white*, as the arbele and the ſage tree; and ſome of a *green tinged with yellow*, as the aſhen-leaved maple and the Chineſe arbor vitæ. The variegated plants alſo are generally entitled to be claſſed with the white, or the yellow, by the ſtrong tincture of the one or the other of thoſe colours on their leaves.

Other conſiderations concerning colours will ſoon be ſuggeſted: the preſent inquiry is only into great fixed diſtinctions. Thoſe in the ſhapes and the greens of trees and ſhrubs have been mentioned: there are others, as great and as important, in their growths; but they are too obvious to deſerve mentioning. Every gradation, from the moſt humble to the moſt lofty, has, in certain ſituations, particular effects: it is unneceſſary to divide them into ſtages.

15
Variety ariſing from thoſe differences.

One principal uſe in ſettling theſe characteriſtic diſtinctions, is to point out the ſtores whence varieties may at all times be readily drawn, and the cauſes by which ſometimes inconſiſtencies may be accounted for. Trees which differ but in one of theſe circumſtances, whether of ſhape, of green, or of growth, though they agree in every other, are ſufficiently diſtinguiſhed for the purpoſe of variety: if they differ in two or three, they become contraſts; if in all, they are oppoſites, and ſeldom groupe well together. But there are intermediate degrees, by which the moſt diſtant may be reconciled: the upright branches of the almond mix very ill with the falling boughs of the weeping willow; but an interval filled with other trees, in figure between the two extremes, renders them at leaſt not unſightly in the ſame plantation. Thoſe, on the contrary, which are of one character, and are diſtinguiſhed only as the characteriſtic mark is ſtrongly or faintly impreſſed upon them, as a young beech and a birch, an acacia and a larch, all pendant, though in different degrees, form a beautiful maſs, in which unity is preſerved without ſameneſs; and ſtill finer groupes may often be produced by greater deviations from uniformity into contraſt.

Occaſions to ſhew the effects of particular ſhapes in certain ſituations will hereafter ſo frequently occur, that a further illuſtration of them now would be needleſs. But there are beſides, ſometimes in trees, and commonly in ſhrubs, ſtill *more minute varieties*,—in the turn of the branches, in the form and the ſize of the foliage, which generally catch, and often deſerve attention. Even the texture of the leaves frequently occaſions many different appearances: ſome have a ſtiffneſs, ſome an agility, by which they are more or leſs proper for ſeveral purpoſes; on many there is a gloſs, very uſeful at times to enliven, at other times too glittering for the hue of the plantation. But all theſe inferior varieties are below our notice in the conſideration of great effects: they are of conſequence only where the plantation is near to the ſight; where it ſkirts a home-ſcene, or borders the ſide of a walk: and in a ſhrubbery, which in its nature is little both in ſtyle and in extent, they ſhould be anxiouſly ſought for. The nobleſt wood is not indeed diſfigured by them; and when a wood, having ſerved as a great object to one ſpot, becomes in another the edge of a walk, little circumſtances, varying with ceaſeleſs change along the outline, will then be attended to: but where-ever theſe minute varieties are fitting, the groſſeſt taſte will feel the propriety, and the moſt curſory obſervation will ſuggeſt the diſtinctions: a detail of all would be endleſs; nor can they be reduced into claſſes. To range the ſhrubs and ſmall trees ſo that they may mutually ſet off the beauties, and conceal the blemiſhes, of each other; to aim at no effects which depend on a nicety for their ſucceſs, and which the ſoil, the expoſure, or the ſeaſon of the day, may deſtroy; to attend more to the groupes than to the individuals; and to conſider the whole as a plantation, not as a collection of plants; are the beſt general rules which can be given concerning them.

16
Of the mixture of greens.

The different tints of greens may ſeem at firſt ſight to be rather minute varieties than characteriſtic diſtinctions: but upon experience it will be found, that from ſmall beginnings they lead to material conſequences; that they are more important on the broad expanſe, than along the narrow outline of a wood; and that by their union, or their contraſt, they produce effects not to be diſregarded in ſcenes of extent and of grandeur.

A hanging wood in autumn is enriched with colours, whoſe beauty cheers the approaches of the inclement ſeaſon they forebode: but when the trees firſt droop, while the verdure as yet only begins to fade, they are no more than ſtronger tints of thoſe colours with which the greens in their vigour are ſhaded; and which now are ſucceeded by a paler white, a brighter yellow, or a darker brown. The effects are not different; they are only more faintly impreſſed at one time than another; but when they are ſtrongeſt, they are moſt obſervable. The fall of the leaf, therefore, is the time to learn the ſpecies, the order, and the proportion of tints, which blended will form *beautiful maſſes*; and, on the other hand, to diſtinguiſh thoſe which are *incompatible* near together.

The peculiar beauty of the tints of red cannot then eſcape obſervation, and the want of them throughout the ſummer-months muſt be regretted: but that want, though it cannot perfectly, may partially be ſupplied; for plants have a *permanent* and an *accidental* colour. The permanent is always ſome ſhade of green; but any other may be the accidental colour; and there is none which ſo many circumſtances concur to produce as a red. It is aſſumed in ſucceſſion by the bud, the bloſſom, the berry, the bark, and the leaf. Sometimes it profuſely overſpreads, at other times it dimly tinges the plant; and a *reddiſh green* is generally the hue of thoſe plants, on which it laſts long, or frequently returns.

Admitting this, at leaſt for many months in the year, among the characteriſtic diſtinctions, a large piece of red green, with a narrow edging of dark green along the further ſide of it, and beyond that a piece of light green larger than the firſt, will be found to compoſe a beautiful maſs. Another, not leſs beautiful, is a yellow green neareſt to the eye, beyond that a light green, then a brown green, and laſtly a dark green. The dark green muſt be the largeſt, the light green the next in extent, and the yellow green the leaſt of all.

From theſe combinations, the agreements between particular tints may be known. A light green may be next either to a yellow or a brown green, and a brown to a dark green, all in conſiderable quantities; and a little rim of dark green may border on a red or a light green. Further obſervations will ſhew, that the yellow and the white greens connect eaſily; but that a large quantity of the light, the yellow, or the white greens, does not mix well with a large quantity alſo of the dark green; and that to form a pleaſing maſs, either the dark green muſt be reduced to a mere edging, or a brown or an intermediate green muſt be interpoſed: that the red, the brown, and the intermediate greens, agree among themſelves: and that any of them may be joined to any other tint; but that the red green will bear a larger quantity of the light than of the dark green near it, nor does it ſeem ſo proper a mixture with the white green as with the reſt.

In maſſing theſe tints, an attention muſt be conſtantly kept up to their *forms*, that they do not lie in large ſtripes one beyond another; but that either they be quite intermingled, or, which is generally more pleaſing, that conſiderable pieces of different tints, each a beautiful figure, be, in different proportions, placed near together. Exactneſs in the ſhapes muſt not be attempted, for it cannot be preſerved; but if the great outlines be well drawn, little variations, afterwards occaſioned by the growth of the plants, will not ſpoil them.

17 Effects ariſing from the diſpoſition of the greens.

A SMALL thicket is generally moſt agreeable, when it is one fine maſs of well-mixed greens: that maſs gives to the whole a *unity*, which can by no other means be ſo perfectly expreſſed. When more than one is neceſſary for the extent of the plantation, ſtill if they are too much contraſted, if the gradations from one to another are eaſy, the unity is not broken by the variety.

While the union of tints is productive of pleaſing effects, ſtrong effects may, on the other hand, be ſometimes produced by their *diſagreements*. Oppoſites, ſuch, for inſtance, as the dark and light greens, in large quantities cloſe together, break to pieces the ſurface upon which they meet; and an outline which cannot be ſufficiently varied in form, may be in appearance, by the management of its ſhades: every oppoſition of tints is a break in a continued line: the depth of receſſes may be deepened by darkening the greens as they retire; a tree which ſtands out from a plantation may be ſeparated by its tint as much as by its poſition; the appearance of ſolidity or airineſs in plants depends not ſolely on the thickneſs or thinneſs, but partly on the colour of the leaves; clumps at a diſtance, may be rendered more or leſs diſtinct by their greens; and the fine effect of a dark green tree, or groupe of trees, with nothing behind it but the ſplendor of a morning or the glow of an evening ſky, cannot be unknown to any who was ever delighted with a picture of Claude, or with the more beautiful originals in nature.

Another effect attainable by the aid of the different tints, is founded on the firſt principles of *perſpective*. Objects grow faint as they retire from the eye; a detached clump, or a ſingle tree, of the lighter greens, will, therefore, ſeem farther off than one equidiſtant of a darker hue; and a regular gradation from one tint to another will alter the apparent length of a continued plantation, according as the dark or light greens begin the gradation. In a ſtraight line this is obvious; in a broken one, the fallacy in the appearance is ſeldom detected, only becauſe the real extent is generally unknown; but experiments will ſupport the principle, if they are made on plantations not very ſmall, nor too cloſe to the eye: the ſeveral parts may then be ſhortened or lengthened, and the variety of the outline be improved by a judicious arrangement of greens.

18 Of the ſeveral ſpecies of wood.

OTHER effects ariſing from mixtures of greens will occaſionally preſent themſelves in the *diſpoſition* of a wood, which is the next conſideration. Wood, as a general term, comprehends all trees and ſhrubs in whatever diſpoſition; but it is ſpecifically applied in a more limited ſenſe, and in that ſenſe we ſhall now uſe it.

Every plantation muſt be either a *wood*, a *grove*, a *clump*, or a *ſingle tree*.

A wood is compoſed both of trees and underwood, covering a conſiderable ſpace. A grove conſiſts of trees without underwood. A clump differs from either only in extent: it may be either cloſe or open: when cloſe, it is ſometimes called a *thicket*; when open, a *groupe of trees*; but both are equally clumps, whatever may be the ſhape or ſituation.

19 Of the ſurface of a wood diſtinguiſhed by its greatneſs.

ONE of the nobleſt objects in nature is the *ſurface of a large thick wood*, commanded from an eminence, or ſeen from below, hanging on the ſide of a hill. The latter is generally the more intereſting object. Its aſpiring ſituation gives it an air of greatneſs; its termination is commonly the horizon: and, indeed, if it is deprived of that ſplendid boundary, if the brow appears above it, (unleſs ſome very peculiar effect characteriſes that brow), it loſes much of its magnificence: it is inferior to a wood which covers a leſs hill from the top to the bottom; for a whole ſpace filled is ſeldom little: but a wood commanded from an eminence is generally no more than a part of the ſcene below; and its boundary is often inadequate to its greatneſs. To continue it, therefore, till it winds out of ſight, or loſes itſelf in the horizon, is generally deſirable: but then the varieties of its ſurface grow confuſed as it retires; while thoſe of a hanging wood are all diſtinct; the furtheſt parts are held up to the eye; and none are at a diſtance, though the whole be extenſive.

The varieties of a ſurface are eſſential to the beauty of it: a continued ſmooth ſhaven level of foliage is neither agreeable nor natural; the different growths of trees commonly break it in reality, and their ſhadows ſtill more in appearance. Theſe ſhades are ſo many tints, which, undulating about the ſurface, are its greateſt embelliſhment; and ſuch tints may be produced with more effect, and more certainty, by a judicious mixture of greens; at the ſame time an additional variety may be introduced, by grouping and contraſting trees very different in ſhape from each other: and whether variety in the greens or in the forms be the deſign, the execution is often eaſy, and ſeldom to a certain degree impoſſible. In raiſing a young wood, it may be perfect. In old woods, there are many ſpots which may be either thinned or thickened: and there the characteriſtic diſtinctions ſhould determine what to plant, or which to leave; at the leaſt will often point out thoſe which, as blemiſhes, ought to be taken away; and the removal of two or three trees will ſometimes accompliſh the deſign. The number of beautiful forms, and agreeable maſſes, which may decorate the ſurface, is ſo great, that where the place will not admit of one, another is always ready; and as no delicacy of finiſhing is required, no minute exactneſs is worth regarding, great effects will not be diſconcerted by ſmall obſtructions and little diſappointments.

The contraſts, however, of maſſes and of groupes muſt not be too ſtrong, where *greatneſs* is the character of the wood; for unity is eſſential to greatneſs: and if direct oppoſites be placed cloſe together, the wood is no longer one object; it is only a confuſed collection of ſeveral ſeparate plantations. But if the progreſs be gradual from the one to the other, ſhapes and tints widely different may aſſemble on the ſame ſurface; and each ſhould occupy a conſiderable ſpace: a ſingle tree, or a ſmall cluſter of trees, in the midſt of an extenſive wood, is in ſize but a ſpeck, and in colour but a ſpot; the groupes and the maſſes muſt be large to produce any ſenſible variety.

Yet ſingle trees in the midſt of a wood, though ſeldom of uſe to diverſify a ſurface, often deſerve particular regard as individuals, and are important to the greatneſs of the whole. The ſuperficies of a ſhrubby thicket, how extenſive ſoever, does not convey the ſame ideas of magnificence, as that of a hanging wood: and yet, at firſt ſight, the difference is not always very diſcernible. It often requires time to collect the ſeveral circumſtances in the latter, which ſuggeſt the elevation to which that broad expanſe of foliage is raiſed, the vaſtneſs of the trunks which ſupport it ſo high, the extent of the branches which ſpread it ſo far. When theſe circumſtances, all of grandeur, crowd together upon the mind, they dignify the ſpace; which, without them, might, indifferently, be the ſuperficies of a thicket or the ſurface of a wood: but a few large trees, not eminent above all about them, but diſtinguiſhed by ſome ſlight ſeparation, and obvious at a glance, immediately reſolve the doubt. They are noble objects in themſelves; become the ſituation; and ſerve as a meaſure to the reſt. On the ſame principle, trees which are thin of boughs and of leaves, thoſe whoſe branches tend upwards, or whoſe heads riſe in ſlender cones, have an appearance more of airineſs than of importance; and are blemiſhes in a wood, where greatneſs is the prevailing idea. Thoſe, on the contrary, whoſe branches hang directly down, have a breadth of head, which ſuits with ſuch a ſituation, though their own peculiar beauty be loſt in it.

Theſe decorations are natural graces, which never derogate from greatneſs; and a number of ſhades playing on the ſurface, over a variety of thoſe beautiful forms into which it may be caſt, enliven that ſameneſs, which, while it prevails, reduces the merit of one of the nobleſt objects in nature to that of mere ſpace. To fill that ſpace with objects of beauty, to delight the eye after it has been ſtruck, to fix the attention where it has been caught, and to prolong aſtoniſhment into admiration, are purpoſes not unworthy of the greateſt deſigns; and, in the execution, productive of embelliſhments, which in ſtyle are not unequal to ſcenes of richneſs and magnificence.

20 Of the ſurface of a romantic, and of a thin wood.

WHEN, in a romantic ſituation, very broken ground is overſpread with wood, it may be proper, on the ſurface of the wood, to mark the inequalities of the ground. *Rudeneſs*, not greatneſs, is the prevailing idea; and a choice directly the reverſe of that which is productive of unity, will produce it. Strong contraſts, even oppoſitions, may be eligible; the aim is rather to disjoint than to connect: a deep hollow may ſink into dark greens; an abrupt bank may be ſhewn by a riſing ſtage of aſpiring trees, a ſharp ridge by a narrow line of conical ſhapes: firs are of great uſe upon ſuch occaſions; their tint, their form, their ſingularity, recommend them.

A hanging *wood of thin foreſt-trees*, and ſeen from below, is ſeldom pleaſing: thoſe few trees, are by the perſpective brought nearer together; it loſes the beauty of a thin wood, and is defective as a thick one: the moſt obvious improvement, therefore, is to thicken it. But, when ſeen from an eminence, a thin wood is often a lively and elegant circumſtance in a view; it is full of objects; and every ſeparate tree ſhews its beauty. To increaſe that vivacity, which is the peculiar excellence of a thin wood, the trees ſhould be characteriſtically diſtinguiſhed both in their tints and their ſhapes; and ſuch as for their airineſs have been proſcribed in a thick wood, are frequently the moſt eligible here. Differences alſo in their growths are a further ſource of variety; each ſhould be conſidered as a diſtinct object, unleſs where a ſmall number are grouped together; and then all that compoſe the little cluſter muſt agree: but the groupes themſelves, for the ſame reaſon as the ſeparate trees, ſhould be ſtrongly contraſted; the continued underwood is their only connection, and that is not affected by their variety.

21 Of the outline of a wood.

THOUGH the ſurface of a wood, when commanded, deſerves all theſe attentions, yet the *outline* more frequently calls for our regard: it is alſo more in our power; it may ſometimes be great, and may always be beautiful. The firſt requiſite is irregularity. That a mixture of trees and underwood ſhould form a long ſtraight line, can never be natural; and a ſucceſſion of eaſy ſweeps and gentle rounds, each a portion of a greater or leſs circle, compoſing all together a line literally ſerpentine, is, if poſſible, worſe. It is but a number of regularities put together in a diſorderly manner, and equally diſtant from the beautiful both of art and of nature. The true beauty of an outline conſiſts more in breaks than in ſweeps; rather in angles than in rounds; in variety, not in ſucceſſion.

The outline of a wood is a continued line, and ſmall variations do not ſave it from the inſipidity of ſameneſs: one deep receſs, one bold prominence, has more effect than twenty little irregularities. That one divides the line into parts, but no breach is thereby made in its unity; a continuation of wood always remains; the form of it only is altered, and the extent is increaſed. The eye, which hurries to the extremity of whatever is uniform, delights to trace a varied line through all its intricacies, to pauſe from ſtage to ſtage, and to lengthen the progreſs. The parts muſt not, however, on that account be multiplied till they are too minute to be intereſting, and ſo numerous as to create confuſion. A few large parts ſhould be ſtrongly diſtinguiſhed in their forms, their directions, and their ſituations; each of theſe may afterwards be decorated with ſubordinate varieties; and the mere growth of the plants will occaſion ſome irregularity; on many occaſions, more will not be required.

Every variety in the outline of a wood muſt be a *prominence*, or a *receſs*. Breadth in either is not ſo important as length to the one, and depth to the other. If the former ends in an angle, the latter diminiſhes to a point; they have more force than a ſhallow dent, or a dwarf excreſcence, how wide ſoever. They are greater deviations from the continued line which they are intended to break; and their effect is to enlarge the wood itſelf, which ſeems to ſtretch from the moſt advanced point, back beyond the moſt diſtant to which it retires. The extent of a large wood on a flat, not commanded, can by no circumſtance be ſo manifeſtly ſhewn, as by a deep receſs; eſpecially if that receſs wind ſo as to conceal the extremity, and leave the imagination to purſue it. On the other hand, the poverty of a ſhallow wood might ſometimes be relieved by here and there a prominence, or clumps, which by their apparent junction ſhould ſeem to be prominences from it. A deeper wood with a continued outline, except when commanded, would not appear ſo conſiderable.

An inlet into a wood ſeems to have been cut, if the oppoſite points of the entrance tally; and that ſhow of art depreciates its merit: but a difference only in the ſituation of thoſe points, by bringing one more forward than the other, prevents the appearance, though their forms be ſimilar. Other points, which diſtinguiſh the great parts, ſhould in general be ſtrongly marked: a ſhort turn has more ſpirit in it than a tedious circuity; and a line broken by angles has a preciſion and firmneſs, which in an undulated line are wanting: the angles ſhould indeed commonly be a little ſoftened; the rotundity of the plant which forms them is ſometimes ſufficient for the purpoſe; but if they are mellowed down too much, they loſe all meaning. Three or four large parts thus boldly diſtinguiſhed, will break a very long outline; more may be, and often ought to be, thrown in, but ſeldom are neceſſary: and when two woods are oppoſed on the ſides of a narrow glade, neither has ſo much occaſion for variety in itſelf as if it were ſingle: if they are very different from each other, the contraſt ſupplies the deficiency to each, and the interval between them is full of variety. The form of that interval is indeed of as much conſequence as their own: though the outlines of both the woods be ſeparately beautiful, yet if together they do not caſt the open ſpace into an agreeable figure, the whole ſcene is not pleaſing; and a figure is never agreeable, when the ſides too cloſely correſpond; whether they are exactly the ſame, or exactly the reverſe of each other, they equally appear artificial.

Every variety of outline hitherto mentioned, may be traced by the *underwood* alone; but frequently the ſame effects may be produced with more eaſe, and with much more beauty, by a *few trees* ſtanding out from the thicket, and belonging, or ſeeming to belong, to the wood, ſo as to make a part of its figure. Even where they are not wanted for that purpoſe, detached trees are ſuch agreeable objects, ſo diſtinct, ſo light, when compared to the covert about them, that ſkirting along it in ſome parts, and breaking it in others, they give an unaffected grace, which can no otherwiſe be given to the outline. They have a ſtill further effect, when they ſtretch acroſs the whole breadth of an inlet, or before part of a receſs into the wood: they are themſelves ſhewn to advantage by the ſpace behind them, and that ſpace, ſeen between their ſtems, they in return throw into an agreeable perſpective. An inferior grace of the ſame kind may be often introduced, only by diſtinguiſhing the boles of ſome trees in the wood itſelf, and keeping down the thicket beneath them. Where even this cannot be well executed, ſtill the outline may be filled with ſuch trees and ſhrubs as ſwell out in the middle of their growth, and diminiſh at both ends; or with ſuch as riſe in a ſlender cone; with thoſe whoſe branches tend upwards; or whoſe baſe is very ſmall in proportion to their height; or which are very thin of boughs and of leaves. In a confined garden-ſcene, which wants room for the effect of detached trees, the outline will be heavy, if theſe little attentions are diſregarded.

22
Surface and outline of a grove.

The prevailing character of a wood is generally grandeur: the principal attention therefore which it requires, is to prevent the exceſſes of that character, to diverſify the uniformity of its extent, to lighten the unwieldineſs of its bulk, and to blend graces with greatneſs. But the character of a grove is *beauty*. Fine trees are lovely objects: a grove is an aſſemblage of them; in which every individual retains much of its own peculiar elegance, and whatever it loſes is transferred to the ſuperior beauty of the whole. To a grove, therefore, which admits of endleſs variety in the diſpoſition of the trees, differences in their ſhapes and their greens are ſeldom very important, and ſometimes they are detrimental. Strong contraſts ſcatter trees which are thinly planted, and which have not the connection of underwood; they no longer form one plantation; they are a number of ſingle trees. A thick grove is not indeed expoſed to this miſchief, and certain ſituations may recommend different ſhapes and different greens for their effects upon the *ſurface*; but in the *outline* they are ſeldom much regarded. The eye attracted into the depth of the grove, paſſes by little circumſtances at the entrance; even varieties in the form of the line do not always engage the attention: they are not ſo apparent as in a continued thicket, and are ſcarcely ſeen if they are not conſiderable.

23
The interior of a grove.

But the ſurface and the outline are not the only circumſtances to be attended to. Though a grove be beautiful as an object, it is beſides delightful as a ſpot to walk or to ſit in; and the choice and the diſpoſition of the trees for effects *within*, are therefore a principal conſideration. Mere irregularity alone will not pleaſe: ſtrict order is there more agreeable than abſolute confuſion; and ſome meaning better than none. A regular plantation has a degree of beauty; but it gives no ſatisfaction, becauſe we know that the ſame number of trees might be more beautifully arranged. A diſpoſition, however, in which the lines only are broken, without varying the diſtances, is leſs natural than any; for though we cannot find ſtraight lines in a foreſt, we are habituated to them in the hedge-rows of fields: but neither in wild nor in cultivated nature do we ever ſee trees equi-diſtant from each other: that regularity belongs to art alone. The diſtances, therefore, ſhould be ſtrikingly different: the trees ſhould gather into groupes, or ſtand in various irregular lines, and deſcribe ſeveral figures: the intervals between them ſhould be contraſted both in ſhape and in dimenſions: a large ſpace ſhould in ſome places be quite open; in others the trees ſhould be ſo cloſe together, as hardly to leave a paſſage between them; and in others as far apart as the connection will allow. In the forms and the varieties of theſe groupes, theſe lines, and theſe openings, principally conſiſts the interior beauty of a grove.

24
Deſcription of a grove at Claremont, (near Eſher in Surry.)

The force of them is moſt ſtrongly illuſtrated at Claremont: where the walk to the cottage, though deſtitute of many natural advantages, and eminent for none; though it commands no proſpect; though the water below it is a trifling pond; though it has nothing, in ſhort, but inequality of ground to recommend it; is yet the fineſt part of the garden: for a grove is there planted in a gently curved direction, all along the ſide of a hill, and on the edge of a wood, which riſes above it. Large receſſes break it into ſeveral clumps, which hang down the declivity; ſome of them approaching, but none reaching quite to the bottom. Theſe receſſes are ſo deep as to form great openings in the midſt of the grove; they penetrate almoſt to the covert: but the clumps being all equally ſuſpended from the wood; and a line of open plantation, though ſometimes narrow, running conſtantly along the top; a continuation of grove is preſerved, and the connection between the parts is never broken. Even a groupe, which near one of the extremities ſtands out quite detached, is ſtill in ſtyle ſo ſimilar to the reſt, as not to loſe all relation. Each of theſe clumps is compoſed of ſeveral others ſtill more intimately united: each is full of groupes, ſometimes of no more than two trees, ſometimes of four or five, and now and then in larger cluſters: an irregular waving line, iſſuing from ſome little crowd, loſes itſelf in the next; or a few ſcattered trees drop in a more diſtant ſucceſſion from the one to the other. The intervals, winding here like a glade, and widening there into broader openings, differ in extent, in figure, and direction; but all the groupes, the lines, and the intervals, are collected together into large general clumps, each of which is at the ſame time both compact and free, identical and various. The whole is a place wherein to tarry with ſecure delight, or ſaunter with perpetual amuſement.

25 Grove at Eſher place, (contiguous to Claremont.)

The grove at Eſher-place was planted by the ſame maſterly hand; but the neceſſity of accommodating the young plantation to ſome large trees which grew there before, has confined its variety. The groupes are few and ſmall; there was not room for larger or for more: there were no opportunities to form continued narrow glades between oppoſite lines; the vacant ſpaces are therefore chiefly irregular openings ſpreading every way, and great differences of diſtance between the trees are the principal variety; but the grove winds along the bank of a large river, on the ſide and at the foot of a very ſudden aſcent, the upper part of which is covered with wood. In one place, it preſſes cloſe to the covert; retires from it in another; and ſtretches in a third acroſs a bold receſs, which runs up high into the thicket. The trees ſometimes overſpread the flat below; ſometimes leave an open ſpace to the river; at other times crown the brow of a large knole, climb up a ſteep, or hang on a gentle declivity. Theſe varieties in the ſituation more than compenſate for the want of variety in the diſpoſition of the trees; and the many happy circumſtances which concur

> ———In Eſher's peaceful grove,
> Where Kent and nature vie for Pelham's love,

render this little ſpot more agreeable than any at Claremont. But though it was right to preſerve the trees already ſtanding, and not to ſacrifice great preſent beauties to ſtill greater in futurity; yet this attention has been a reſtraint; and the grove at Claremont, conſidered merely as a plantation, is in delicacy of taſte, and fertility of invention, ſuperior to that at Eſher.

Both were early eſſays in the modern art of gardening: and, perhaps from an eagerneſs to ſhew the effect, the trees in both were placed too near together: though they are ſtill far ſhort of their growth, they are run up into poles, and the groves are already paſt their prime; but the temptation to plant for ſuch a purpoſe no longer exiſts, now that experience has juſtified the experiment. If, however, we ſtill have not patience to wait, it is poſſible to ſecure both a preſent and a future effect, by fixing firſt on a diſpoſition which will be beautiful when the trees are large, and then intermingling another which is agreeable while they are ſmall. Theſe occaſional trees are hereafter to be taken away; and muſt be removed in time, before they become prejudicial to the others.

The conſequence of variety in the diſpoſition, is variety in the light and ſhade of the grove; which may be improved by the choice of the trees. Some are impenetrable to the fierceſt ſun-beam; others let in here and there a ray between the large maſſes of their foliage; and others, thin both of boughs and of leaves, only chequer the ground. Every degree of light and ſhade, from a glare to obſcurity, may be managed, partly by the number, and partly by the texture, of the trees. Differences only in the manner of their growths have alſo correſponding effects: there is a cloſeneſs under thoſe whoſe branches deſcend low, and ſpread wide; a ſpace and liberty where the arch above is high; and frequent tranſitions from the one to the other are very pleaſing. Theſe ſtill are not all the varieties of which the interior of a grove is capable: trees indeed, whoſe branches nearly reach the ground, being each a ſort of thicket, are inconſiſtent with an open plantation: but though ſome of the characteriſtic diſtinctions are thereby excluded, other varieties more minute ſucceed in their place; for the freedom of paſſage throughout brings every tree in its turn near to the eye, and ſubjects even differences in foliage to obſervation. Theſe, ſlight as they may ſeem, are agreeable when they occur: it is true, they are not regretted when wanting; but a defect of ornament is not neceſſarily a blemiſh.

26 Of the forms of clumps.

It has been already obſerved, that clumps differ only in extent from woods, if they are cloſe; or from groves, if they are open: they are ſmall woods, and ſmall groves, governed by the ſame principles as the larger, after allowances made for their dimenſions. But beſides the properties they may have in common with woods or with groves, they have others peculiar to themſelves, which require examination.

They are either *independent* or *relative*: when independent, their beauty, as ſingle objects, is ſolely to be attended to; when relative, the beauty of the individuals muſt be ſacrificed to the effect of the whole, which is the greater conſideration.

The leaſt clump that can be, is of two trees; and the beſt effect they can have is, that their heads united ſhould appear one large tree: two therefore of different ſpecies, or ſeven or eight of ſuch ſhapes as do not eaſily join, can hardly be a beautiful groupe, eſpecially if it have a tendency to a circular form. Such clumps of firs, though very common, are ſeldom pleaſing; they do not compoſe one maſs, but are only a confuſed number of pinnacles. The confuſion is however avoided, by placing them in ſucceſſion, not in cluſters; and a clump of ſuch trees is therefore more agreeable when it is extended

tended rather in length than in breadth.

Three trees together muſt form either a right line, or a triangle: to diſguiſe the regularity, the diſtances ſhould be very different. Diſtinctions in their ſhapes contribute alſo to the ſame end; and a variety in their growths ſtill more. When a ſtraight line conſiſts of two trees nearly ſimilar, and of a third much lower than they are, the even direction in which they ſtand is hardly diſcernible.

If humbler growths at the extremity can diſcompoſe the ſtricteſt regularity, the uſe of them is thereby recommended upon other occaſions. It is indeed the variety peculiarly proper for clumps: every apparent artifice affecting the objects of nature, diſguſts; and clumps are ſuch diſtinguiſhed objects, ſo liable to the ſuſpicion of having been left or placed on purpoſe to be ſo diſtinguiſhed, that, to divert the attention from theſe ſymptoms of art, irregularity in the compoſition is more important to them than to a wood or to a grove: being alſo leſs extenſive, they do not admit ſo much variety of outline: but variety of growths is moſt obſervable in a ſmall compaſs; and the ſeveral gradations may often be caſt into beautiful figures.

The extent and the outline of a wood or a grove engage the attention more than the extremities; but in clumps the laſt are of the moſt conſequence: they determine the form of the whole; and both of them are generally in ſight: great care ſhould therefore be taken to make them agreeable and different. The eaſe with which they may be compared, forbids all ſimilarity between them: for every appearance of equality ſuggeſts an idea of art; and therefore a clump as broad as it is long, ſeems leſs the work of nature than one which ſtretches into length.

Another peculiarity of clumps, is the facility with which they admit a mixture of trees and of ſhrubs, of wood and of grove; in ſhort, of every ſpecies of plantation. None are more beautiful than thoſe which are ſo compoſed. Such compoſitions are, however, more proper in compact than in ſtraggling clumps: they are moſt agreeable when they form one maſs: if the tranſitions from very lofty to very humble growths, from thicket to open plantations, be frequent and ſudden, the diſorder is more ſuited to rude than to elegant ſcenes.

26
Of the forms of clumps.

27
ſes and ſituations of depen-
nt
umps.

THE *occaſions* on which independent clumps may be applied, are many. They are often deſirable as beautiful objects in themſelves; they are ſometimes neceſſary to break an extent of lawn, or a continued line, whether of ground or of plantation; but on all occaſions a jealouſy of art conſtantly attends them, which irregularity in their figure will not always alone remove. Though elevations ſhew them to advantage, yet a hillock evidently thrown up on purpoſe to be crowned with a clump, is artificial to a degree of diſguſt: ſome of the trees ſhould therefore be planted on the ſides, to take off that appearance. The ſame expedient may be applied to clumps placed on the brow of a hill, to interrupt its ſameneſs: they will have leſs oſtentation of deſign, if they are in part carried down either declivity. The objection already made to planting many along ſuch a brow, is on the ſame principle: a ſingle clump is leſs ſuſpected of art; if it be an open one, there can be no finer ſituation for it, than juſt at the point of an abrupt hill, or on a promontory into a lake or a river. It is in either a beautiful termination, diſtinct by its poſition, and enlivened by an expanſe of ſky or of water about and beyond it. Such advantages may balance little defects in its form: but they are loſt if other clumps are planted near it; art then intrudes, and the whole is diſpleaſing.

28
Of clumps which have a relation to each other.

BUT though a multiplicity of clumps, when each is an independent object, ſeldom ſeems natural; yet a number of them may, without any appearance of art, be admitted into the ſame ſcene, if they bear a *relation* to each other: if by their ſucceſſion they diverſify a continued outline of wood, if between them they form beautiful glades, if all together they caſt an extenſive lawn into an agreeable ſhape, the *effect* prevents any ſcrutiny into the means of producing it. But when the reliance on that effect is ſo great, every other conſideration muſt give way to the beauty of the whole. The figure of the glade, of the lawn, or of the wood, are principally to be attended to: the fineſt clumps, if they do not fall eaſily into the great lines, are blemiſhes; their connections, their contraſts, are more important than their forms.

A line of clumps, if the intervals be cloſed by others beyond them, has the appearance of a wood, or of a grove; and in one reſpect the ſemblance has an advantage over the reality. In different points of view, the relations between the clumps are changed, and a variety of forms is produced, which no continued wood or grove, however broken, can furniſh. Theſe forms cannot all be equally agreeable; and too anxious a ſolicitude to make them every where pleaſing, may, perhaps, prevent their being ever beautiful. The effect muſt often be left to chance; but it ſhould be ſtudiouſly conſulted from a few principal points of view; and it is eaſy to make any receſs, any prominence, any figure in the outline, by clumps thus advancing before, or retiring behind one another.

But amidſt all the advantages attendant on this ſpecies of plantation, it is often exceptionable when commanded from a neighbouring eminence: clumps below the eye loſe ſome of their principal beauties, and a number of them betray the art of which they are always liable to be ſuſpected; they compoſe no ſurface of wood, and all effects ariſing from the relations between them are entirely loſt. A proſpect ſpotted with many clumps can hardly be great: unleſs they are ſo diſtinct as to be objects, or ſo diſtant as to unite into one maſs, they are ſeldom an improvement of a view.

29
Of ſingle trees.

THE proper ſituations for ſingle trees are frequently the ſame as for clumps: the choice will often be determined, ſolely by the conſideration of proportion between the object, and the ſpot it is intended to occupy; and if the deſired effect can be attained by a ſingle tree, the ſimplicity of the means recommends it. Sometimes it will be preferred merely for variety; and may be uſed to mark one point in a ſcene in which two or three points are already diſtinguiſhed by clumps. It may occaſionally be applied to moſt of the purpoſes for which clumps are uſed; may be an independent object; may interrupt a continued line, or decorate an extent of ſpace. There is but one effect reſulting from clumps which may not to a certain degree be produced by ſingle trees: a number of them will never unite into one large maſs; but more diſtant relations may be obſerved between them. Scattered about a lawn, they may caſt it into an agreeable ſhape; and to produce that ſhape, each muſt be placed with an attention to the reſt: they may ſtand in particular directions, and collectively form agreeable figures; or between ſeveral ſtraggling trees little glades may open, full of variety and beauty. The lines they trace are fainter than thoſe which larger plantations deſcribe; but then their forms are their own: they are therefore abſolutely free from all appearance of art; any diſpoſition of them, if it be but irregular, is ſure to be natural.

The ſituations of ſingle trees is the firſt conſideration, and differences in the diſtances between them their greateſt variety. In ſhape, they admit of no choice but that which their ſpecies affords: greatneſs often, beauty often, ſometimes mere ſolidity, and now and then peculiarity alone, recommends them. Their ſituations will alſo frequently determine the ſpecies. If they are placed before a continued line of wood only to break it, they ſhould commonly be ſimilar to the trees in that wood; they will elſe loſe their connection, and not affect the outline which they are intended to vary: but if they are deſigned to be independent objects, they are as ſuch more diſcernible when diſtinguiſhed, both in their ſhapes and their greens, from any plantations about them. After all, the choice, eſpecially in large ſcenes, is much confined to the trees on the ſpot. Young clumps from the firſt have ſome, and ſoon produce a conſiderable effect: but a young ſingle tree for many years has none at all: and it is often more judicious to preſerve one already growing, though not exactly ſuch as might be wiſhed, either in itſelf, or in its ſituation, than to plant in its ſtead another, which may be a finer object, and better placed, in a diſtant futurity.

Sect. III. *Of Water.*

30 Effects and ſpecies of water.

In conſidering the ſubjects of gardening, ground and wood firſt preſent themſelves: water is the next; which, though not abſolutely neceſſary to a beautiful compoſition, yet occurs ſo often, and is ſo capital a feature, that it is always regretted when wanting; and no large place can be ſuppoſed, a little ſpot can hardly be imagined, in which it may not be agreeable. It accommodates itſelf to every ſituation; is the moſt intereſting object in a landſcape, and the happieſt circumſtance in a retired receſs; captivates the eye at a diſtance, invites approach, and is delightful when near: it refreſhes an open expoſure; it animates a ſhade; cheers the dreárineſs of a waſte, and enriches the moſt crowded view. In form, in ſtyle, and in extent, it may be made equal to the greateſt compoſitions, or adapted to the leaſt: it may ſpread in a calm expanſe to ſoothe the tranquillity of a peaceful ſcene; or, hurrying along a devious courſe, add ſplendor to a gay, and extravagance to a romantic, ſituation. So various are the characters which water can aſſume, that there is ſcarcely an idea in which it may not concur, or an impreſſion which it cannot enforce. A deep ſtagnated pool, dank and dark with ſhades which it dimly reflects, befits the ſeat of melancholy; even a river, if it be ſunk between two diſmal banks, and dull both in motion and colour, is like a hollow eye, which deadens the countenance; and over a ſluggard, ſilent ſtream, creeping heavily along all together, a gloom hangs, which no art can diſſipate, nor even the ſunſhine diſperſe. A gently murmuring rill, clear and ſhallow, juſt gurgling, juſt dimpling, impoſes ſilence, ſuits with ſolitude, and leads to meditation: a briſker current, which wantons in little eddies over a bright ſandy bottom, or babbles among pebbles, ſpreads cheerfulneſs all around: a greater rapidity, and more agitation, to a certain degree are animating; but in exceſs, inſtead of wakening, they alarm the ſenſes: the roar and the rage of a torrent, its force, its violence, its impetuoſity, tend to inſpire terror; that terror which, whether as cauſe or effect, is ſo nearly allied to ſublimity.

Abſtracted, however, from all theſe ideas, from every ſenſation, either of depreſſion, compoſure, or exertion; and conſidering water merely as an object; no other is ſo apt ſoon to catch, and long to fix, the attention. But it may want beauties of which we know it is capable, or the marks may be confuſed by which we diſtinguiſh its ſpecies; and theſe defects diſpleaſe: to avoid them, the properties of each ſpecies muſt be determined.

All water is either *running*, or *ſtagnated:* when ſtagnated, it forms a *lake* or a *pool,* which differ only in extent; and a *pool* and a *pond* are the ſame. Running waters are either a *rivulet*, a *river*, or a *rill;* and theſe differ only in breadth: a *rivulet* and a *brook* are ſynonymous terms; a *ſtream* and a *current* are general names for all.

In a garden, the water is generally imitative. That which in the open country would be called a *great pond,* there aſſumes the name, and ſhould be ſhaped as if it had the extent, of a lake; for it is large in proportion to the other parts of the place. Though ſometimes a real river paſſes thro' a garden, yet ſtill but a ſmall portion of it is ſeen; and more frequently the ſemblance only of ſuch a portion is ſubſtituted inſtead of the reality. In either caſe, the imitation is loſt, if the characteriſtic diſtinctions between a lake and a river be not ſcrupulouſly preſerved.

31 Difference between a lake and a river.

The characteriſtic property of running water is *progreſs;* of ſtagnated, is *circuity:* the one ſtretches into length, the other ſpreads over ſpace. But it is neceſſary that the whole circumference of a lake be ſeen, or that no bounds be ſet to the proſpect of a river: on the contrary, the latter is never more beautiful than when it is loſt in a wood, or retires behind a hill from the view: the former never appears ſo great as when its termination is concealed; the *ſhape*, not the *cloſe*, denotes the character: if the oppoſite ſhores are both concave, they ſeem intended to ſurround, and to meet; if they are nearly parallel, they ſhew no tendency to come together, but ſuggeſt the idea of continuation.

To make both the banks of a river in concave forms is to ſin againſt this firſt principle; and yet the fault is often committed, in order to increaſe the expanſe. But when the bold ſweep of a river is thus converted into an inſignificant pool, more is loſt to the imagination in length, than is gained to the view in breadth; and, paradoxical as the aſſertion may ſeem, it is certainly true, that the water would appear more important were it narrower. When one bank, therefore, retires, the other, if it does not advance, ſhould, at the leaſt, continue its former direction; or if that ſhould be convex, it may be ſtraitened; but both muſt not together depart from the appearance of progreſs.

Particular occaſions may, however, juſtify a ſeeming

ing deviation from the rule. To make room for an iſland, it may be proper to widen the river every way: for there the water is, in fact, intended to ſurround, and to meet; while the currents on each ſide preſerve the principal character. The ſame liberty may alſo be allowed on the influx of a collateral ſtream; and the acceſſion will account for both the breadth and for the ſhape: but the licence muſt here be uſed with moderation, leſt the wide place become principal, and divide the river into two ſtreams, the one falling into a pool, and the other iſſuing from it. Both the ſides of a lake may at all times retire; but on ſuch an acceſſion, the increaſe ſhould be chiefly on the ſhore oppoſite to the collateral ſtream, that it may appear to be a real enlargement of the lake, and not merely the mouth of a river.

A collateral ſtream ſhould, in general, keep, or ſeem to keep, for ſome way, to nearly the ſame breadth: if it diminiſhes very faſt, it muſt ſoon come to an end, and has more the appearance of a creek than of a ſtream. Whether it be the one or the other, may be matter of indifference when it falls into a lake: but a creek is ſeldom agreeable in a river; it diverts the current, its waters ſeem ſtagnated, it weakens the idea of progreſs.

All receſſes in which the current is loſt, are blemiſhes in a river. A bay is as exceptionable as a creek. Whatever be the form, if it be a receptacle, not a paſſage, it is a ſymptom that the water rather ſpreads than proceeds, and hurts the character of the river. But a head-land, which only turns or contracts the ſtream, though it make a ſort of bay, is not liable to the ſame objection. Such a bay has a vent; ſuch an obſtruction only ſtrengthens the current; they do not ſuggeſt the moſt diſtant idea of ſtagnation. It is almoſt needleſs to add, that in a lake, juſt the reverſe of a river, creeks, bays, receſſes of every kind, are always in character, ſometimes neceſſary, and generally beautiful: the objections to them in the one, are recommendations of them to the other.

32
a lake.

Besides the circumſtances which have been mentioned, and in which a river and a lake eſſentially differ; beſides thoſe in which they agree, and which are too obvious to require illuſtration; there are ſome peculiar to each character, and which, though common in the one, can hardly occur in the other; at leaſt, not ſo often, nor to that degree, as to become ſubjects of compariſon.

Space is eſſential to a lake; it may ſpread to any extent; and the mind, always pleaſed to expand itſelf on great ideas, delights even in its vaſtneſs. A lake cannot be too large as a ſubject of deſcription or of contemplation: but the eye receives little ſatisfaction when it has not a form on which to reſt: the ocean itſelf hardly atones by all its grandeur for its infinity; and a proſpect of it is, therefore, always moſt agreeable, when in ſome part, at no great diſtance, a reach of ſhore, a promontory, or an iſland, reduces the immenſity into ſhape. If the moſt extenſive view which can be the object of viſion, muſt be reſtrained in order to be pleaſing; if the nobleſt ideas which the creation can ſuggeſt, muſt be checked in their career, before they can be reconciled to the principles of beauty; an offence againſt thoſe principles, a tranſgreſſion of that reſtraint, will not eaſily be forgiven on a ſubject leſs than infinite: a lake whoſe bounds are out of ſight, is circumſcribed in reality, not in appearance; at the ſame time that it diſappoints the eye, it confines the imagination; it is but a waſte of waters, neither intereſting nor agreeable.

A diſtant flat coaſt, dimly and doubtfully ſeen, does not obviate the objection; but it may be the means of removing it; for elevation and diſtinctneſs give an appearance of proximity, and contract the ſpace they limit. This is the conſtant effect of a high ſhore: a low one, covered with wood, is in reality raiſed; and marked by buildings, becomes more conſpicuous; it acquires an artificial elevation and diſtinctneſs.

Theſe obſervations, though immediately relative to very large bodies of water, are ſtill applicable to imitative lakes in parks and gardens. The principles upon which they are founded are equally true in both; and though an artificial lake cannot be ſuppoſed, which ſhall be abſolutely, yet comparatively it may be extravagant. It may be ſo out of proportion to its appendages, as to ſeem a waſte of water; for all ſize is in ſome reſpects relative: if this exceeds its due dimenſions, and if a flatneſs of ſhore beyond it adds ſtill to the drearineſs of the ſcene, wood to raiſe the banks, and objects to diſtinguiſh them, will, from the ſame cauſe, produce the ſame effects as on a larger ſcale. If the length of a piece of water be too great for its breadth, ſo as to deſtroy all idea of circuity, the extremities ſhould be conſidered as too far off, and made important, to give them proximity; while at the ſame time the breadth may be favoured, by keeping down the banks on the ſides. On the ſame principle, if the lake be too ſmall, a low ſhore will, in appearance, increaſe the extent.

But it is not neceſſary that the whole ſcene be bounded: if form be impreſſed on a conſiderable part, the eye can, without diſguſt, permit a large reach to ſtretch beyond its ken; it can even be pleaſed to obſerve a tremulous motion in the horizon, which ſhews that the water has not there yet attained its termination. Still ſhort of this, the extent may be kept in uncertainty; a hill or a wood may conceal one of the extremities, and the country beyond it, in ſuch a manner as to leave room for the ſuppoſed continuation of ſo large a body of water. Opportunities to chooſe this ſhape are frequent, and it is the moſt perfect of any: the ſcene is cloſed, but the extent of the lake is undermined; a complete form is exhibited to the eye, while a boundleſs range is left open to the imagination.

But mere form will only give content, not delight: that depends upon the outline, which is capable of exquiſite beauty; and the *bays*, and the *creeks*, and the *promontories*, which are ordinary parts of that outline, together with the accidents of *iſlands*, of *inlets* and of *outlets* to rivers, are in their ſhapes and their combinations an inexhauſtible fund of variety.

A ſtraight line of conſiderable length may find a place in that variety; and it is ſometimes of ſingular uſe to prevent the ſemblance of a river in a channel formed between iſlands and the ſhore. But no figure perfectly regular ought ever to be admitted; it always ſeems artificial, unleſs its ſize abſolutely forbid the ſuppoſition. A ſemicircular bay, though the ſhape be beautiful, is not natural; and any rectilinear figure is abſo-

Section III. Water.

abſolutely ugly: but if one line be curved, another may ſometimes be almoſt ſtraght: the contraſt is agreeable; and to multiply the occaſions of ſhewing contraſts, may often be a reaſon for giving ſeveral directions to a creek, and more than two ſides to a promontory.

Bays, creeks, and promontories, though extremely beautiful, ſhould not, however, be very numerous: for a ſhore broken into little points and hollows has no certainty of outline; it is only ragged, not diverſified; and the diſtinctneſs and ſimplicity of the great parts are hurt by the multiplicity of ſubdiviſions. But iſlands, though the channels between them be narrow, do not ſo often derogate from greatneſs: they intimate a ſpace beyond them whoſe boundaries do not appear; and remove to a diſtance the ſhore which is ſeen in perſpective between them. Such partial interruptions of the ſight ſuggeſt ideas of extent to the imagination.

The inlets and the outlets of rivers have ſimilar effects: fancy purſues the courſe of the ſtream far beyond the view; no limits are fixed to its excurſions. The greateſt compoſition therefore of water is that which is in part a lake, and in part a river; which has all the expanſe of the one, and all the continuation of the other, each being ſtrongly characteriſed to the very point of their junction. If that junction break into a ſide of the lake, the direction of the river ſhould be oblique to the line it cuts; rectangular biſections are in this, as in all other inſtances, formal: but when the conflux is at an angle, ſo that the bank of the river coincides with one ſhore of the lake, they ſhould both continue for ſome way in the ſame direction; a deviation from that line immediately at the outlet detaches the lake from the river.

32 Courſe of a river.

THOUGH the windings of a river are proverbially deſcriptive of its courſe; yet without being perpetually wreathed, it may be natural. Nor is the character expreſſed only by the turnings. On the contrary, if they are too frequent and ſudden, the current is reduced into a number of ſeparate pools, and the idea of progreſs is obſcured by the difficulty of tracing it. Length is the ſtrongeſt ſymptom of continuation: long reaches are, therefore, characteriſtic of a river; and they conduce much to its beauty: each is a conſiderable piece of water; and variety of beautiful forms may be given to their outlines; but a ſtraight one can very ſeldom be admitted: it has the appearance of a cut canal, unleſs great breadth, a bridge acroſs it, and ſtrong contraſts between the objects on the banks, diſguiſe the formality. A very ſmall curvature obliterates every idea of art and ſtagnation; and a greater is often miſchievous: for an exceſs of deviation from a ſtraight towards a circular line, ſhortens the view, weakens the idea of continuation, and tho' not chargeable with ſtiffneſs, yet approaches to regularity; whereas the line of beauty keeps at a diſtance from every figure which a rule can determine or a compaſs deſcribe.

A conſiderable degree of roundneſs is, however, often becoming, where the ſtream changes its direction: and if the turn be effected by a ſharp point of land on one ſide, there is the more occaſion for circuity on the other. The river ſhould alſo be widened under that other bank: for it is the nature of water thus driven out of its courſe, to daſh and encroach upon the oppoſite ſhore. Where this circumſtance has been attended to, the bend appears natural; and the view ending in ſpace, gives ſcope to the imagination. The turn, therefore, ought generally to be larger than a right angle: if it be leſs, it cloſes immediately, and checks the idea of progreſs.

33 Of brid

To further that idea is one uſe of *bridges*. Though they croſs, they do not cloſe the view: the water is ſeen to run through them, and is ſuppoſed to continue far beyond them: ſuch a communication between the oppoſite banks implies the want of any other, and gives both length and depth to the ſtream. The form of a lake, on the contrary, intimates, that all the ſeveral ſhores are, by making a certain circuit, acceſſible. Bridges, therefore, are inconſiſtent with the nature of a lake, but characteriſtic of a river: they are on that account uſed to diſguiſe a termination: but the deception has been ſo often practiſed, that it no longer deceives; and a bolder aim at the ſame effect will now be more ſucceſsful. If the end can be turned juſt out of ſight, a bridge at ſome diſtance raiſes a belief, while the water beyond it removes every doubt, of the continuation of the river: the ſuppoſition immediately occurs, that if a diſguiſe had been intended, the bridge would have been placed further back; and the diſregard thus ſhewn to one deception, gains credit for the other.

To give to bridges their full effect, the connection between them and the river muſt be attended to: from the want of it, the ſingle wooden arch, now much in faſhion, ſeems to us generally miſplaced. Elevated, without occaſion, ſo much above, it is totally detached from, the river; it is often ſeen ſtraddling in the air, without a glimpſe of the water to account for it: and the oſtentation of it as an ornamental object, diverts all that train of ideas which its uſe as a communication might ſuggeſt. The vaſtneſs of Walton bridge cannot without affectation be mimicked in a garden, where the magnificent idea of including the Thames under one arch is wanting, and where the ſtructure itſelf reduced to a narrow ſcale retains no pretenſions to greatneſs. Unleſs the ſituation make ſuch a height neceſſary, or the point of view be greatly above it, or wood or riſing ground inſtead of ſky behind it, fill up the vacancy of the arch, it ſeems an effort without a cauſe, forced and prepoſterous.

The vulgar foot-bridge, of planks only, guarded on one hand by a common rail, and ſupported by a few ordinary piles, is often more proper. It is perfect as a communication, becauſe it pretends to nothing further: it is the utmoſt ſimplicity of cultivated nature: and if the banks from which it ſtarts be of a moderate heighth, its elevation preſerves it from meanneſs. No other ſpecies ſo effectually characteriſes a river: it ſeems too plain for an ornament, too obſcure for a diſguiſe: it muſt be for uſe; it can be a paſſage only: it is therefore ſpoiled, if adorned; it is diſfigured, if only painted of any other than a duſky colour.

But being thus incapable of all decoration and importance, it is often too humble for a great, and too ſimple for an elegant, ſcene. A ſtone bridge is generally more ſuitable to either: but in this alſo, an extraordinary elevation is ſeldom becoming, unleſs the grandeur compenſate for the diſtance at which it leaves the water below. A gentle riſe, and eaſy ſweep, more cloſely preſerve the relation: a certain degree of union ſhould alſo be formed between the banks and the bridge; that it may ſeem to riſe out of the banks, not barely to be impoſed upon them. It ought not generally to ſwell much above their level; the parapet wall ſhould be brought down near to the ground, or end againſt ſome ſwell; and the ſize and the uniformity of the abutments ſhould be broken by hillocks or thickets about them: every expedient ſhould be uſed to mark the connection of the building both with the ground from which it ſtarts, and the water which it croſſes.

In wild and romantic ſcenes may be introduced a ruined ſtone-bridge, of which ſome arches may be ſtill ſtanding, and the loſs of thoſe which are fallen may be ſupplied by a few planks, with a rail, thrown over the vacancy. It is a pictureſque object; it ſuits the ſituation; and the antiquity of the paſſage, the care taken to keep it ſtill open though the original building is decayed, the apparent neceſſity which thence reſults for a communication, give it an impoſing air of reality.

In every ſcene of magnificence, in ſome where elegance chiefly prevails, a bridge with a colonnade, or other ornamental ſtructure upon it, is characteriſtically proper, and it has a peculiarity which recommends it to many ſituations. The colonnade is alone a perfect independent object, which may belong to ſeveral ſpecies of buildings: it may, therefore, embelliſh a ſcene where no water is viſible: but the ſight muſt not be let down below the baluſtrade. If the arches appear, this is like other bridges ſhown by themſelves: they may now and then be of uſe to mark a continuation of water, which would otherwiſe be doubtful; but in general they only remind us of what is wanting to the view.

In ſome ſituations, two or three bridges may be admitted into one ſcene; a collateral ſtream always, the turnings of the ſame ſtream often, afford opportunities to place them in ſeveral directions; and a greater diſtinction between objects is ſeldom required, than that between two bridges, in conſtruction exactly alike, one of which preſents the paſſage over it, and the other that under it, to the eye. Such a variety of beautiful forms have beſides been invented for them, that, in ſimilar poſitions, they may be objects in very different ſtyles: and collateral circumſtances occaſion ſtill further diſtinctions. A bridge, which, by means of a bend in the river, is backed with wood or riſing grounds, has, in the effect, little ſimilarity to one through which nothing can be ſeen but the water and the ſky: and if the accident which diſtinguiſhes, immediately groupes with the bridge; if, for inſtance, a tree, or a little cluſter of trees, ſtand ſo that the ſtems appear beneath, the heads above the arches; the whole is but one pictureſque object, which retains no more than a diſtant reſemblance to a bridge quite ſimple and unaccompanied. Amidſt all this variety, two or three may eaſily be choſen, which, in the ſame landſcape, ſo far from aſſimilating, will diverſify the parts; and, if properly diſpoſed, neither in a confuſed crowd nor in a formal ſucceſſion, will not encumber the view.

34 Accompaniments on the banks.

A RIVER requires a number of *accompaniments*. The changes in its courſe furniſh a variety of ſituations; while the fertility, convenience, and amenity, which attend it, account for all appearances of inhabitants and improvement. Profuſion of ornament on a fictitious river, is a juſt imitation of cultivated nature. Every ſpecies of building, every ſtile of plantation, may abound on the banks; and whatever be their characters, their proximity to the water is commonly the happieſt circumſtance in their ſituation. A luſtre is from thence diffuſed on all around; each derives an importance from its relation to this capital feature: thoſe which are near enough to be reflected, immediately belong to it; thoſe at a greater diſtance ſtill ſhare in the animation of the ſcene; and objects totally detached from each other, being all attracted towards the ſame intereſting connexion, are united into one compoſition.

35 Deſcription of the water at Blenheim.

In the front of Blenheim was a deep broad valley, which abruptly ſeparated the caſtle from the lawn and the plantations before it; even a direct approach could not be made, without building a monſtrous bridge over the vaſt hollow: but this forced communication was only a ſubject of raillery; and the ſcene continued broken into two parts, abſolutely diſtinct from each other. This valley has been lately flooded: it is not filled; the bottom only is covered with water: the ſides are ſtill very high; but they are no longer the ſteeps of a chaſm, they are the bold ſhores of a noble river. The ſame bridge is ſtanding without alteration: but no extravagance remains; the water gives it propriety. Above it the river firſt appears, winding from behind a ſmall thick wood, in the valley; and ſoon taking a determined courſe, it is then broad enough to admit an iſland filled with the fineſt trees: others, correſponding to them in growth and diſpoſition, ſtand in groupes on the banks, intermixed with younger plantations. Immediately below the bridge, the river ſpreads into a large expanſe: the ſides are open lawn. On that furtheſt from the houſe formerly ſtood the palace of Henry the Second, celebrated in many an ancient ditty by the name of Fair Roſamond's Bower. A little clear ſpring, which riſes there, is by the country people ſtill called Fair Roſamond's Well. The ſpot is now marked by a ſingle willow. Near it, is a fine collateral ſtream, of a beautiful form, retaining its breadth as far as it is ſeen, and retiring at laſt behind a hill from the view. The main river, having received this acceſſion, makes a gentle bend; then continues for a conſiderable length in one wide direct reach; and, juſt as it diſappears, throws itſelf down a high caſcade, which is the preſent termination. On one of the banks of this reach is the garden: the ſteeps are there diverſified with thickets and with glades; but the covert prevails, and the top is crowned with lofty trees. On the other ſide is a noble hanging wood in the park: it was depreciated when it ſunk into a hollow, and was poorly loſt in the bottom; but it is now a rich appendage to the river, falling down an eaſy ſlope quite to the water's edge, where, without overſhadowing, it is reflected on the ſurface. Another face of the ſame wood borders the collateral ſtream, with an outline more indented and various; while a very large irregular clump adorns the oppoſite declivity. This clump is at a conſiderable diſtance from the principal river: but the ſtream it be-

belongs to, brings it down to connect with the reſt; and the other objects, which were before diſperſed, are now, by the intereſt of each in a relation which is common to all, collected into one illuſtrious ſcene. The caſtle is itſelf a prodigious pile of building; which, with all the faults in its architecture, will never ſeem leſs than a truly princely habitation; and the confined ſpot where it was placed, on the edge of an abyſs, is converted into a proud ſituation, commanding a beautiful proſpect of water, and open to an extenſive lawn, adequate to the manſion, and an emblem of its domain. In the midſt of this lawn ſtands a column, a ſtately trophy, recording the exploits of the Duke of Marlborough, and the gratitude of Britain. Between this pillar and the caſtle is the bridge, which now, applied to a ſubject worthy of it, is eſtabliſhed in all the importance due to its greatneſs. The middle arch is wider than the Rialto, but not too wide for the occaſion; and yet this is the narroweſt part of the river: but the length of the reaches is every where proportioned to their breadth: each of them is alone a noble piece of water: and the laſt, the fineſt of all, loſes itſelf gradually in a wood, which, on that ſide, is alſo the boundary of the lawn, and riſes into the horizon. All is great in the front of Blenheim: but in that vaſt ſpace no void appears; ſo important are the parts, ſo magnificent the objects. The plain is extenſive, the valley is broad, the wood is deep. Tho' the intervals between the buildings are large, they are filled with the grandeur which buildings of ſuch dimenſions and ſo much pomp diffuſe all around them; and the river, in its long varied courſe, approaching to every object, and touching upon every part, ſpreads its influence over the whole. Notwithſtanding their diſtances from each other, they all ſeem to be aſſembled about the water, which is every where a fine expanſe, whoſe extremities are undetermined. In ſize, in form, and in ſtyle, it is equal to the majeſty of the ſcene; and is deſigned in the ſpirit, is executed with the liberality, of the original donation, when this reſidence of a mighty monarch was beſtowed by a great people, as a munificent reward on the hero who had deſerved beſt of his country.

35 Of a river flowing through a wood.

In the compoſition of this ſcene, the river, both as a part itſelf, and as uniting the other parts, has a principal ſhare. But water is not loſt, though it be in ſo confined or ſo concealed a ſpot as to enter into no view; it may render that ſpot delightful. It is capable of the moſt exquiſite beauty in its form; and though not in ſpace, may yet in diſpoſition have pretenſions to greatneſs: for it may be divided into ſeveral branches, which will form a cluſter of iſlands all connected together, make the whole place irriguous, and, in the ſtead of extent, ſupply a quantity of water. Such a ſequeſtrated ſcene uſually owes its retirement to the trees and the thickets with which it abounds; but in the diſpoſition of them, one diſtinction ſhould be conſtantly attended to. A river flowing through a wood which overſpreads one continued ſurface of ground, and a river between two woods, are in very different circumſtances. In the latter caſe, the woods are ſeparate; they may be contraſted in their forms and their characters, and the outline of each ſhould be forcibly marked. In the former, no outline ought to be diſcernible; for the river paſſes between trees, not betweeen boundaries: and though, in the progreſs of its courſe, the ſtyle of the plantations may be often changed, yet on the oppoſite banks a ſimilarity ſhould conſtantly prevail, that the identity of the wood may never be doubtful.

A river between two woods may enter into a view; and then it muſt be governed by the principles which regulate the conduct and the accompaniments of a river in an open expoſure. But, when it runs through a wood, it is never to be ſeen in proſpect: the place is naturally full of obſtructions; and a continued opening, large enough to receive a long reach, would ſeem an artificial cut. The river muſt therefore neceſſarily wind more than in croſſing a lawn, where the paſſage is entirely free: but its influence will never extend ſo far on the ſides: the buildings muſt be near the banks; and, if numerous, will ſeem crowded, being all in one track, and in ſituations nearly alike. The ſcene, however, does not want variety: on the contrary, none is capable of more. The objects are not indeed ſo different from each other as in an open view; but they are very different, and in much greater abundance: for this is the interior of a wood, where every tree is an object, every combination of trees a variety, and no large intervals are requiſite to diſtinguiſh the ſeveral diſpoſitions; the grove, the thicket, or the groupes, may prevail, and their forms and their relations may be conſtantly changed, without reſtraint of fancy, or limitation of number.

Water is ſo univerſally and ſo deſervedly admired in a proſpect, that the moſt obvious thought in the management of it, is to lay it as open as poſſible, and purpoſely to conceal it would generally ſeem a ſevere ſelf-denial: yet ſo many beauties may attend its paſſage through a wood, that larger portions of it might be allowed to ſuch retired ſcenes, than are commonly ſpared from the view, and the different parts in different ſtyles would be fine contraſts to each other.

36 Deſcrip of the w ter at W ton, (th ſeat of Grenvil in the va Ayleſbu Buckin hamſhir

If the water at Wotton were all expoſed, a walk of near two miles along the banks would be of a tedious length, from the want of thoſe changes of the ſcene, which now ſupply through the whole extent a ſucceſſion of perpetual variety. That extent is ſo large as to admit of a diviſion into four principal parts, all of them great in ſtyle and in dimenſions, and differing from each other both in character and ſituation. The two firſt are the leaſt. The one is a reach of a river, about the third of a mile in length, and of a competent breadth, flowing through a lovely mead, open in ſome places to views of beautiful hills in the country, and adorned in others with clumps of trees, ſo large, that their branches ſtretch quite acroſs, and form a high arch over the water. The next ſeems to have been once a formal baſin, encompaſſed with plantations, and the appendages on either ſide ſtill retain ſome traces of regularity; but the ſhape of the water is free from them: the ſize is about 14 acres; and out of it iſſue two broad collateral ſtreams, winding towards a large river, which they are ſeen to approach, and ſuppoſed to join. A real junction is however impoſſible, from the difference of the levels; but the terminations are ſo artfully concealed, that the deception is never ſuſpected, and when known is not eaſily explained. The river is the third great diviſion of the water; a lake into which it falls, is the fourth. Theſe two do actually join: but their characters are directly oppoſite; the ſcenes they belong to are totally diſtinct; and the tranſition from the one to the other is very gradual: for an iſland near the conflux, dividing the breadth, and concealing the end of the lake, moderates for ſome way the ſpace; and permitting it to expand but by degrees, raiſes an idea of greatneſs, from uncertainty accompanied with increaſe. The reality does not diſappoint the expectation; and the iſland, which is the point of view, is itſelf equal to the ſcene: it is large, and high above the lake; the ground is irregularly broken; thickets hang on the ſides; and towards the top is placed an Ionic portico, which commands a noble extent of water, not leſs than a mile in circumference, bounded on one ſide with wood, and open on the other to two ſloping lawns, the leaſt of an hundred acres, diverſified with clumps, and bordered by plantations. Yet this lake, when full in view, and with all the importance which ſpace, form, and ſituation can give, is not more intereſting than the ſequeſtered river, which has been mentioned as the third great diviſion of the water. It is juſt within the verge of a wood, three quarters of a mile long, every where broad, and its courſe is ſuch as to admit of infinite variety without any confuſion. The banks are cleared of underwood; but a few thickets ſtill remain, and on one ſide an impenetrable covert ſoon begins: the interval is a beautiful grove of oaks, ſcattered over a green ſward of extraordinary verdure. Between theſe trees and theſe thickets the river ſeems to glide gently along, conſtantly winding, without one ſhort turn, or one extended reach, in the whole length of the way. This even temper in the ſtream ſuits the ſcenes through which it paſſes; they are in general of a very ſober caſt; not melancholy, but grave; never expoſed to a glare; never darkened with gloom; nor, by ſtrong contraſts of light and ſhade, exhibiting the exceſs of either. Undiſturbed by an extent of proſpects without, or a multiplicity of objects within, they retain at all times a mildneſs of character; which is ſtill more forcibly felt when the ſhadows grow faint as they lengthen, when a little ruſtling of birds in the ſpray, the leaping of the fiſh, and the fragrancy of the woodbine, denote the approach of evening; while the ſetting ſun ſhoots its laſt gleams on a Tuſcan portico, which is cloſe to the great baſin, but which from a ſeat near this river is ſeen at a diſtance, through all the obſcurity of the wood glowing on the banks, and reflected on the ſurface of the water. In another ſtill more diſtinguiſhed ſpot is built an elegant bridge, with a colonnade upon it, which not only adorns the place where it ſtands, but is alſo a pictureſque object to an octagon building near the lake, where it is ſhewn in a ſingular ſituation, over-arched, encompaſſed, and backed with wood, without any appearance of the water beneath. This building in return is alſo an object from the bridge; and a Chineſe room, in a little iſland juſt by, is another: neither of them are conſiderable, and the others which are viſible are at a diſtance, but more or greater adventitious ornaments are not required in a ſpot ſo rich as this in beauties peculiar to its character. A profuſion of water pours in from all ſides round upon the view; the opening of the lake appears; a glimpſe is caught of the large baſin; one of the collateral ſtreams is full in ſight, and the bridge itſelf is in the midſt of the fineſt part of the river: all ſeem to communicate the one with the other. Though thickets often intercept, and groupes perplex, the view, yet they never break the connection between the ſeveral pieces of water: each may ſtill be traced along large branches, or little catches; which in ſome places are over-ſhadowed and dim; in others gliſten through a glade, or glimmer between the boles of trees in a diſtant perſpective; and in one, where they are quite loſt to the view, ſome arches of a ſtone-bridge, but partially ſeen among the wood, preſerve their connection. However interrupted, however varied, they ſtill appear to be parts of one whole, which has all the intricacy of number, and the greatneſs of unity; the variety of a ſtream, and the quantity of a lake; the ſolemnity of a wood, and the animation of water.

37
Of a rill and a rivulet.

If a large river may ſometimes, a ſmaller current undoubtedly may often, be conducted through a wood: it ſeldom adorns, it frequently disfigures a proſpect, where its courſe is marked, not by any appearance of water, but by a confuſed line of clotted graſs, which diſagrees with the general verdure. A rivulet may, indeed, have conſideration enough for a home ſcene, though it be open; but a rill is always moſt agreeable when moſt retired from public view. Its characteriſtic excellencies are vivacity and variety, which require attention, leiſure, and ſilence, that the eye may pore upon the little beauties, and the ear liſten to the low murmurs of the ſtream without interruption. To ſuch indulgence a confined ſpot only is favourable; a cloſe copſe is, therefore, often more acceptable than a high wood, and a ſequeſtered valley at all times preferable to any open expoſure: a ſingle rill at a very little diſtance is a mere water-courſe; it loſes all its charms; it has no importance in itſelf, and bears no proportion to the ſcene. A number of little ſtreams have, indeed, an effect in any ſituation, but not as objects; they are intereſting only on account of the character they expreſs, the irriguous appearance which they give to the whole.

The full tide of a large river has more force than activity, and ſeems too unwieldy to allow of very quick tranſitions. But in a rill, the agility of its motion accounts for every caprice: frequent windings diſguiſe its inſignificance: ſhort turnings ſhew its vivacity: ſudden changes in the breadth are a ſpecies of its variety: and however fantaſtically the channel may be wreathed, contracted, and widened, it ſtill appears to be natural. We find an amuſement in tracing the little ſtream through all the intricacies of its courſe, and in ſeeing it force a paſſage through a narrow ſtreight, expatiate on every opportunity, ſtruggle with obſtructions, and puzzle out its way. A rivulet, which is the mean betwixt a river and a rill, partakes of the character of both: it is not licenſed to the extravagance of the one, nor under the ſame reſtraints as the other: it may have more frequent bends than the river; longer reaches than a rill: the breadth of a ſtream determines whether the principal beauty reſults from extent or from variety.

The murmurs of a rill are amongſt the moſt pleaſing circumſtances which attend it. If the bed of the ſtream be rough, mere declivity will occaſion a conſtant ripling noiſe: when the current drops down a de-

deſcent, though but of a few inches, or forcibly bubbles up from a little hollow, it has a deep gurgling tone, not uniformly continued, but inceſſantly repeated, and therefore more engaging than any. The flatteſt of all, is that ſound rather of the ſplaſhing than the fall of water, which an even gentle ſlope, or a tame obſtruction, will produce: this is leſs pleaſing than the others; but none ſhould be entirely excluded: all in their turns are agreeable; and the choice of them is much in our power: by obſerving their cauſes, we may often find the means to ſtrengthen, to weaken, or to change them; and the addition or removal of a ſingle ſtone, or a few pebbles, will ſometimes be ſufficient for the purpoſe.

38 Of caſcades.

A rill cannot pretend to any ſound beyond that of a little water-fall: the roar of a caſcade belongs only to larger ſtreams; but it may be produced by a rivulet to a conſiderable degree, and attempts to do more have generally been unſucceſsful. A vain ambition to imitate nature in her great extravagancies betrays the weakneſs of art. Though a noble river, throwing itſelf headlong down a precipice, be an object truly magnificent, it muſt however be confeſſed, that in a ſingle ſheet of water there is a formality, which its vaſtneſs alone can cure; but the heighth, not the breadth, is the wonder: when it falls no more than a few feet, the regularity prevails; and its extent only ſerves to expoſe the vanity of affecting the ſtyle of a cataract in an artificial caſcade. It is leſs exceptionable if divided into ſeveral parts: for then each ſeparate part may be wide enough for its depth; and in the whole, variety, not greatneſs, will be the predominant character. But a ſtructure of rough, large, detached ſtones, cannot eaſily be contrived of ſtrength ſufficient to ſupport a great weight of water: it is ſometimes from neceſſity almoſt ſmooth and uniform; and then it loſes much of its effect: ſeveral little falls in ſucceſſion are preferable to one great caſcade which in figure or in motion approaches to regularity.

When greatneſs is thus reduced to number, and length becomes of more importance than breadth, a rivulet vies with a river; and it more frequently runs in a continued declivity, which is very favourable to ſuch a ſucceſſion of falls. Half the expence and labour which are ſometimes beſtowed on a river, to give it, at the beſt, a forced precipitancy, in one ſpot only, would animate a rivulet through the whole of its courſe: and, after all, the moſt intereſting circumſtance in falling waters is their animation. A great caſcade fills us with ſurpriſe: but all ſurpriſe muſt ceaſe; and the motion, the agitation, the rage, the froth, and the variety of the water, are finally the objects which engage the attention: for theſe a rivulet is ſufficient; and they may there be produced without that appearance of effort which raiſes a ſuſpicion of art.

To obviate ſuch a ſuſpicion, it may be ſometimes expedient to begin the deſcent out of ſight; for the beginning is the difficulty: if that be concealed, the ſubſequent falls ſeem but a conſequence of the agitation which characteriſes the water at its firſt appearance; and the imagination is, at the ſame time, let looſe to give ideal extent to the caſcades. When a ſtream iſſues from a wood, ſuch management will have a great effect: the bends of its courſe in an open expoſure may afford frequent opportunities for it; and ſometimes a low broad bridge may furniſh the occaſion: a little fall hid under the arch will create a diſorder; in conſequence of which, a greater caſcade below will appear very natural.

Sect. IV. *Of Rocks.*

39 Of the accompaniments of rocks.

Rills, rivulets, and caſcades, abound among rocks: they are natural to the ſcene; and ſuch ſcenes commonly require every *accompaniment* which can be procured for them. Mere rocks, unleſs they are peculiarly adapted to certain impreſſions, may ſurpriſe, but can hardly pleaſe: they are too far removed from common life, too barren, and unhoſpitable; rather deſolate than ſolitary, and more horrid than terrible. So auſtere a character cannot be long engaging, if its rigour be not ſoftened by circumſtances which may belong either to theſe or to more cultivated ſpots: and when the dreárineſs is extreme, little ſtreams and water-falls are of themſelves inſufficient for the purpoſe; an intermixture of vegetation is alſo neceſſary, and on ſome occaſions even marks of inhabitants are proper.

40 Deſcription of Middleton-dale, (near Chatſworth.)

Middleton-dale is a cleft between rocks, aſcending gradually from a romantic village, till it emerges, at about two miles diſtance, on the vaſt moor-lands of the Peake. It is a diſmal entrance to a deſart: the hills above it are bare; the rocks are of a grey colour; their ſurfaces are rugged, and their ſhapes ſavage; frequently terminating in craggy points, ſometimes reſembling vaſt unwieldy bulwarks, or riſing in heavy buttreſſes one above another; and here and there a miſhappen maſs bulging out hangs lowering over its baſe. No traces of men are to be ſeen, except in a road which has no effect on ſuch a ſcene of deſolation, and in the lime-kilns conſtantly ſmoking on the ſide; but the labourers who occaſionally attend them live at a diſtance; there is not a hovel in the dale; and ſome ſcanty withering buſhes are all its vegetation: for the ſoil between the rocks produces as little as they do; it is diſfigured with all the tinges of brown and red, which denote barrenneſs; in ſome places it has crumbled away, and ſtrata of looſe dark ſtones only appear; and in others, long lines of droſs and rubbiſh ſhoveled out of mines, have fallen down the ſteeps. In theſe mines, the veins of lead on one ſide of the dale, are obſerved always to have correſponding veins, in exactly the ſame direction, on the other: and the rocks, though differing widely in different places, yet always continue in one ſtyle for ſome way together, and ſeem to have a relation to each other. Both theſe appearances make it probable, that Middleton-dale is a chaſm rent in the mountain by ſome convulſion of nature, beyond the memory of man, or perhaps before the iſland was peopled: the ſcene, though it does not prove the fact, yet juſtifies the ſuppoſition; and it gives credit to the tales of the country people, who, to aggravate its horrors, always point to a precipice, down which they ſay that a poor girl of the village threw herſelf headlong, in deſpair, at the neglect of the man whom ſhe loved; and ſhew a cavern, where a ſkeleton was once diſcovered, but of what wretch is unknown, his bones were the only memorial left of him. All the dreárineſs however of the place, which accords ſo well with ſuch traditions, abates upon the junction of another valley, the ſides of which are ſtill of rock, but mixed and crowned with fine wood; and Middleton-dale becomes more mild by ſharing in its beauties: near this junction a clear ſtream iſſues from under the hill, and runs down the dale, receiving as it proceeds many rills and ſprings, all as tranſparent as itſelf. The principal rivulet is full of little water-falls: they are ſometimes continued in ſucceſſion along a reach of conſiderable length, which is whitened with froth all the way; at other times the brook wreathes in frequent windings, and drops down a ſtep at every turn; or ſlopes between tufts of graſs, in a briſk, though not a precipitant deſcent; when it is moſt quiet, a thouſand dimples ſtill mark its vivacity; it is every where active, ſometimes rapid, ſeldom ſilent, but never furious or noiſy: the firſt impreſſions which it makes are of ſprightlineſs and gaiety, very different from thoſe which belong to the ſcene all around; but by dwelling upon both, they are brought nearer together; and a melancholy thought occurs, that ſuch a ſtream ſhould be loſt in watering a waſte; the wilderneſs appears more forlorn which ſo much vivacity cannot enliven; as the idea of deſolation is heightened by reflecting that the

> Flower is born to bluſh unſeen,
> And waſte its ſweetneſs on the deſart air;

and that

> The nightingale attunes her notes,
> Where none are left to hear.

If ſuch a ſcene occurs within the precincts of a park or a garden, no expence ſhould be ſpared to meliorate the ſoil, wherever any ſoil can be found. Without ſome vegetation among the rocks, they are only an object of curioſity, or a ſubject of wonder: but verdure alone will give ſome relief to the drearineſs of the ſcene; and ſhrubs or buſhes, without trees, are a ſufficiency of wood: the thickets may alſo be extended by the creeping plants, ſuch as pyracantha, vines, and ivy, to wind up the ſides, or cluſter on the tops of the rocks. And to this vegetation may be added ſome ſymptoms of inhabitants, but they muſt be ſlight and few: the uſe of them is only to cheer, not to deſtroy, the ſolitude of the place; and ſuch therefore ſhould be choſen as are ſometimes found in ſituations retired from public reſort; a cottage may be lonely, but it muſt not here ſeem ruinous and neglected; it ſhould be tight and warm, with every mark of comfort about it, to which its poſition in ſome ſheltered receſs may greatly contribute. A cavity alſo in the rocks, rendered eaſy of acceſs, improved to a degree of convenience, and maintained in a certain ſtate of preſervation, will ſuggeſt ſimilar ideas of protection from the bittereſt inclemencies of the ſky, and even of occaſional refreſhment and repoſe. But we may venture ſtill further: a mill is of neceſſity often built at ſome diſtance from the town which it ſupplies; and here it would at the ſame time apply the water to a uſe, and increaſe its agitation. The dale may beſides be made the haunt of thoſe animals, ſuch as goats, which are ſometimes wild, and ſometimes domeſtic; and which accidentally appearing, will divert the mind from the ſenſations, natural to the ſcene, but not agreeable if continued long without interruption. Theſe and ſuch other expedients will approximate the ſevereſt retreat to the habitations of men, and convert the appearance of a perpetual baniſhment into that of a temporary retirement from ſociety.

But too ſtrong a force on the nature of the place always fails. A winding-path, which appears to be worn, not cut, has more effect than a high road, all artificial and level, which is too weak to overbear, and yet contradicts, the general idea. The objects therefore to be introduced muſt be thoſe which hold a mean between ſolitude and population; and the inclination of that choice towards either extreme, ſhould be directed by the degree of wildneſs which prevails: for tho' that runs ſometimes to an exceſs which requires correction, at other times it wants encouragement, and at all times it ought to be preſerved: it is the predominant character of rocks, which mixes with every other, and to which all the appendages muſt be accommodated; and they may be applied ſo as greatly to increaſe it: a licentious irregularity of wood and of ground, and a fantaſtic conduct of the ſtreams, neither of which would be tolerated in the midſt of cultivation, become and improve romantic ſpots; even buildings, partly by their ſtyle, but ſtill more by their poſition, in ſtrange, difficult, or dangerous ſituations, diſtinguiſh and aggravate the native extravagancies of the ſcene.

In the choice and the application of theſe accompaniments, conſiſts all our power over rocks; they are themſelves too vaſt and too ſtubborn to ſubmit to our controul; but by the addition or removal of appendages, which we can command, parts may be ſhewn or concealed, and the characters with their impreſſions may be weakened or enforced: to adapt the accompaniments accordingly, is the utmoſt ambition of art when rocks are the ſubject.

Their moſt diſtinguiſhed characters are, *dignity*, *terror*, and *fancy*: the expreſſions of all are conſtantly wild: and ſometimes a rocky ſcene is only wild, without pretenſions to any particular character.

41
Of rocks characteriſed by dignity.

That which inſpires ideas of greatneſs, as diſtinguiſhed from thoſe of terror, has leſs wildneſs in it than any. There is a compoſure in dignity, which is diſconcerted by quick tranſitions and the flutter of variety. A ſucceſſion, therefore, of nearly the ſame forms, a repetition of them one above the other, do not derogate from an effect, which depends more on the extent than the changes of the ſcene: the dimenſions which are neceſſary to produce that effect, contract the room for variety; the parts muſt be large: if the rocks are only high, they are but ſtupendous, not majeſtic: breadth is equally eſſential to their greatneſs; and every ſlender, every groteſque ſhape, is excluded.

Art may interpoſe to ſhew theſe large parts to the eye, and magnify them to the imagination, by taking away thickets which ſtretch quite acroſs the rocks, ſo as to diſguiſe their dimenſions; or by filling with wood the ſmall intervals between them, and thus, by concealing the want, preſerving the appearance of continuation.

When rocks retire from the eye down a gradual declivity, we can, by raiſing the upper ground, deepen the fall, lengthen the perſpective, and give both height and extent to thoſe at a diſtance: this effect may be ſtill increaſed by covering that upper ground with a thicket, which ſhall ceaſe, or be lowered, as it deſcends.

A thicket, on other occaſions, makes the rocks which riſe out of it ſeem larger than they are. If they ſtand upon a bank overſpread with ſhrubs, their beginning is at the leaſt uncertain; and the preſumption is, that they ſtart from the bottom.

Another uſe of this bruſhy underwood is to conceal the fragments and rubbiſh which have fallen from the ſides and the brow, and which are often unſightly. Rocks are ſeldom remarkable for the elegance of their forms; they are too vaſt, and too rude, to pretend to delicacy: but their ſhapes are often agreeable; and we can affect thoſe ſhapes to a certain degree, at leaſt we can cover many blemiſhes in them, by conducting the growth of ſhrubby and creeping plants about them.

For all theſe purpoſes mere underwood ſuffices: but for greater effects larger trees are requiſite: they are worthy of the ſcene; and not only improvements, but acceſſions to its grandeur: we are uſed to rank them among the nobleſt objects of nature; and when we ſee that they cannot aſpire to the midway of the heights around them, the rocks are raiſed by the compariſon. A ſingle tree is, therefore, often preferable to a clump: the ſize, though really leſs, is more remarkable: and clumps are beſides generally exceptionable in a very wild ſpot, from the ſuſpicion of art which attends them; but a wood is free from that ſuſpicion, and its own character of greatneſs recommends it to every ſcene of magnificence.

On the ſame principle, all the conſideration which can be, ſhould be given to the ſtreams. No number of little rills are equal to one broad river; and in the principal current, ſome varieties may be ſacrificed to importance: but a degree of ſtrength ſhould always be preſerved: the water, though it needs not be furious, ſhould not be dull; for dignity, when moſt ſerene, is not languid; and ſpace will hardly atone for want of animation.

The character, however, of greatneſs, when diveſted of terror, is placid. It does not, therefore, exclude marks of inhabitants, though it never requires them to tame its wildneſs: and without inviting, it occaſionally admits an intermixture of vegetation. It even allows of buildings intended only to decorate the ſcene: but they muſt be adequate to it, both in ſize and in character. And if cultivation is introduced, that too ſhould be conformable to the reſt: not a ſingle narrow patch cribbed out of the waſte; but the confines of a country ſhelving into the vale, and ſuggeſting the idea of extent: nothing trivial ought to find admittance. But, on the other hand, the character is not violated by a mixture of agreeableneſs with its grandeur; and far leſs is extravagance required to ſupport it: ſtrange ſhapes in extraordinary poſitions, enormous weights unaccountably ſuſtained, trees rooted in the ſides, and torrents raging at the foot of the rocks, are, at the beſt, needleſs exceſſes. There is a temperance in dignity, which is rather hurt by a wanton violence on the common order of nature. Great objects alone, great in their dimenſions and in their ſtyle, are amply ſufficient to ſatisfy and to fill the mind: when theſe fail, then, and then only, we are apt to have recourſe to wonder, in order to excite admiration.

42
Deſcription of Matlock Bath, (in Derbyſhire.)

Many of the circumſtances which have been mentioned concur at Matlock Bath, which is ſituated in a vale near three miles long, ſhut up at one end by a riſing moor, and at the other end by vaſt cliffs of rock: the entrance into it is hewn through one of them, and is indeed a noble rude portal to a ſcene of romantic magnificence. One ſide of the valley is a very high range of hill, rough with buſhes, and great blocks or ledges of ſtone. The other ſide is waſhed by the Derwent, and conſiſts chiefly of rocks; which, however, are often interrupted by ſteep declivities of green ſward, large thickets, and gentle deſcents of fine fields from the adjacent country. The rocks ſometimes form the brow, ſometimes they fix the foot, and ſometimes they break the ſides, of the hill. At the high Tor they are 123 yards above the water: in other places they are no more than an abrupt bank of a few feet to the river: for the moſt part they are nearly perpendicular, falling in ſeveral ſtages, or in one vaſt precipice, from the top to the bottom. But though ſimilar in ſhape, they are widely different in their conſtruction: in one place they are irregularly jointed, in another more uniformly ribbed, in a third they form a continued ſurface from the ſummit to the baſe, and frequently they are compoſed of enormous maſſes of ſtone heaped upon each other. From ſome ſuch ſcene probably was conceived the wild imagination in ancient mythology of the giants piling Pelion upon Oſſa: in this, all is vaſt; height, breadth, ſolidity, boldneſs of idea, and unity of ſtyle, combine to form a character of greatneſs, conſiſtent throughout, not uniform, unmixed with any littleneſs, unallayed with any extravagance. The colour of the rocks is almoſt white; and their ſplendour is enhanced in many places by ivy and ſingle yew-trees appearing amongſt them: the intervals between them are generally filled with a bruſhy underwood, which diverſifies and embelliſhes the ſcene very beautifully, but for want of large trees adds nothing to its grandeur; there are few of any note through out the vale: the beſt are in a ſmall wood near the bath; but they are not adequate to the objects around them, to the ſteeps of the hill, the loftineſs of the rocks, and the character of the Derwent. That character is, indeed, rather too ſtrong for the place: in ſize, and in the direction of its courſe, the river is exactly ſuch as might be wiſhed; but it is a torrent, in which force and fury prevail: the caſcades in it are innumerable; before the water is recovered from one fall, it is hurried down another; and its agitation being thus increaſed by repeated ſhocks, it puſhes on with reſtleſs violence to the next, where it daſhes againſt fragments of rocks, or foams among heaps of ſtones which the ſtream has driven together. The colour all along is of a reddiſh brown; even the foam is tinged with a duſky hue: and where there are no caſcades, ſtill the declivity of the bed preſerves the rapidity, and a quantity of little breakers continue the turbulence of the current. Many of theſe circumſtances are certainly great: but a more temperate river, rolling its full tide along with ſtrength and activity, without rage; falling down one noble caſcade, inſtead of many; and if animated ſometimes by reſiſtance, yet not conſtantly ſtruggling with obſtructions; would have been more conſiſtent with the ſedate ſteady dignity of theſe noble piles of rock, whoſe brightneſs, together with the verdure of a vigorous and luxuriant, though humble vegetation, and ſome appearances of culture, give to the whole an air of cheerful ſerenity, which is diſturbed by the impetuoſity of the Derwent.

43
Of rocks characteriſed by terror.

THIS river would be better ſuited to a ſcene characteriſed by that terror, which the combination of greatneſs with force inſpires, and which is animating and in-

intereſting, from the exertion and anxiety attending it. The terrors of a ſcene in nature are like thoſe of a dramatic repreſentation: they give an alarm; but the ſenſations are agreeable, ſo long as they are kept to ſuch as are allied only to terror, unmixed with any that are horrible and diſguſting. Art may therefore be uſed to heighten them, to diſplay the objects which are diſtinguiſhed by greatneſs, to improve the circumſtances which denote force, to mark thoſe which intimate danger, and to blend with all here and there a caſt of melancholy.

Greatneſs is as eſſential to the character of terror as to that of dignity: vaſt efforts in little objects are but ridiculous; nor can force be ſuppoſed upon trifles incapable of reſiſtance. On the other hand, it muſt be allowed, that exertion and violence ſupply ſome want of ſpace. A rock wonderfully ſupported, or threatening to fall, acquires a greatneſs from its ſituation, which it has not in dimenſions; ſo circumſtanced, the ſize appears to be monſtrous: a torrent has a conſequence which a placid river of equal breadth cannot pretend to: and a tree, which would be inconſiderable in the natural ſoil, becomes important when it burſts forth from a rock.

Such circumſtances ſhould be always induſtriouſly ſought for; it may be worth while to cut down ſeveral trees, in order to exhibit one apparently rooted in the ſtone. By the removal perhaps of only a little bruſh-wood, the alarming diſpoſition of a rock, ſtrangely undermined, rivetted, or ſuſpended, may be ſhewn; and if there be any ſoil above its brow, ſome trees planted there, and impending over it, will make the object ſtill more extraordinary. As to the ſtreams, great alterations may generally be made in them: and therefore it is of uſe to aſcertain the ſpecies proper to each ſcene, becauſe it is in our power to enlarge or contract their dimenſions; to accelerate or retard their rapidity; to form, increaſe, or take away obſtructions; and always to improve, often to change, their characters.

Inhabitants furniſh frequent opportunities to ſtrengthen the appearances of force, by giving intimations of danger. A houſe placed at the edge of a precipice, any building on the pinnacle of a crag, makes that ſituation ſeem formidable, which might otherwiſe have been unnoticed: a ſteep, in itſelf not very remarkable, becomes alarming, when a path is carried aſlant up the ſide: a rail on the brow of a perpendicular fall, ſhews that the height is frequented and dangerous: and a common foot-bridge thrown over a cleft between rocks has a ſtill ſtronger effect. In all theſe inſtances, the imagination immediately tranſports the ſpectator to the ſpot, and ſuggeſts the idea of looking down ſuch a depth: in the laſt, that depth is a chaſm, and the ſituation is directly over it.

In other inſtances, exertion and danger ſeem to attend the occupations of the inhabitants:

> ———Half way down
> Hangs one that gathers ſamphire; dreadful trade!

is a circumſtance choſen by the great maſter of nature, to aggravate the terrors of the ſcene he deſcribes. Mines are frequent in rocky places: and they are full of ideas ſuited to ſuch occaſions. To theſe may ſometimes be added the operations of engines: for machinery, eſpecially when its powers are ſtupendous or its effects formidable, is an effort of art which may be accommodated to the extravagancies of nature.

43
Of rocks characteri
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ror.

44
Deſcription of a ſcene near a place called Symond's Gate, between Roſs and Monmouth.

A ſcene at the New Weir on the Wye, which in itſelf is truly great and awful, ſo far from being diſturbed, becomes more intereſting and important, by the buſineſs to which it is deſtined. It is a chaſm between two high ranges of hill, which riſe almoſt perpendicularly from the water; the rocks on the ſides are moſtly heavy maſſes, and their colour is generally brown: but here and there a pale craggy ſhape ſtarts up to a vaſt height above the reſt, unconnected, broken, and bare: large trees frequently force out their way amongſt them: and many of them ſtand far back in the covert, where their natural duſky hue is deepened by the ſhadow which overhangs them. The river too, as it retires, loſes itſelf in woods, which cloſe immediately above, then riſe thick and high, and darken the water. In the midſt of all this gloom is an iron forge, covered with a black cloud of ſmoke, and ſurrounded with half-burned ore, with coal, and with cinders: the fuel for it is brought down a path, worn into ſteps narrow and ſteep, and winding among precipices: and near it is an open ſpace of barren moor, about which are ſcattered the huts of the workmen. It ſtands cloſe to the caſcade of the Weir; where the agitation of the current is increaſed by large fragments of rocks, which have been ſwept down by floods from the banks, or ſhivered by tempeſts from the brow: and the ſullen ſound, at ſtated intervals, from the ſtrokes of the great hammers in the forge, deadens the roar of the waterfall. Juſt below it, while the rapidity of the ſtream ſtill continues, a ferry is carried acroſs it: and lower down the fiſhermen uſe little round boats, called *truckles*, the remains, perhaps, of the ancient Britiſh navigation, which the leaſt motion will overſet, and the ſlighteſt touch may deſtroy. All the employments of the people ſeem to require either exertion or caution: and the ideas of force or of danger which attend them, give to the ſcene an animation unknown in a ſolitary, though perfectly compatible with the wildeſt romantic ſituations.

But marks of inhabitants muſt not be carried to the length of cultivation, which is too mild for the ruggedneſs of the place, and has beſides an air of cheerfulneſs inconſiſtent with the character of terror: a little inclination towards melancholy is generally acceptable, at leaſt to the excluſion of all gaiety; and beyond that point, ſo far as to throw juſt a tinge of gloom upon the ſcene. For this purpoſe, the objects whoſe colour is obſcure ſhould be preferred; and thoſe which are too bright may be thrown into ſhadow: the wood may be thickened, and the dark greens abound in it: if it is neceſſarily thin, yews and ſhabby firs ſhould be ſcattered about it: and ſometimes to ſhew a withering or a dead tree, it may for a ſpace be cleared entirely away. All ſuch circumſtances are acquiſitions, if they can be had without detriment to the principal character: for it muſt ever be remembered, that where terror prevails, melancholy is but a ſecondary conſideration.

45
Of rocks characteriſed by fancy.

The different ſpecies of rocks often meet in the ſame place, and compoſe a noble ſcene, which is not diſtinguiſhed by any particular character: it is only when one eminently prevails, that it deſerves ſuch a preference as to exclude every other. Sometimes a ſpot, remarkable for nothing but its wildneſs, is highly romantic: and when this wildneſs riſes to fancy, when the moſt ſingular, the moſt oppoſite forms and combinations are thrown together, then a mixture alſo of ſeveral characters adds to the number of inſtances which there concur to diſplay the inexhauſtible variety of nature.

46 Deſcription of Dovedale, (near Aſhbourne in Derbyſhire.)

So much variety, ſo much fancy, are ſeldom found within the ſame extent as in Dovedale. It is about two miles in length, a deep, narrow, hollow valley: both the ſides are of rock; and the Dove in its paſſage between them is perpetually changing its courſe, its motion, and appearance. It is never leſs than ten, nor ſo much as twenty yards wide, and generally about four feet deep; but tranſparent to the bottom, except when it is covered with a foam of the pureſt white, under water-falls which are perfectly lucid. Theſe are very numerous, but very different. In ſome places they ſtretch ſtraight acroſs, or aſlant the ſtream: in others, they are only partial; and the water either daſhes againſt the ſtones, and leaps over them, or, pouring along a ſteep, rebounds upon thoſe below; ſometimes it ruſhes through the ſeveral openings between them; ſometimes it drops gently down; and at other times it is driven back by the obſtruction, and turns into an eddy. In one particular ſpot, the valley almoſt cloſing, leaves hardly a paſſage for the river, which pent up, and ſtruggling for a vent, rages and roars and foams, till it has extricated itſelf from the confinement. In other parts, the ſtream, though never languid, is often gentle; flows round a little deſart iſland, glides between bits of bulruſhes, diſperſes itſelf among tufts of graſs or of moſs, bubbles about a water-dock, or plays with the ſlender threads of aquatic plants which float upon the ſurface. The rocks all along the dale vary as often in their ſtructure, as the ſtream in its motion. In one place, an extended ſurface gradually diminiſhes from a broad baſe almoſt to an edge; in another, a heavy top hanging forwards, overſhadows all beneath: ſometimes many different ſhapes are confuſedly tumbled together; and ſometimes they are broken into ſlender ſharp pinnacles, which riſe upright, often two or three together, and often in more numerous clnſters. On this ſide of the dale, they are univerſally bare; on the other, they are intermixed with wood; and the vaſt height of both the ſides, with the narrowneſs of the interval between them, produces a further variety: for whenever the ſun ſhines from behind the one, the form of it is diſtinctly and completely caſt upon the other; the rugged ſurface on which it falls diverſifies the tints; and a ſtrong reflected light often glares on the edge of the deepeſt ſhadow. The rocks never continue long in the ſame figure or ſituation, and are very much ſeparated from each other: ſometimes they form the ſides of the valley, in precipices, in ſteeps, or in ſtages; ſometimes they ſeem to riſe in the bottom, and lean back againſt the hill; and ſometimes they ſtand out quite detached, heaving up in cumbrous piles, or ſtarting into conical ſhapes, like vaſt ſpars, an 100 feet high; ſome are firm and ſolid throughout, ſome are cracked, and ſome, ſplit and undermined, are wonderfully upheld by fragments apparently unequal to the weight they ſuſtain. One is placed before, one over another, and one fills, at ſome diſtance behind, an interval between two. The changes in their diſpoſition are infinite; every ſtep produces ſome new combination; they are continually croſſing, advancing, and retiring: the breadth of the valley is never the ſame 40 yards together: at the narrow paſs which has been mentioned, the rocks almoſt meet at the top, and the ſky is ſeen as through a chink between them: juſt by this gloomy abyſs, is a wider opening, more light, more verdure, more cheerfulneſs, than any where elſe in the dale. Nor are the forms and the ſituations of the rocks their only variety: many of them are perforated by large natural cavities, ſome of which open to the ſky, ſome terminate in dark receſſes, and through ſome are to be ſeen ſeveral more uncouth arches, and rude pillars, all detached, and retiring beyond each other, with the light ſhining in between them, till a rock far behind them cloſes the perſpective: the noiſe of the caſcades in the river echoes amongſt them; the water may often be heard at the ſame time gurgling near, and roaring at a diſtance; but no other ſounds diſturb the ſilence of the ſpot: the only trace of men is a blind path, but lightly and but ſeldom trodden, by thoſe whom curioſity leads to ſee the wonders they have been told of Dovedale. It ſeems, indeed, a fitter haunt for more ideal beings: the whole has the air of enchantment. The perpetual ſhifting of the ſcenes; the quick tranſitions, the total changes; then the forms all around, groteſque as chance can caſt, wild as nature can produce, and various as imagination can invent; the force which ſeems to have been exerted to place ſome of the rocks where they are now fixed immoveable, the magic by which others appear ſtill to be ſuſpended; the dark caverns, the illuminated receſſes, the fleeting ſhadows, and the gleams of light glancing on the ſides, or trembling on the ſtream; and the lonelineſs and the ſtillneſs of the place, all crowding together on the mind, almoſt realize the ideas which naturally preſent themſelves in this region of romance and of fancy.

The ſolitude of ſuch a ſcene is agreeable, on account of the endleſs entertainment which its variety affords, and in the contemplation of which both the eye and the mind are delighted to indulge; marks of inhabitants and cultivation would diſturb that ſolitude; and ornamental buildings are too artificial in a place ſo abſolutely free from reſtraint. The only accompaniments proper for it are wood and water; and by theſe ſometimes improvements may be made. When two rocks ſimilar in ſhape and poſition are near together, by ſkirting one of them with wood, while the other is left bare, a material diſtinction is eſtabliſhed between them: if the ſtreams be throughout of one character, it is in our power, and ſhould be our aim, to introduce another. Variety is the peculiar property of the ſpot, and every acceſſion to it is a valuable acquiſition. On the ſame principle, endeavours ſhould be uſed, not only to multiply, but to aggravate differences, and to increaſe diſtinctions into contraſts: but the ſubject will impoſe a caution againſt attempting too much. Art muſt almoſt deſpair of improving a ſcene, where nature ſeems to have exerted her invention.

SECT. V. *Of Buildings.*

47 Of the of bui ings.

Buildings are the very reverſe of rocks. They are abſolutely in our power, both the ſpecies and the ſituation; and hence ariſes the exceſs in which they often abound. The deſire of doing ſomething, is ſtronger than the fear of doing too much: theſe may always be procured by expence, and bought by thoſe who know not how to chooſe; who conſider profuſion as ornament, and confound by number inſtead of diſtinguiſhing by variety.

Buildings probably were firſt introduced into gardens merely for convenience, to afford refuge from a ſudden ſhower, and ſhelter againſt the wind; or, at the moſt, to be ſeats for a party; or for retirement. They have ſince been converted into objects, and now the original *uſe* is too often forgotten in the greater purpoſes to which they are applied: they are conſidered as objects only; the inſide is totally neglected, and a pompous edifice frequently wants a room barely comfortable. Sometimes the pride of making a laviſh diſplay to a viſitor, without any regard to the owner's enjoyments, and ſometimes too ſcrupulous an attention to the ſtyle of the ſtructure, occaſions a poverty and dulneſs within, which deprives the buildings of part of their utility. But in a garden they ought to be conſidered both as beautiful objects, and as agreeable retreats: if a character becomes them, it is that of the ſcene they belong to; not that of their primitive application. A Grecian temple or Gothic church, may adorn ſpots where it would be affectation to preſerve that ſolemnity within, which is proper for places of devotion: they are not to be exact models, ſubjects only of curioſity or ſtudy; they are alſo ſeats: and ſuch ſeats will be little frequented by the proprietor; his mind muſt generally be indiſpoſed to ſo much ſimplicity, and ſo much gloom, in the midſt of gaiety, richneſs, and variety.

But though the interior of buildings ſhould not be diſregarded, it is by their exterior that they become *objects*; and ſometimes by the one, ſometimes by the other, and ſometimes by both, they are entitled to be conſidered as *characters*.

As objects, they are deſigned either to *diſtinguiſh*, or to *break*, or to *adorn*, the ſcenes to which they are applied.

The differences between one wood, one lawn, one piece of water, and another, are not always very apparent; the ſeveral parts of a garden would, therefore, often ſeem ſimilar, if they were not diſtinguiſhed by buildings: but theſe are ſo obſervable, ſo obvious at a glance, ſo eaſily retained in the memory, they mark the ſpots where they are placed with ſo much ſtrength, they attract the relation of all around with ſo much power, that parts thus diſtinguiſhed can never be confounded together. Yet it by no means follows, that therefore every ſcene muſt have its edifice: the want of one is ſometimes a variety; and other circumſtances are often ſufficiently characteriſtic: it is only when theſe too nearly agree, that we muſt have recourſe to buildings for differences: we can introduce, exhibit, or contraſt them as we pleaſe: the moſt ſtriking object is thereby made a mark of diſtinction; and the force of this firſt impreſſion prevents our obſerving the points of reſemblance.

The uniformity of a view may be broken by ſimilar means, and on the ſame principle: when a wide heath, a dreary moor, or a continued plain, is in proſpect, objects which catch the eye ſupply the want of variety: none are ſo effectual for this purpoſe as buildings. Plantations or water can have no very ſenſible effect, unleſs they are large or numerous, and almoſt change the character of the ſcene: but a ſmall ſingle building diverts the attention at once from the ſameneſs of the extent; which it breaks, but does not divide; and diverſifies, without altering, its nature. The deſign, however, muſt not be apparent. The merit of a cottage applied to this purpoſe, conſiſts in its being free from the ſuſpicion; and a few trees near it will both enlarge the object, and account for its poſition. Ruins are a hackneyed device immediately detected, unleſs their ſtyle be ſingular, or their dimenſions extraordinary. The ſemblance of an ancient Britiſh monument might be adapted to the ſame end, with little trouble, and great ſucceſs. The materials might be brick, or even timber plaſtered over, if ſtone could not eaſily be procured: whatever they were, the fallacy would not be diſcernible; it is an object to be ſeen at a diſtance, rude, and large, and in character agreeable to a wild open view. But no building ought to be introduced, which may not in reality belong to ſuch a ſituation: no Grecian temples, no Turkiſh moſques, no Egyptian obeliſks or pyramids; none imported from foreign countries, and unuſual here. The apparent artifice would deſtroy an effect; which is ſo nice as to be weakened, if objects proper to produce it are diſplayed with too much oſtentation; if they ſeem to be contrivances, not accidents; and the advantage of their poſition appear to be more laboured than natural.

But in a garden, where objects are intended only to adorn, every ſpecies of architecture may be admitted, from the Grecian down to the Chineſe; and the choice is ſo free, that the miſchief moſt to be apprehended, is an abuſe of this latitude in the multiplicity of buildings. Few ſcenes can bear more than two or three: in ſome, a ſingle one has a greater effect than any number: and a careleſs glimpſe, here and there, of ſuch as belong immediately to different parts, frequently enliven the landſkip with more ſpirit than thoſe which are induſtriouſly ſhewn. If the effect of a partial ſight, or a diſtant view, were more attended to, many ſcenes might be filled, without being crowded; a greater number of buildings would be tolerated, when they ſeemed to be caſual, not forced; and the animation, and the richneſs of the objects, might be had without pretence or diſplay.

Too fond an oſtentation of buildings, even of thoſe which are principal, is a common error; and when all is done, they are not always ſhewn to the greateſt advantage. Though their ſymmetry and their beauties ought in general to be diſtinctly and fully ſeen, yet an oblique is ſometimes better than a direct view: and they are often leſs agreeable objects when entire, than when a part is covered, or their extent is interrupted; when they are boſomed in wood, as well as backed by it; or appear between the ſtems of trees which riſe before or above them: thus thrown into perſpective, thus grouped and accompanied, they may be as important as if they were quite expoſed, and are frequently more pictureſque and beautiful.

But a ſtill greater advantage ariſes from this management, in connecting them with the ſcene: they are conſiderable, and different from all around them; inclined therefore to ſeparate from the reſt; and yet they are ſometimes ſtill more detached by the pains taken to exhibit them: that very importance which is the cauſe of the diſtinction, ought to be a reaſon for guarding againſt the independence to which it is naturally prone, and by which an object, which ought to be a part of the whole, is reduced to a mere individual. An elevated is generally a noble ſituation. When it is a point or a pinnacle, the ſtructure may be a continuation of the aſcent; and on many occaſions, ſome parts of the building may deſcend lower than others, and multiply the appearances of connection: but an edifice in the midſt of an extended ridge, commonly ſeems naked alone, and impoſed upon the brow, not joined to it. If wood, to accompany it, will not grow there, it had better be brought a little way down the declivity; and then all behind, above, and about it, are ſo many points of contact, by which it is incorporated into the landſkip.

Accompaniments are important to a building; but they loſe much of their effect, when they do not appear to be caſual. A little mount juſt large enough for it: a ſmall piece of water below, of no other uſe than to reflect it; and a plantation cloſe behind, evidently placed there only to give it relief; are as artificial as the ſtructure itſelf, and alienate it from the ſcene of nature into which it is introduced, and to which it ought to be reconciled. Theſe appendages therefore ſhould be ſo diſpoſed, and ſo connected with the adjacent parts, as to anſwer other purpoſes, tho' applicable to this; that they may be bonds of union, not marks of difference; and that the ſituation may appear to have been choſen, at the moſt, not made, for the building.

In the choice of a ſituation, that which ſhews the building beſt ought generally to be preferred: eminence, relief, and every other advantage which can be, ought to be given to an object of ſo much conſideration: they are for the moſt part deſirable; ſometimes neceſſary; and exceptionable only when, inſtead of riſing out of the ſcene, they are forced into it, and a contrivance to procure them at any rate is avowed without any diſguiſe. There are, however, occaſions, in which the moſt tempting advantages of ſituation muſt be waved; the general compoſition may forbid a building in one ſpot, or require it in another; at other times, the intereſt of the particular groupe it belongs to, may exact a ſacrifice of the opportunities to exhibit its beauties and importance; and at all times, the pretenſions of every individual object muſt give way to the greater effect of the whole.

49
Of thoſe expreſſive of characters.

The ſame ſtructure which adorns as an object, may alſo be expreſſive as a character. Where the former is not wanted, the latter may be deſirable: or it may be weak for one purpoſe, and ſtrong for the other; it may be grave, or gay; magnificent, or ſimple; and, according to its ſtyle, may or may not be agreeable to the place it is applied to. But mere conſiſtency is not all the merit which buildings can claim: their characters are ſometimes ſtrong enough to *determine*, *improve*, or *correct*, that of the ſcene; and they are ſo conſpicuous, and ſo diſtinguiſhed, that whatever force they have is immediately and ſenſibly felt. They are fit therefore to make a firſt impreſſion; and when a ſcene is but faintly characteriſed, they give at once a caſt which ſpreads over the whole, and which the weaker parts concur to ſupport, though perhaps they were not able to produce it.

Nor do they ſtop at fixing an uncertainty, or removing a doubt; they raiſe and enforce a character already marked: a temple adds dignity to the nobleſt, a cottage ſimplicity to the moſt rural, ſcenes; the lightneſs of a ſpire, the airineſs of an open rotunda, the ſplendor of a continued colonnade, are leſs ornamental than expreſſive; others improve cheerfulneſs into gaiety, gloom into ſolemnity, and richneſs into profuſion: a retired ſpot, which might have been paſſed unobſerved, is noticed for its tranquillity, as ſoon as it is appropriated by ſome ſtructure to retreat; and the moſt unfrequented place ſeems leſs ſolitary than one which appears to have been the haunt of a ſingle individual, or even of a ſequeſtered family, and is marked by a lonely dwelling, or the remains of a deſerted habitation.

The means are the ſame, the application of them only is different, when buildings are uſed to correct the character of the ſcene; to enliven its dulneſs, mitigate its gloom, or to check its extravagance; and, on a variety of occaſions, to ſoften, to aggravate, or to counteract, particular circumſtances attending it. But care muſt be taken that they do not contradict too ſtrongly the prevailing idea: they may leſſen the drearineſs of a waſte, but they cannot give it amenity; they may abate horrors, but they will never convert them into graces; they may make a tame ſcene agreeable, and even intereſting, not romantic; or turn ſolemnity into cheerfulneſs, but not into gaiety. In theſe, and in many other inſtances, they correct the character, by giving it an inclination towards a better, which is not very different; but they can hardly alter it entirely: when they are totally inconſiſtent with it, they are at the beſt nugatory.

The great effects which have been aſcribed to buildings, do not depend upon thoſe trivial ornaments and appendages, which are often too much relied on; ſuch as the furniture of a hermitage, painted glaſs in a Gothic church, and ſculpture about a Grecian temple; groteſque or bacchanalian figures to denote gaiety, and death's-heads to ſignify melancholy. Such devices are only deſcriptive, not expreſſive, of character; and muſt not be ſubſtituted in the ſtead of thoſe ſuperior properties, the want of which they acknowledge, but do not ſupply. They beſides often require time to trace their meaning, and to ſee their application; but the peculiar excellence of buildings is, that their effects are inſtantaneous, and therefore the impreſſions they make are forcible. In order to to produce ſuch effects, the general ſtyle of the ſtructure, and its poſition, are the principal conſiderations: either of them will ſometimes be ſtrongly characteriſtic alone; united, their powers are very great; and both are ſo important, that if they do not concur, at leaſt they muſt not contradict one another. The colour alſo of the buildings is ſeldom a matter of indifference: that exceſſive brightneſs which is too indiſcriminately uſed to render them conſpicuous, is apt to diſturb the harmony of the whole, ſometimes makes them too glaring as objects, and is often inconſiſtent with their characters. When theſe eſſential points are ſecured, ſubordinate circumſtances may be made to agree with them; and though minute, they may not be improper, if they are not affected; they frequently mark a correſpondence between the outſide and the inſide of a building: in the latter they are not inconſiderable; they may there be obſerved at leiſure, and there they explain in detail the character which is more generally expreſſed in the air of the whole.

50 Species and ſituations of buildings.

To enumerate the ſeveral buildings which may be uſed for convenience, or diſtinction, as ornaments, or as characters, would lead us far from our ſubject into a treatiſe of architecture: for every branch of architecture furniſhes, on different occaſions, objects proper for a garden; and different ſpecies may meet in the ſame compoſition: no analogy exiſts between the age and the country whence they are borrowed, and the ſpot they are applied to, except in ſome particular inſtances; but, in general, they are naturalized to a place of the moſt improved cultivated nature by their effects: beauty is their uſe; and they are conſiſtent with each other, if all are conformable to the ſtyle of the ſcene, proportioned to its extent, and agreeable to its character. On the other hand, varieties more than ſufficient for any particular ſpot, enough for a very extenſive view, may be found in every ſpecies; to each alſo belong a number of characters; the Grecian architecture can lay aſide its dignity in a ruſtic building, and the caprice of the Gothic is ſometimes not incompatible with greatneſs: our choice therefore may be confined to the variations of one ſpecies, or range through the contraſts of many, as circumſtances, taſte, or other conſiderations, ſhall determine.

The choice of ſituations is alſo very free. Circumſtances which are requiſite to particular ſtructures, may often be combined happily with others, and enter into a variety of compoſitions: even where they are appropriated, they may ſtill be applied in ſeveral degrees, and the ſame edifice may thereby be accommodated to very different ſcenes. Some buildings which have a juſt expreſſion when accompanied with proper appendages, have none without them; they may therefore be characters in one place, and only objects in another. On all theſe occaſions, the application is allowable, if it can be made without inconſiſtency: a hermitage muſt not be cloſe to a road; but whether it be expoſed to view on the ſide of a mountain, or concealed in the depth of a wood, is almoſt a matter of indifference; that it is at a diſtance from public reſort, is ſufficient. A caſtle muſt not be ſunk in a bottom; but that it ſhould ſtand on the utmoſt pinnacle of a hill, is not neceſſary: on a lower knole, and backed by the riſe, it may appear to greater advantage as an object, and be much more important to the general compoſition. A tower,

> “Boſom'd high in tufted trees,”

has been ſelected by one of our greateſt poets as a ſingular beauty; and the juſtneſs of his choice has been ſo generally acknowledged, that the deſcription is become almoſt proverbial: and yet a tower does not ſeem deſigned to be ſurrounded by a wood; but the appearance may be accounted for: it does ſometimes occur; and we are eaſily ſatisfied of the propriety, when the effect is ſo pleaſing. Many buildings, which from their ſplendor beſt become an open expoſure, will yet be ſometimes not ill beſtowed on a more ſequeſtered ſpot, either to characteriſe or adorn it; and others, for which a ſolitary would in general be preferred to an eminent ſituation, may occaſionally be objects in very conſpicuous poſitions. A Grecian temple, from its peculiar grace and dignity, deſerves every diſtinction; it may, however, in the depth of a wood, be ſo circumſtanced, that the want of thoſe advantages to which it ſeems entitled, will not be regretted. A happier ſituation cannot be deviſed, than that of the temple of Pan at the ſouth lodge on Enfield chace. It is of the uſual oblong form, encompaſſed by a colonnade; in dimenſions, and in ſtyle, it is equal to a moſt extenſive landſkip: and yet by the antique and ruſtic air of its Doric columns without baſes; by the chaſtity of its little ornaments, a crook, a pipe, and a ſcrip, and thoſe only over the doors; and by the ſimplicity of the whole both within and without; it is adapted with ſo much propriety to the thickets which conceal it from the view, that no one can wiſh it to be brought forward, who is ſenſible to the charms of the Arcadian ſcene which this building alone has created. On the other hand, a very ſpacious field, or ſheep-walk, will not be diſgraced by a cottage, a Dutch barn, or a hay-ſtack; nor will they, though ſmall and familiar, appear to be inconſiderable or inſignificant objects. Numberleſs other inſtances might be adduced to prove the impoſſibility of reſtraining particular buildings to particular ſituations, upon any general principles: the variety in their forms is hardly greater than in their application.

51 Of ruins.

To this great variety muſt be added the many changes which may be made by the means of *ruins*. They are a claſs by themſelves, beautiful as objects, expreſſive as characters, and peculiarly calculated to connect with appendages into elegant groupes. They may be accommodated with eaſe to irregularity of ground, and their diſorder is improved by it. They may be intimately blended with trees and thickets; and the interruption is an advantage: for imperfection and obſcurity are their properties; and to carry the imagination to ſomething greater than is ſeen, is their effect. They may for any of theſe purpoſes be ſeparated into detached pieces; contiguity is not neceſſary, nor even the appearance of it, if the relation be preſerved; but ſtraggling ruins have a bad effect, when the ſeveral parts are equally conſiderable. There ſhould be one large maſs to raiſe an idea of greatneſs, to attract the others about it, and to be a common centre of union to all: the ſmaller pieces then mark the original dimenſions of one extenſive ſtructure; and no longer appear to be the remains of ſeveral little buildings.

All remains excite an inquiry into the former ſtate of the edifice, and fix the mind in a contemplation of the uſe it was applied to; beſides the characters expreſſed by their ſtyle and poſition, they ſuggeſt ideas which would not ariſe from the buildings if entire. The purpoſes of many have ceaſed: an abbey, or a caſtle, if complete, can now be no more than a dwelling; the memory of the times, and of the manners to which they are adapted, is preſerved only in hiſtory, and in ruins; and certain ſenſations of regret, of veneration, or compaſſion, attend the recollection. Nor are theſe confined to the remains of buildings which are now in diſuſe: thoſe of an old manſion raiſe reflections on the domeſtic comforts once enjoyed, and the ancient hoſpitality which reigned there. Whatever building we ſee in decay, we naturally contraſt its preſent to its former ſtate, and delight to ruminate on the compariſon. It is true that ſuch effects properly belong to real ruins; they are however produced in a certain degree by thoſe which are fictitious: the impreſſions are not ſo ſtrong, but they are exactly ſimilar; and the repreſentation, though it does not preſent facts to the memory, yet ſuggeſts ſubjects to the imagination. But, in order to affect the fancy, the ſuppoſed original deſign ſhould be clear, the uſe obvious, and the form eaſy to be traced: no fragments ſhould be hazarded without a preciſe meaning, and an evident connection; none ſhould be perplexed in their conſtruction, or uncertain as to their application. Conjectures about the form, raiſe doubts about the exiſtence of the ancient ſtructure: the mind muſt not be allowed to heſitate; it muſt be hurried away from examining into the reality, by the exactneſs and the force of the reſemblance.

52
Deſcription of Tintern abbey, [between Chepſtowe and Monmouth.]

In the ruins of Tintern abbey, the original conſtruction of the church is perfectly marked; and it is principally from this circumſtance that they are celebrated as a ſubject of curioſity and contemplation. The walls are almoſt entire; the roof only is fallen in, but moſt of the columns which divided the ayles are ſtill ſtanding: of thoſe which have dropped down, the baſes remain, every one exactly in its place; and in the middle of the nave four lofty arches, which once ſupported the ſteeple, riſe high in the air above all the reſt, each reduced now to a narrow rim of ſtone, but completely preſerving its form. The ſhapes even of the windows are little altered: but ſome of them are quite obſcured, others partially ſhaded, by tufts of ivy; and thoſe which are moſt clear, are edged with its ſlender tendrils, and lighter foliage, wreathing about the ſides and the diviſions: it winds round the pillars; it clings to the walls; and in one of the ayles cluſters at the top in bunches, ſo thick and ſo large, as to darken the ſpace below. The other ayles, and the great nave, are expoſed to the ſky: the floor is entirely overſpread with turf; and to keep it clear from weeds and buſhes, is now its higheſt preſervation. Monkiſh tomb-ſtones, and the monuments of benefactors long ſince forgotten, appear above the green ſward; the baſes of the pillars which have fallen, riſe out of it; and maimed effigies, and ſculpture worn with age and weather, Gothic capitals, carved cornices, and various fragments, are ſcattered about, or lie in heaps piled up together. Other ſhattered pieces, though diſjointed and mouldering, ſtill occupy their original places; and a ſtair-caſe much impaired, which led to a tower now no more, is ſuſpended at a great height, uncovered and inacceſſible. Nothing is perfect; but memorials of every part ſtill ſubſiſt; all certain, but all in decay; and ſuggeſting, at once, every idea which can occur in a ſeat of devotion, ſolitude, and deſolation. Upon ſuch models, fictitious ruins ſhould be formed; and if any parts are entirely loſt, they ſhould be ſuch as the imagination can eaſily ſupply from thoſe which are ſtill remaining. Diſtinct traces of the building which is ſuppoſed to have exiſted, are leſs liable to the ſuſpicion of artifice, than an unmeaning heap of confuſion. Preciſion is always ſatisfactory, but in the reality it is only agreeable; in the copy, it is eſſential to the imitation.

A material circumſtance to the truth of the imitation, is, that the ruin appear to be very old. The idea is beſides intereſting in itſelf: a monument of antiquity is never ſeen with indifference; and a ſemblance of age may be given to the repreſentation, by the hue of the materials, the growth of ivy and other plants, and cracks and fragments ſeemingly occaſioned rather by decay than by deſtruction. An appendage evidently more modern than the principal ſtructure will ſometimes corroborate the effect: the ſhed of a cottager amidſt the remains of a temple, is a contraſt both to the former and to the preſent ſtate of the building; and a tree flouriſhing among ruins, ſhews the length of time they have lain neglected. No circumſtance ſo forcibly marks the deſolation of a ſpot once inhabited, as the prevalence of nature ever it:

“ *Campos ubi Troja fuit,*”

is a ſentence which conveys a ſtronger idea of a city totally overthrown, than a deſcription of its remains; but in a repreſentation to the eye, ſome remains muſt appear; and then the perverſion of them to an ordinary uſe, or an intermixture of a vigorous vegetation, intimates a ſettled deſpair of their reſtoration.

PART II. OF THOSE PROPERTIES IN THE OBJECTS OF NATURE WHICH SHOULD DETERMINE THE CHOICE AND ARRANGEMENT OF THEM IN GARDENING.

SECT. I. *Of Art.*

THE ſeveral conſtituent parts of the ſcenes of nature having now been conſidered, the next inquiry is into the particular principles and circumſtances which may affect them when they are applied to the ſubjects of gardening.

It has always been ſuppoſed, that *art* muſt then interfere: but art was carried to exceſs, when from acceſſory it became principal, and the ſubject upon which it was employed was brought under regulations leſs applicable to that than to any other; when ground, wood, and water, were reduced to mathematical figures, and ſimilarity and order were preferred to freedom and variety. Theſe miſchiefs, however, were occaſioned, not by the uſe, but the perverſion of art; it excluded, inſtead of improving upon nature, and thereby deſtroyed the very end it was called in to promote.

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So ſtrange an abuſe probably aroſe from an idea of ſome neceſſary correſpondence between the manſion, and the ſcene it immediately commanded: the forms, therefore, of both were determined by the ſame rules; and terraces, canals, and avenues, were but ſo many variations of the plan of the building. The regularity thus eſtabliſhed ſpread afterwards to more diſtant quarters: there, indeed, the abſurdity was acknowledged as ſoon as a more natural diſpoſition appeared; but a prejudice in favour of art, as it is called, *juſt about the houſe*, ſtill remains. If, by the term, *regularity* is intended, the principle is equally applicable to the vicinity of any other building; and every temple in the garden ought to have its concomitant formal ſlopes and plantations: or the conformity may be reverſed, and we may as reaſonably contend, that the building ought to be irregular, in order to be conſiſtent with the ſcene it belongs to. The truth is, that both propoſitions are erroneous: architecture requires ſymmetry; the objects of nature freedom: and the properties of the one cannot with juſtice be transferred to the other. But if, by the term, no more is meant than merely *deſign*, the diſpute is at an end: choice, arrangement, compoſition, improvement, and preſervation, are ſo many ſymptoms of art, which may occaſionally appear in ſeveral parts of a garden, but ought to be diſplayed without reſerve near the houſe: nothing there ſhould ſeem neglected; it is a ſcene of the moſt cultivated nature; it ought to be enriched, it it ought to be adorned; and deſign may be avowed in the plan, and expence in the execution.

Even regularity is not excluded: ſo capital a ſtructure may extend its influence beyond its walls: but this power ſhould be exerciſed only over its immediate appendages. The platform upon which the houſe ſtands, is generally continued to a certain breadth on every ſide; and, whether it be pavement or gravel, may undoubtedly coincide with the ſhape of the building. The road which leads up to the door may go off from it in an equal angle, ſo that the two ſides ſhall exactly correſpond: and certain ornaments, though detached, are yet rather within the province of architecture than of gardening. Works of ſculpture are not, like buildings, objects familiar in ſcenes of cultivated nature; but vaſes, ſtatutes, and termini, are uſual appendages to a conſiderable edifice: as ſuch, they may attend the manſion, and treſpaſs a little upon the garden, provided they are not carried ſo far into it as to loſe their connection with the ſtructure. The platform and the road are alſo appurtenances to the houſe; all theſe may therefore be adapted to its form, and the environs will thereby acquire a degree of regularity: but to give it to the objects of nature, only on account of their proximity to others which are calculated to receive it, is, at the beſt, a refinement.

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the ap-
ach.

Upon the ſame principles regularity has been required in the *approach;* and an additional reaſon has been aſſigned for it, that the idea of a ſeat is thereby extended to a diſtance. But that may be done by other means than by an avenue. A private road is eaſily known. If carried through grounds, or a park, it is commonly very apparent: even in a lane, here and there a bench, a painted gate, a ſmall plantation, or any other little ornament, will ſufficiently denote it: if the entrance only be marked, ſimple preſervation will retain the impreſſion along the whole progreſs. Or the road may wind through ſeveral ſcenes diſtinguiſhed by objects, or by an extraordinary degree of cultivation; and then the length of the way, and the variety of improvements through which it is conducted, may extend the appearance of domain, and the idea of a ſeat, beyond the reach of any direct avenue.

An avenue being confined to one termination, and excluding every view on the ſides, has a tedious ſameneſs throughout: to be great, it muſt be dull; and the object to which it is appropriated, is after all ſeldom ſhewn to advantage. Buildings, in general, do not appear ſo large, and are not ſo beautiful, when looked at in front, as when they are ſeen from an angular ſtation, which commands two ſides at once, and throws them both into perſpective. But a winding lateral approach is free from theſe objections; it may beſides be brought up to the houſe without diſturbing any of the views from it: but an avenue cuts the ſcenery directly in two, and reduces all the proſpect to a narrow viſta. A mere line of perſpective, be the extent what it may, will ſeldom compenſate for the loſs of that ſpace which it divides, and of the parts which it conceals.

56
Deſcription of the approach at Caverſham, [the ſeat of Lord Cadogan, near Reading.]

The approach to Caverſham, though a mile in length, and not once in ſight of the houſe till cloſe upon it, yet can never be miſtaken for any other way than it is; a paſſage only through a park is not introduced with ſo much diſtinction, ſo preciſely marked, or kept in ſuch preſervation. On each ſide of the entrance is an elegant lodge: the interval between them is a light open palliſade, croſſing the whole breadth of a lovely valley: the road is conducted along the bottom, continually winding in natural eaſy ſweeps, and preſenting at every bend ſome new ſcene to the view; at laſt it gently ſlants up the ſide of a little riſe to the manſion, where the eminence, which ſeemed inconſiderable, is found to be a very elevated ſituation, to which the approach, without once quitting the valley, had been inſenſibly aſcending all the way. In its progreſs, it never breaks the ſcenes through which it paſſes: the plantations and the glades are continued without interruption, quite acroſs the valley: the oppoſite ſides have a relation to each other, not anſwering, not contraſted, but connected: nor does the diſpoſition ever ſeem to have been made with any attention to the road; but the ſcenes ſtill belong purely to the park; each of them is preſerved entire, and avails itſelf of all the ſpace which the ſituation will allow. At the entrance the ſlopes are very gentle, with a few large hawthorns, beeches, and oaks, ſcattered over them: theſe are thickened by the perſpective as the valley winds; and juſt at the bend, a large clump hangs on a bold aſcent, from whence different groupes, growing gradually leſs and leſs till they end in ſingle trees, ſtretch quite away to a fine grove which crowns the oppoſite brow. The road paſſes between the groupes, under a light and lofty arch of aſh; and then opens upon a glade, broken on the left only by a ſingle tree, and on the right by ſeveral beeches ſtanding ſo cloſe together as to be but one in appearance. This glade is bounded by a beautiful grove, which in one part ſpreads a perfect gloom, but in others divides into different cluſters, which leave openings for the gleams of light to pour in between them. It extends to the edge, and borders for ſome way the ſide of a collateral dale, which retires ſlowly from the view; and in which the falls of the ground are more tame, the bottom more flattened, than in the principal valley; the banks of this alſo, near the junction, are more gentle than before: but on the oppoſite ſide, the ſteeps and the clumps ſtill continue; and amongſt them is a fine knole, from which deſcend two or three groupes of large trees, feathering down to the bottom, and by the pendency of their branches favouring the declivity. To theſe ſucceeds an open ſpace, diverſified only by a few ſcattered trees; and in the midſt of it, ſome magnificent beeches crowding together, overſhadow the road, which is carried through a narrow darkſome paſſage between them: ſoon after it riſes under a thick wood in the garden up to the houſe, where it ſuddenly burſts out upon a rich and extenſive proſpect, with the town and the churches of Reading in full ſight, and the hills of Windſor-foreſt in the horizon. Such a view at the end of a long avenue, would have been, at the beſt, but a compenſation for the tediouſneſs of the way; but here the approach is as delightful as the termination. Yet even in this, a ſimilarity of ſtyle may be ſaid to prevail. But it has every variety of open plantations; and theſe are not confuſedly thrown together, but formed into ſeveral ſcenes, all of them particularly marked: one is characteriſed by a grove, the next by clumps, and others by little groupes or ſingle trees: the plantations ſometimes cover only the brow, and retire along the top from the view; ſometimes they ſeem to be ſuſpended on the edge or the ſides of the deſcents; in one place they leave the bottom clear, in another they overſpread the whole valley: the intervals are often little leſs than lawns; at other times they are no more than narrow glades between the groves, or only ſmall openings in the midſt of a plantation. The ground, without being broken into diminutive parts, is caſt into an infinite number of elegant ſhapes, in every gradation from the moſt gentle ſlope, to a very precipitate fall: the trees alſo are of ſeveral kinds, and their ſhadows of various tints; thoſe of the horſe-cheſnuts are dark; the beeches ſpread a broader but leſs gloomy obſcurity; and they are often ſo vaſt, they ſwell out in a ſucceſſion of ſuch enormous maſſes, that, though contiguous, a deep ſhade ſinks in between them, and diſtinguiſhes each immenſe individual: ſuch intervals are in ſome places filled up with other ſpecies; the maples are of ſo extraordinary a ſize, that they do not appear inconſiderable, when cloſe to the foreſt-trees; large hawthorns, ſome oaks, and in one part many, perhaps too many limes, the remains of former avenues, are intermixed; and amongſt all theſe often riſe the talleſt aſh, whoſe lighter foliage only chequers the turf beneath, while their peculiar hue diverſifies the greens of the groupes they belong to.

57 Of regularity in the ſeveral parts of a garden.

If regularity is not entitled to a preference in the environs or approach to a houſe, it will be difficult to ſupport its pretenſions to a place in any more *diſtant parts* of a park or a garden. Formal ſlopes of ground are ugly: right or circular lines bounding water, do not indeed change the nature of the element; it ſtill retains ſome of its agreeable properties; but the ſhape given to it is diſguſting. Regularity in plantations is leſs offenſive; we are habituated, as has been already obſerved, to ſtraight lines of trees, in cultivated nature; a double row, meeting at the top, and forming a complete arched viſta, has a peculiar effect; other regular figures have a degree of beauty: and to alter or to diſguſſe ſuch a diſpoſition, without deſtroying a number of fine trees, which cannot well be ſpared, may ſometimes be difficult; but it hardly ever ought to be choſen in the arrangement of a young plantation.

Regularity was, however, once thought eſſential to every garden, and every approach; and it yet remains in many. It is ſtill a character, denoting the neighbourhood of a gentleman's habitation; and an avenue, as an object in a view, gives to a houſe, otherwiſe inconſiderable, the air of a manſion. Buildings which anſwer one another at the entrance of an approach, or on the ſides of an opening, have a ſimilar effect; they diſtinguiſh at once the precincts of a ſeat from the reſt of the country. Some pieces of ſculpture alſo, ſuch as vaſes and termini, may perhaps now and then be uſed, to extend the appearance of a garden beyond its limits, and to raiſe the mead in which they are placed above the ordinary improvements of cultivated nature. At other times they may be applied as ornaments to the moſt poliſhed lawns; the traditional ideas we have conceived of Arcadian ſcenes, correſpond with ſuch decorations: and ſometimes a ſolitary urn, inſcribed to the memory of a perſon now no more, but who once frequented the ſhades where it ſtands, is an object equally elegant and intereſting. The occaſions, however, on which we may, with any propriety, treſpaſs beyond the bounds of cultivated nature, are very rare; the force of the character can alone excuſe the artifice avowed in expreſſing it.

Sect. II. *Of Pictureſque Beauty.*

58 Of the different effects from the ſame objects in ſcene and picture.

But regularity can never attain to a great ſhare of beauty, and to none of the ſpecies called *pictureſque*; a denomination in general expreſſive of excellence, but which, by being too indiſcriminately applied, may be ſometimes productive of errors. That a ſubject is recommended at leaſt to our notice, and probably to our favour, if it has been diſtinguiſhed by the pencil of an eminent painter, is indiſputable: we are delighted to ſee thoſe objects in the reality, which we are uſed to admire in the repreſentation; and we improve upon their intrinſic merit, by recollecting their effects in the picture. The greateſt beauties of nature will often ſuggeſt the remembrance; for it is the buſineſs of a landſkip painter to ſelect them: and his choice is abſolutely unreſtrained; he is at liberty to exclude all objects which may hurt the compoſition; he has the power of combining thoſe which he admits in the moſt agreeable manner; he can even determine the ſeaſon of the year, and the hour of the day, to ſhew his landſkip in whatever light he prefers. The works therefore of a great maſter, are fine exhibitions of nature, and an excellent ſchool wherein to form a taſte for beauty: but ſtill their authority is not abſolute; they muſt be uſed only as ſtudies, not as models; for a picture and a ſcene in nature, though they agree in many, yet differ in ſome particulars, which muſt always be taken into conſideration, before we can decide upon the circumſtances which may be tranſferred from the one to other.

In their *dimenſions* the diſtinction is obvious; the ſame objects on different ſcales have very different effects; thoſe which ſeem monſtrous on the one, may appear diminutive on the other; and a form, which is elegant in a ſmall object, may be too delicate for a large one. Beſides, in a canvas of a few feet, there is not room for every ſpecies of variety which in nature is pleaſing. Though the characteriſtic diſtinction of trees may be marked, their more minute differences, which however enrich plantations, cannot be expreſſed: and a multiplicity of encloſures, catches of water, cottages, cattle, and a thouſand other circumſtances, which enliven a proſpect, are, when reduced into a narrow compaſs, no better than a heap of confuſion. Yet, on the other hand, the principal objects muſt often be more diverſified in a picture than in a ſcene: a building which occupies a conſiderable portion of the former, will appear ſmall in the latter when compared to the ſpace all around it; and the number of parts which may be neceſſary to break its ſameneſs in one, will aggravate its inſignificance in the other. A tree which preſents one rich maſs of foliage, has ſometimes a fine effect in nature; but when painted, is often a heavy lump, which can be lightened only by ſeparating the boughs, and ſhewing the ramifications between them. In ſeveral other inſtances the object is frequently affected by the proportion it bears to the actual, not the ideal, circumjacent extent.

58 Of the different effects from the ſame objects in ſcene and picture.

Painting, with all its powers, is ſtill more unequal to ſome ſubjects, and can give only *a faint, if any, repreſentation* of them: but a gardener is not therefore to reject them: he is not debarred from a view down the ſides of a hill, or a proſpect where the horizon is lower than the ſtation, becauſe he never ſaw them in a picture. Even when painting exactly imitates the appearances of nature, it is often weak in conveying the *ideas* which they excite, and on which much of their effect ſometimes depends. This however is not always a diſadvantage; the appearance may be more pleaſing than the idea which accompanies it, and the omiſſion of the one may be an improvement of the other. Many beautiful tints denote diſagreeable circumſtances: the hue of a barren heath is often finely diverſified; a piece of bare ground is ſometimes overſpread with a number of delicate ſhades; and yet we prefer a more uniform verdure to all their variety. In a picture, the ſeveral tints which occur in nature may be blended, and retain only their beauty, without ſuggeſting the poverty of the ſoil which occaſions them: but in the reality, the cauſe is more powerful than the effect: we are leſs pleaſed with the ſight, than we are hurt by the reflection; and a moſt agreeable mixture of colours may preſent no other idea than of drearineſs and ſterility.

On the other hand, *utility* will ſometimes ſupply the want of beauty in the reality, but not in a picture. In the former, we are never totally inattentive to it; we are familiariſed to the marks of it; and we allow a degree of merit to an object which has no other recommendation. A regular building is generally more agreeable in a ſcene than in a picture, and an adjacent platform, if evidently convenient, is tolerable in the one; it is always a right line too much in the other. Utility is at the leaſt an excuſe, when it is real; but it is an idea never included in the repreſentation.

Many more inſtances might be alleged to prove, that the ſubjects for a painter and a gardener are not always the ſame. Some which are agreeable in the reality, loſe their effect in the imitation; and others, at the beſt, have leſs merit in a ſcene than in a picture. The term *pictureſque* is therefore applicable only to ſuch objects in nature, as, after allowing for the differences between the arts of painting and of gardening, are fit to be formed into groupes, or to enter into a compoſition where the ſeveral parts have a relation to each other, and in oppoſition to thoſe which may be ſpread abroad in detail, and have no merit but as individuals.

Sect. III. *Of Character.*

59 Of emblematical characters.

Character is very reconcileable with beauty; and, even when independent of it, has attracted ſo much regard, as to occaſion ſeveral frivolous attempts to produce it: ſtatues, inſcriptions, and even paintings, hiſtory and mythology, and a variety of devices, have been introduced for this purpoſe. The heathen deities and heroes have therefore had their ſeveral places aſſigned to them in the woods and the lawns of a garden: natural caſcades have been diſfigured with river-gods; and columns erected only to receive quotations: the compartiments of a ſummer-houſe have been filled with pictures of gambols and revels, as ſignificant of gaiety: the cypreſs, becauſe it was once uſed in funerals, has been thought peculiarly adapted to melancholy: and the decorations, the furniture, and the environs of a building, have been crowded with puerilities under pretence of propriety. All theſe devices are rather *emblematical* than expreſſive: they may be ingenious contrivances, and recall abſent ideas to the recollection; but they make no immediate impreſſion: for they muſt be examined, compared, perhaps explained, before the whole deſign of them is well underſtood: and though an alluſion to a favourite or well-known ſubject of hiſtory, of poetry, or of tradition, may now and then animate or dignify a ſcene; yet as the ſubject does not naturally belong to a garden, the alluſion ſhould not be principal: it ſhould ſeem to have been ſuggeſted by the ſcene; a tranſitory image, which irreſiſtibly occurred; not ſought for, not laboured; and have the force of a metaphor, free from the detail of an allegory.

60 Of imitative characters.

Another ſpecies of character ariſes from direct *imitation*; when a ſcene or an object, which has been celebrated in deſcription, or is familiar in idea, is repreſented in a garden. Artificial ruins, lakes, and rivers, fall under this denomination. The air of a ſeat extended to a diſtance, and ſcenes calculated to raiſe ideas of Arcadian elegance or of rural ſimplicity, with many more which have been occaſionally mentioned or will obviouſly occur, may be ranked in this claſs. They are all repreſentations. But the materials, the dimenſions, and other circumſtances, being the ſame in the copy and the original, their effects are ſimilar in both: and if not equally ſtrong the defect is not in the reſemblance; but the conſciouſneſs of an imitation checks that train of thought which the appearance naturally ſuggeſts. Yet an over-anxious ſolicitude to diſguiſe the fallacy is often the means of expoſing it: too many points of likeneſs ſometimes hurt the deception; they ſeem ſtudied and forced; and the affectation of reſemblance deſtroys the ſuppoſition of a reality. A hermitage is the habitation of a recluſe; it ſhould be diſtinguiſhed by its ſolitude, and its ſimplicity: but if it is filled with crucifixes, hour-glaſſes, beads, and every other trinket which can be thought of, the attention is diverted from enjoying the retreat to examining the particulars: all the collateral circumſtances which agree with a character, ſeldom meet in one ſubject; and when they are induſtriouſly brought together, though each be natural, the collection is artificial.

The peculiar advantages which gardening has over other imitative arts, will not, however, ſupport attempts to introduce, they rather forbid the introduction of characters, to which the ſpace is not adequate. A plain ſimple field, unadorned but with the common rural appendages, is an agreeable opening: but if it is extremely ſmall, neither a hay-ſtack, nor a cottage, nor a ſtile, nor a path, nor much leſs all of them together, will give it an air of reality. A harbour or an artificial lake is but a conceit: it raiſes no idea of refuge or ſecurity; for the lake does not ſuggeſt an idea of danger: it is detached from the large body of water; and yet it is in itſelf but a poor inconſiderable baſin, vainly affecting to mimick the majeſty of the ſea. When imitative characters in gardening are egregiouſly defective in any material circumſtance, the truth of the others expoſes and aggravates the failure.

61 Of original characters.

But the art of gardening aſpires to more than imitation: it can create *original* characters, and give expreſſions to the ſeveral ſcenes ſuperior to any they can receive from alluſions. Certain properties, and certain diſpoſitions, of the objects of nature, are adapted to excite particular ideas and ſenſations: many of them have been occaſionally mentioned; and all are very well known. They require no diſcernment, examination, or diſcuſſion; but are obvious at a glance, and inſtantaneouſly diſtinguiſhed by our feelings. Beauty alone is not ſo engaging as this ſpecies of character: the impreſſions it makes are more tranſient and leſs intereſting; for it aims only at delighting the eye, but the other affects our ſenſibility. An aſſemblage of the moſt elegant forms in the happieſt ſituations is to a degree indiſcriminate, if they have not been ſelected and arranged with a deſign to produce certain expreſſions; an air of magnificence, or of ſimplicity, of cheerfulneſs, tranquillity, or ſome other general character, ought to pervade the whole; and objects pleaſing in themſelves, if they contradict that character, ſhould therefore be excluded: thoſe which are only indifferent, muſt ſometimes make room for ſuch as are more ſignificant; many will often be introduced for no other merit than their expreſſion; and ſome, which are in general rather diſagreeable, may occaſionally be recommended by it. Barrenneſs itſelf may be an acceptable circumſtance in a ſpot dedicated to ſolitude and melancholy.

The power of ſuch characters is not confined to the ideas which the objects immediately ſuggeſt; for theſe are connected with others, which inſenſibly lead to ſubjects, far diſtant, perhaps, from the original thought, and related to it only by a ſimilitude in the ſenſations they excite. In a proſpect, enriched and enlivened with inhabitants and cultivation, the attention is caught at firſt by the circumſtances which are gayeſt in their ſeaſon, the bloom of an orchard, the feſtivity of a hay-field, and the carols of harveſt-home: but the cheerfulneſs which theſe infuſe into the mind, expands afterwards to other objects than thoſe immediately preſented to the eye; and we are thereby diſpoſed to receive, and delighted to purſue, a variety of pleaſing ideas, and every benevolent feeling. At the ſight of a ruin, reflections on the change, the decay, and the deſolation before us, naturally occur; and they introduce a long ſucceſſion of others, all tinctured with that melancholy which theſe have inſpired: or if the monument revive the memory of former times, we do not ſtop at the ſimple fact which it records, but recollect many more coæval circumſtances, which we ſee, not perhaps as they were, but as they are come down to us, venerable with age, and magnified by fame. Even, without the aſſiſtance of buildings, or other adventitious circumſtances, nature alone furniſhes materials for ſcenes which may be adapted to almoſt every kind of expreſſion: their operation is general, and their conſequences infinite: the mind is elevated, depreſſed, or compoſed, as gaiety, gloom, or tranquillity, prevail in the ſcene; and we ſoon loſe ſight of the means by which the character is formed: we forget the particular objects it preſents; and giving way to their effects, without recurring to the cauſe, we follow the track they have begun, to any extent which the diſpoſition they accord with will allow. It ſuffices that the ſcenes of nature have a power to affect our imagination and our ſenſibility: for ſuch is the conſtitution of the human mind, that if once it is agitated, the emotion often ſpreads far beyond the occaſion; when the paſſions are rouſed, their courſe is unreſtrained; when the fancy is on the wing, its flight is unbounded; and, quitting the inanimate objects which firſt gave them their ſpring, we may be led by thought above thought, widely differing in degree, but ſtill correſponding in character, till we riſe from familiar ſubjects up to the ſublimeſt conceptions, and are rapt in the contemplation of whatever is great or beautiful, which we ſee in nature, feel in man, or attribute to divinity.

Sect. IV. *Of the General Subject.*

62 Differenc between farm, a g den, a pa and a riding.

The ſcenes of nature are alſo affected by the general ſubject to which they are applied, whether that be a *farm*, a *garden*, a *park*, or a *riding*. Theſe may all indeed be parts of one place; they may border on each other; they may, to a degree, be intermixed: but each is ſtill a character of ſuch force, that, whichever prevails, the propriety of all other characters, and of every ſpecies of beauty, muſt be tried by their conformity to this. And circumſtances neceſſary to one, may be inconſiſtencies in the reſt: *elegance* is the peculiar excellence of a garden, *greatneſs* of a park, *ſimplicity* of a farm, and *pleaſantneſs* of a riding. Theſe diſtinguiſhing properties will alone exclude from the one, many objects which are very acceptable in the others; but theſe are not the only properties in which they eſſentially differ.

A garden is intended to walk or to ſit in, which are circumſtances not conſidered in a riding; a park comprehends all the uſes of the other two; and theſe uſes determine the *proportional extent* of each. A large garden would be but a ſmall park; and the circumference of a conſiderable park but a ſhort riding. A farm is in ſome meaſure denominated from its ſize: if it greatly exceed the dimenſions of a garden, ſo that its bounds are beyond the reach of a walk, it becomes a riding. A farm and a garden hence appear to be calculated for indolent, a riding for active amuſements, and a park for both: ſeats, therefore, and buildings for refreſhment or indulgence, ſhould be frequent in a garden or a farm; ſhould ſometimes occur in a park; but are unneceſſary in a riding.

Within the narrow compaſs of a garden, there is not room for *diſtant effects*. On the other hand, it allows of objects which are ſtriking only in a *ſingle point of view*; for we may ſtop there to contemplate them: and an obſcure catch, or a partial glimpſe of others, are alſo acceptable circumſtances, in the leiſure of a ſeat, or even in the courſe of a loitering walk. But theſe are loſt in a riding, where the pleaſantneſs of the road, not of the ſpot, is the principal conſideration; and its greateſt improvement is a diſtant object, which may be ſeen from ſeveral points, or along a conſiderable part of the way. *Minute beauties* in general may abound in a garden; they may be frequent in a farm; in both we have opportunities to obſerve and to examine them: in a park, they are below our notice; in a riding, they eſcape it.

Proſpects are agreeable to either of the four general ſubjects, but not equally neceſſary to all. In a garden, or in a farm, ſcenes within themſelves are often ſatiſfactory; and, in their retired ſpots, an opening would be improper. A park is defective, if confined to its incloſure: a perpetual ſucceſſion of home-ſcenes, through ſo large an extent, wants variety; and fine proſpects are circumſtances of greatneſs: but they are not required in every part. The place itſelf ſupplies many noble views; and theſe are not much improved by a diſtant rim, or a little peep of the country, which is inadequate to the reſt of the compoſition. A riding has ſeldom much beauty of it own; it depends on objects without for its pleaſantneſs: if it only leads now and then to a ſtriking point, and is dull all the reſt of the way, it will not be much frequented; but very moderate views are ſufficient to render its progreſs agreeable.

By concealing, therefore, much of the proſpects, we deſtroy the amuſement of a riding. The view of the country ſhould not be hurt by the improvements of the road. In a garden, on the contrary, continution of ſhade is very acceptable; and if the views be ſometimes interrupted, they may ſtill be caught from many points: we may enjoy them there whenever we pleaſe; and they would pall if conſtantly in ſight. The beſt ſituation for a houſe is not that which has the greateſt command; a cheerful look-out from the windows is all that the proprietor deſires. He is more ſenſible to the charms of the greater proſpects, if he ſees them only occaſionally, and they do not become inſipid by being familiar: for the ſame reaſon he does not wiſh for them in every part of his garden; and temporary concealments give them freſh ſpirit whenever they appear. But the views of a riding are not viſited ſo often, as thereby to loſe any of their effect. Plantations, therefore, in a country, ſhould be calculated rather for objects to look at, than for ſhades to paſs through. In a park, they may anſwer both purpoſes: but in a garden, they are commonly conſidered as places to walk or to ſit in. As ſuch, too, they are moſt welcome in a farm: but ſtill the diſtinction between an improved and an ordinary farm being, by no circumſtance, ſo ſenſibly marked, as by the arrangement of the trees, they are more important, as objects, there than in a garden.

Though a farm and a garden agree in many particulars connected with extent, yet, in *ſtyle*, they are the two extremes. Both, indeed, are ſubjects of cultivation: but cultivation in the one is *huſbandry*, and in the other *decoration*; the former is appropriated to *profit*, the latter to *pleaſure*. Fields profuſely ornamented do not retain the appearance of a farm; and an apparent attention to produce, obliterates the idea of a garden. A park is ſometimes not much hurt by being turned to account. The uſe of a riding is to lead from one beauty to another, and be a ſcene of pleaſure all the way: made avowedly for that purpoſe only, it admits more embelliſhment and diſtinction than an ordinary road through a farm. See the articles Farm, Park, and Riding.

Sect. V. *Of a Garden.*

63 Of a garden ſurrounding an incloſure.

The gravel paths have been been mentioned † as contributing to the appearance of a garden: they are unuſual elſewhere; they conſtantly preſent the idea of a walk; and the correſpondence between their ſides, the exactneſs of the edges, the nicety of the materials and of the preſervation, appropriate them to ſpots in the higheſt ſtate of improvement. Applied to any other ſubject than a park, their effect is the ſame. A field, ſurrounded by a gravel-walk, is, to a degree, bordered by a garden; and many ornaments may be introduced as appendages to the latter, which would otherwiſe appear to be inconſiſtent with the former. When theſe accompaniments occupy a conſiderable ſpace, and are ſeparated from the field, the idea of a garden is complete as far as they extend; but if the gravel be omitted, and the walk be only of turf, a greater breadth to the border, and more richneſs in the decorations, are neceſſary to preſerve that idea.

Many gardens are nothing more than ſuch *a walk round a field*; that field is often raiſed to the character of a lawn; and ſometimes the incloſure is, in fact, a paddock. Whatever it be, the walk is certainly garden: it is a ſpot ſet apart for pleaſure; it admits on the ſides a profuſion of ornament; it is fit for the reception of every elegance, and requires the niceſt preſervation: it is attended alſo with many advantages; may be made and kept without much expence; leads to a variety of points; and avails itſelf, in its progreſs, of the ſeveral circumſtances which belong to the incloſure it ſurrounds, whether they be the rural appurtenances of a farm, or thoſe more refined which diſtinguiſh a paddock.

But it has at the ſame time its inconveniencies and defects. Its approach to the ſeveral points is always circuitous, and they are thereby often thrown to a diſtance from the houſe and from each other: there is no acceſs to them acroſs the open expoſure: the way muſt conſtantly be the ſame: the view all along is into one opening, which muſt be peculiarly circumſtanced, to furniſh within itſelf a ſufficient variety: and the embelliſhments of the walk are ſeldom important; their number is limited; and the little ſpace allotted for their reception admits only of thoſe which can be accommodated to the ſcale, and will conform to the character. This ſpecies of garden, therefore, reduces almoſt to a ſameneſs all the places it is applied to: the ſubject ſeems exhauſted: no walk round a field can now be very different from ſeveral others already exiſting. At the beſt too it is but a walk: the fine ſcenery of a garden is wanting: and that in the field, which is ſubſtituted in its ſtead, is generally of an inferior character; and often defective in connection with the ſpot which commands it, by the intervention of the fence, or the viſible difference in the preſervation.

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† See the article Park.

This objection, however, has more or leſs force according to the character of the incloſure. If that be a paddock or a lawn, it may exhibit ſcenes not unworthy of the moſt elegant garden; which agreeing in ſtyle, will unite in appearance, with the walk. The other objections alſo are ſtronger or weaker in proportion to the ſpace allowed for the appendages; and not applicable at all to a broad circuit of garden, which has room within itſelf for ſcenery, variety, and character: but the common narrow walk, too indiſcriminately in faſhion, if continued to a conſiderable extent, becomes very tireſome; and the points it leads to muſt be more than ordinarily delightful, to compenſate for the fatigue of the way.

This tediouſneſs may, however, be remedied, without any extravagant enlargement of the plan, by taking in, at certain intervals, an additional breadth, ſufficient only for a little ſcene to interrupt the uniformity of the progreſs. The walk is then a communication, not between points of view, through all which it remains unaltered; but between the ſeveral parts of a garden, in each of which it is occaſionally loſt; and, when reſumed, it is at the worſt a repetition, not a continuation of the ſame idea; the eye and the mind are not always confined to one tract; they expatiate at times, and have been relieved before they return to it. Another expedient, the very reverſe of this, may now and then be put in practice: it is to contract, inſtead of enlarging, the plan; to carry the walk, in ſome part of its courſe, directly into the field, or at the moſt to ſecure it from cattle; but, to make it quite ſimple, omit all its appendages, and drop every idea of a garden. If neither of theſe, nor any other means, be uſed to break the length of the way, though the incloſure ſhould furniſh a ſucceſſion of ſcenes, all beautiful, and even contraſted to each other, yet the walk will introduce a ſimilarity between them. This ſpecies of garden, therefore, ſeems proper only for a place of a very moderate extent; if it be ſtretched out to a great length, and not mixed with other characters, its ſameneſs hurts that variety, which it is its peculiar merit to diſcover.

64
Of a garden which occupies the whole incloſure.

But the advantages attending it upon ſome, and the uſe of it on ſo many, occaſions, have raiſed a partiality in its favour; and it is often carried round a place, where *the whole incloſure is garden:* the interior openings and communications furniſh there a ſufficient range; and they do not require that number and variety of appendages, which muſt be introduced to diſguiſe the uniformity of the circuitous walk, but which often interfere with greater effects. It is at the leaſt unneceſſary in ſuch a garden; but plain gravel-walks to every part are commonly deemed to be indiſpenſable: they undoubtedly are convenient; but it muſt alſo be acknowledged, that though ſometimes they adorn, yet at other times they diſfigure, the ſcenes thro' which they are conducted. The proprietor of the place, who viſits theſe ſcenes at different ſeaſons, is moſt anxious for their beauty in fine weather; he does not feel the reſtraint to be grievous, if all of them be not at all times equally acceſſible; and a gravel-walk perpetually before him, eſpecially when it is uſeleſs, muſt be irkſome. It ought not, therefore, to be oſtentatiouſly ſhewn; on many occaſions it ſhould be induſtriouſly concealed: that it lead to the capital points is ſufficient; it can never be requiſite along the whole extent of every ſcene: it may often ſkirt a part of them, without appearing; or juſt touch upon them, and withdraw; but if it cannot be introduced at all without hurting them, it ought commonly to be omitted.

The ſides of a gravel-walk muſt correſpond, and its courſe be in ſweeps gently bending all the way. It preſerves its form, though conducted through woods, or along glades, of the moſt licentious irregularity. But a graſs walk is under no reſtraint; the ſides of it may be perpetually broken, and the direction frequently changed: ſudden turns, however, are harſh; they check the idea of progreſs; they are rather diſappointments than varieties; and if they are ſimilar, they are in the worſt ſtyle of affectation. The line muſt be curved, but it ſhould not to be wreathed; if it be truly ſerpentine, it is the moſt unnatural of any. It ought conſtantly to proceed; and wind only juſt ſo much, that the termination of the view may differ at every ſtep, and the end of the walk never appear: the thickets which confine it ſhould be diverſified with ſeveral mixtures of greens; no diſtinctions in the forms of the ſhrubs or the trees will be loſt, when there are opportunities to obſerve them ſo nearly; and combinations and contraſts without number may be made, which will be there truly ornamental. Minute beauties are proper in a ſpot precluded from great effects: and yet ſuch a walk, if it be broad, is by no means inſignificant; it may have an importance which will render it more than a mere communication.

But the peculiar merit of that ſpecies of garden which occupies the whole incloſure, conſiſts in the larger ſcenes: it can make room for them both in breadth and in length; and being dedicated entirely to pleaſure, free from all other conſiderations, thoſe ſcenes may be in any ſtyle which the nature of the place will allow: a number of them is expected; all different; ſometimes contraſted; and each diſtinguiſhed by its beauty. If the ſpace be divided into little ſlips, and made only a collection of walks, it forfeits all its advantages, loſes its character, and can have no other excellence than ſuch as it may derive from ſituation: whereas, by a more liberal diſpoſition, it may be made independent of whatever is external; and though proſpects are no where more delightful than from a point of view which is alſo a beautiful ſpot, yet if in ſuch a garden they ſhould be wanting, the elegant, pictureſque, and various ſcenes within itſelf, almoſt ſupply the deficiency.

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This is the character of the gardens at Stowe: for there the views in the country are only circumſtances ſubordinate to the ſcenes; and the principal advantage of the ſituation is the variety of the ground within the incloſure. The houſe ſtands on the brow of a gentle aſcent; part of the gardens lie on the declivity, and ſpread over the bottom beyond it: this eminence is ſeparated by a broad winding valley from another which is higher and ſteeper; and the deſcents of both are broken by large dips and hollows, ſloping down the ſides of the hills. The whole ſpace is divided into a number of ſcenes, each diſtinguiſhed with taſte and fancy; and the changes are ſo frequent, ſo ſudden, and complete, the tranſitions ſo artfully conducted, that the ſame ideas are never continued or repeated to ſatiety.

Theſe gardens were begun when regularity was in faſhion; and the original boundary is ſtill preſerved, on account of its magnificence: for round the whole circuit, of between three or four miles, is carried a very broad gravel walk, planted with rows of trees, and open either to the park or the country; a deep-ſunk fence attends it all the way, and comprehends a ſpace of near four hundred acres. But in the interior ſcenes of the garden, few traces of regularity appear: where it yet remains in the plantations, it is generally diſguiſed: every ſymptom, almoſt, of formality is obliterated from the ground; and an octagon baſin in the bottom, is now converted into an irregular piece of water, which receives on one hand two beautiful ſtreams, and falls on the other down a caſcade into a lake.

In the front of the houſe is a conſiderable lawn, open to the water: beyond which are two elegant Doric pavilions, placed in the boundary of the garden, but not marking it, though they correſpond to each other; for ſtill further back, on the brow of ſome riſing grounds without the incloſure, ſtands a noble Corinthian arch, by which the principal approach is conducted, and from which all the gardens are ſeen, reclining back againſt their hills: they are rich with plantations; full of objects; and, lying on both ſides of the houſe almoſt equally, every part is within a moderate diſtance, notwithſtanding the extent of the whole.

On the right of the lawn, but concealed from the houſe, is a perfect garden-ſcene, called the *queen's amphitheatre*, where art is avowed, though formality is avoided. The fore ground is ſcooped into a gentle hollow. The plantations on the ſides, though but juſt reſcued from regularity, yet in ſtyle are contraſted to each other: they are, on one hand, chiefly thickets, ſtanding out from a wood; on the other, they are open groves, through which a glimpſe of the water is viſible. At the end of the hollow, on a little knole, quite detached from all appendages, is placed an open Ionic rotunda: beyond it, a large lawn ſlopes acroſs the view; a pyramid ſtands on the brow; the queen's pillar, in a receſs on the deſcent; and all the three buildings, being evidently intended for ornament alone, are peculiarly adapted to a garden-ſcene. Yet their number does not render it gay: the duſky hue of the pyramid, the retired ſituation of the queen's pillar, and the ſolitary appearance of the rotunda, give it an air of gravity; it is encompaſſed with wood; and all the external views are excluded; even the opening into the lawn is but an opening into an incloſure.

At the king's pillar, very near to this, is another lovely ſpot; which is ſmall, but not confined; for no termination appears: the ground one way, the water another, retire under the trees out of ſight, but nowhere meet with a boundary. The view is firſt over ſome very broken ground, thinly and irregularly planted; then between two beautiful clumps, which feather down to the bottom; and afterwards acroſs a glade, and through a little grove beyond it, to that part of the lake, where the thickets, cloſe upon the brink, ſpread a tranquillity over the ſurface, in which their ſhadows are reflected. Nothing is admitted to diſturb that quiet: no building obtrudes: for objects to fix the eye are needleſs in a ſcene, which may be comprehended at a glance; and none would ſuit the paſtoral idea it inſpires, of elegance too refined for a cottage, and of ſimplicity too pure for any other edifice.

The ſituation of the rotunda promiſes a proſpect more enlarged; and in fact moſt of the objects on this ſide of the garden are there viſible: but they want both connection and contraſt; each belongs peculiarly to ſome other ſpot: they are all blended together in this, without meaning; and are rather ſhewn on a map, than formed into a picture. The water only is capital; a broad expanſe of it is ſo near as to be ſeen under the little groupes on the bank without interruption. Beyond it is a wood, which in one place leaves the lake, to run up behind a beautiful building, of three pavilions joined by arcades, all of the Ionic order: it is called *Kent's Building*. And never was a deſign more happily conceived: it ſeems to be characteriſtically proper for a garden; it is ſo elegant, ſo varied, and ſo purely ornamental: it directly fronts the rotunda, and a narrow rim of the country appears above the trees beyond it. But the effect even of this noble object is fainter here than at other points: its poſition is not the moſt advantageous; and it is but one among many other buildings, none of which are principal.

The ſcene at the temple of Bacchus is in character directly the reverſe of that about the rotunda, though the ſpace and the objects are nearly the ſame in both: but in this, all the parts concur to form one whole. The ground from every ſide ſhelves gradually towards the lake; the plantations on the further bank open to ſhew Kent's building, riſe from the water's edge towards the knole on which it ſtands, and cloſe again behind it. That elegant ſtructure, inclined a little from a front view, becomes more beautiful by being thrown into perſpective; and though at a greater diſtance, is more important than before, becauſe it is alone in the view: for the queen's pillar and the rotunda are removed far aſide; and every other circumſtance refers to this intereſting object: the water attracts, the ground and the plantations direct, the eye thither; and the country does not juſt glimmer in the offſkip, but is cloſe and eminent above the wood, and connected by clumps with the garden. The ſcene all together is a moſt animated landſkip: and the ſplendor of the building; the reflection in the lake; the tranſparency of the water, and the pictureſque beauty of its form, diverſified by little groupes on the brink, while on the broadeſt expanſe no more trees caſt their ſhadows than are ſufficient to vary the tints of the ſurface; all theſe circumſtances, vying in luſtre with each other, and uniting in the point to which every part of the ſcene is related, diffuſe a peculiar brilliancy over the whole compoſition.

The view from Kent's building, is very different from thoſe which have been hitherto deſcribed. They are all directed down the declivity of the lawn. This riſes up the aſcent: the eminence being crowned with lofty wood, becomes thereby more conſiderable; and the hillocks into which the general fall is broken, ſloping further out this way than any other, they alſo acquire an importance which they had not before: that, particularly, on which the rotunda is placed, ſeems here to be a profound ſituation; and the ſtructure appears to be properly adapted to ſo open an expoſure. The temple of Bacchus, on the contrary, which commands ſuch an illuſtrious view, is itſelf a retired object, cloſe under the covert. The wood riſing on the brow, and deſcending down one ſide of the hill, is ſhewn to be deep; is high, and ſeems to be higher than it is. The lawn too is extenſive; and part of the boundary being concealed, it ſuggeſts the idea of a ſtill greater extent. A ſmall portion only of the lake indeed is viſible; but it is not here an object: it is a part of the ſpot; and neither termination being in ſight, it has no diminutive appearance: if more water had been admitted, it might have hurt the character of the place, which is ſober and temperate; neither ſolemn nor gay; great and ſimple, but elegant; above ruſticity, yet free from oſtentation.

Theſe are the principal ſcenes on one ſide of the gardens. On the other, cloſe to the lawn before the houſe, is the winding valley abovementioned: the lower part of it is aſſigned to the Elyſian fields. Theſe are watered by a lovely rivulet; are very lightſome, and very airy, ſo thinly are the trees ſcattered about them; are open at one end to more water and a larger glade; and the reſt of the boundary is frequently broken to let in objects afar off, which appear ſtill more diſtant from the manner of ſhewing them. The entrance is under a Doric arch, which coincides with an opening among the trees, and forms a kind of viſta, through which a Pembroke bridge juſt below, and a lodge built like a caſtle in the park, are ſeen in a beautiful perſpective. That bridge is at one extremity of the gardens; the queen's pillar is at another; yet both are viſible from the ſame ſtation in the Elyſian fields: and all theſe external objects are unaffectedly introduced, diveſted of their own appurtenances, and combined with others which belong to the ſpot. The temple of friendſhip alſo is in ſight, juſt without the place: and within it, are the temples of ancient virtue, and of the Britiſh worthies; the one in an elevated ſituation, the other low down in the valley, and near to the water: both are decorated with the effigies of thoſe who have been moſt diſtinguiſhed for military, civil, or literary merit; and near to the former ſtands a roſtral column, ſacred to the memory of captain Grenville, who fell in an action at ſea: by placing here the meed of valour, and by filling theſe fields with the repreſentations of thoſe who have deſerved beſt of mankind, the character intended to be given to the ſpot is juſtly and poetically expreſſed; and the number of the images which are preſented or excited, perfectly correſponds with it. Solitude was never reckoned among the charms of Elyſium; it has been always pictured as the manſion of delight and of joy: and in this imitation, every circumſtance accords with that eſtabliſhed idea. The vivacity of the ſtream which flows through the vale; the glimpſes of another approaching to join it; the ſprightly verdure of the green ſward, and every buſt of the Britiſh worthies reflected in the water; the variety of the trees: the lightneſs of the greens; their diſpoſition; all of them diſtinct objects, and diſperſed over gentle inequalities of the ground; together with the multiplicity of objects both within and without, which embelliſh and enliven the ſcene; give it a gaiety, which the imagination can hardly conceive, or the heart wiſh to be exceeded.

Cloſe by this ſpot, and a perfect contraſt to it, is the alder grove; a deep receſs, in the midſt of a ſhade, which the blaze of noon cannot brighten. The water ſeems to be a ſtagnated pool, eating into its banks; and of a peculiar colour, not dirty but clouded, and dimly reflecting the dun hue of the horſe-cheſnuts and alders which preſs upon the brink: the ſtems of the latter, riſing in cluſters from the ſame root, bear one another down, and ſlant over the water. Miſhapen elms and ragged firs are frequent in the wood which encompaſſes the hollow; the trunks of dead trees are left ſtanding amongſt them; and the uncouth ſumach, and the yew, with elder, nut, and holly, compoſe the underwood: ſome limes and laurels are intermixt; but they are not many: the wood is in general of the darkeſt greens; and the foliage is thickened with ivy, which not only twines up the trees, but creeps alſo over the falls of the ground: theſe are ſteep and abrupt: the gravel-walk is covered with moſs; and a grotto at the end, faced with broken flints and pebbles, preſerves, in the ſimplicity of its materials, and the duſkineſs of its colour, all the character of its ſituation: two little rotundas near it were better away; one building is ſufficient for ſuch a ſcene of ſolitude as this, in which more circumſtances of gloom concur than were ever perhaps collected together.

Immediately above the alder-grove is the principal eminence in the gardens. It is divided by a great dip into two pinnacles; upon one of which is a large Gothic building. The ſpace before this ſtructure is an extenſive lawn: the ground on one ſide falls immediately into the dip; and the trees which border the lawn, ſinking with the ground, the houſe riſes above them, and fills the interval: the vaſt pile ſeems to be ſtill larger than it is; for it is thrown into perſpective, and between and above the heads of the trees, the upper ſtory, the porticoes, the turrets and balluſtrades, and all the ſlated roofs, appear in a noble confuſion. On the other ſide of the Gothic building, the ground ſlopes down a long-continued declivity into a bottom, which ſeems to be perfectly irriguous. Divers ſtreams wander about it in ſeveral directions: the conflux of that which runs from the Elyſian fields with another below it, is full in ſight; and a plain wooden bridge thrown over the latter, and evidently deſigned for a paſſage, impoſes an air of reality on the river. Beyond it is one of the Doric porticoes which front the houſe; but now it is alone; it ſtands on a little bank above the water, and is ſeen under ſome trees at a diſtance before it: thus grouped, and thus accompanied, it is a happy incident, concurring with many other circumſtances to diſtinguiſh this landſkip by a character of cheerfulneſs and amenity.

From the Gothic building a broad walk leads to the Grecian valley, which is a ſcene of more grandeur than any in the gardens. It enters them from the park, ſpreading at firſt to a conſiderable breadth; then winds; grows narrower, but deeper; and loſes itſelf at laſt in a thicket, behind ſome lofty elms, which interrupt the ſight of the termination. Lovely woods and groves hang all the way on the declivities: and the open ſpace is broken by detached trees; which, near the park, are cautiouſly and ſparingly introduced, leſt the breadth ſhould be contracted by them; but as the valley ſinks, they advance more boldly down the ſides, ſtretch acroſs or along the bottom, and cluſter at times into groupes and forms, which multiply the varieties of the larger plantations. Thoſe are ſometimes cloſe coverts, and ſometimes open groves: the trees riſe in one upon high ſtems, and feather down to the bottom in another; and between them are ſhort openings into the park or the gardens. In the midſt of the ſcene, juſt at the bend of the valley, and commanding it on both ſides, upon a large, eaſy, natural riſe, is placed the temple of Concord and Victory: at one place its majeſtic front of ſix Ionic columns, ſupporting a pediment filled with bas relief, and the points of it crowned with ſtatues, faces the view; at another, the beautiful colonnade, on the ſide, of ten lofty pillars, retires in perſpective. It is ſeen from every part; and impreſſing its own character of dignity on all around, it ſpreads an awe over the whole: but no gloom, no melancholy attends it: the ſenſations it excites are rather placid; but full of reſpect, admiration, and ſolemnity: no water appears to enliven, no diſtant proſpect to enrich, the view; the parts of the ſcene are large, the idea of it ſublime, and the execution happy; it is independent of all adventitious circumſtances, and relies on itſelf for its greatneſs.

The ſcenes which have been deſcribed are ſuch as are moſt remarkable for beauty or character: but the gardens contain many more: and even the objects in theſe, by their ſeveral combinations, produce very different effects, within the diſtance ſometimes of a few paces, from the unevenneſs of the ground, the variety of the plantations, and the number of the buildings. The multiplicity of the laſt has indeed been often urged as an objection to Stowe; and certainly, when all are ſeen by a ſtranger in two or three hours, twenty or thirty capital ſtructures, mixed with others of inferior note, do ſeem too many. But the growth of the wood every day weakens the objection, by concealing them one from the other: each belongs to a diſtinct ſcene; and if they are conſidered ſeparately, at different times, and at leiſure, it may be difficult to determine which to take away. Yet ſtill it muſt be acknowledged that their frequency deſtroys all ideas of ſilence and retirement. Magnificence and ſplendor are the characteriſtics of Stowe: it is like one of thoſe places celebrated in antiquity, which were devoted to the purpoſes of religion, and filled with ſacred groves, hallowed fountains, and temples dedicated to ſeveral deities; the reſort of diſtant nations, and the object of veneration to half the heathen world: this pomp is, at Stowe, blended with beauty; and the place is equally diſtinguiſhed by its amenity and its grandeur.

In the midſt of ſo much embelliſhment as may be introduced into this ſpecies of garden, a plain field, or a ſheep-walk, is ſometimes an agreeable relief, and even wilder ſcenes may occaſionally be admitted. Theſe indeed are not properly parts of a garden, but they may be comprehended within the verge of it; and their proximity to the more ornamented ſcenes is at leaſt a convenience, that the tranſition from the one to the other may be eaſy, and the change always in our option. For though a ſpot in the higheſt ſtate of improvement be a neceſſary appendage to a ſeat; yet, in a place which is perfect, other characters will not be wanting: if they cannot be had on a large ſcale, they are acceptable on a ſmaller; and ſo many circumſtances are common to all, that they may often be intermixed; they may always border on each other.

Sect. VI. *Of the Seaſons.*

To every view belongs a light which ſhews it to advantage: every ſcene and every object is in its higheſt beauty only at particular hours of the day; and every place is, by its ſituation or its character, peculiarly agreeable in certain months of the year. The *ſeaſons* thus become ſubjects of conſideration in gardening; and when ſeveral of thoſe circumſtances which diſtinguiſh a ſpot more at one time than another happen to concur, it will often be worth the while to add to their number, and to exclude ſuch as do not agree with them, for no other purpoſe than to ſtrengthen their effect at that particular time. Different parts may thus be adapted to different ſeaſons, and each in its turn will be in perfection. But if the place will not allow of ſuch a ſucceſſion, ſtill *occaſional effects* may often be ſecured and improved, without prejudice to the ſcene when they are paſt, and without affectation while they continue.

66 Occaſional effects.

The temple of Concord and Victory at Stowe has been mentioned as one of the nobleſt objects that ever adorned a garden: but there is a moment when it appears in ſingular beauty. The ſetting ſun ſhines on the long colonnade which faces the weſt: all the lower parts of the building are darkened by the neighbouring wood: the pillars riſe at different heights out of the obſcurity; ſome of them are nearly overſpread with it, ſome are chequered with a variety of teints, and others illuminated almoſt down to their baſes: The light is gently ſoftened off by the rotundity of the columns: but it ſpreads in broad gleams upon the wall within them; and pours full and without interruption on all the entablature, diſtinctly marking every dentil. On the ſtatues which adorn the ſeveral points of the pediment, a deep ſhade is contraſted to ſplendor: the rays of the ſun linger on the ſide of the temple long after the front is overcaſt with the ſober hue of evening; and they tip the upper branches of the trees, or glow in the openings between them, while the ſhadows lengthen acroſs the Grecian valley.

Such an occaſional effect, however tranſient, is ſo exquiſitely beautiful, that it would be unpardonable to neglect it. Others may be produced at ſeveral hours of the day; and the diſpoſition of the buildings, of the ground, the water, and the plantations, may often be accommodated to ſupport them. There are alſo occaſional effects in certain months, or only weeks, of the year, ariſing from ſome particular bloom, ſome ocupation then carrying on, or other incident, which may ſo far deſerve attention as to recommend a choice and arrangement of objects, which at that time will improve the compoſition, though at another they may have no extraordinary merit.

67 Of different parts of the day.

Besides theſe tranſitory effects, there are others which may be defined and produced with more exactneſs, which are fixed to ſtated periods, and have certain properties belonging to them. Some ſpecies and ſituations of objects are in themſelves adapted to receive or to make the impreſſions which characterize the principal parts of the day: their ſplendor, their ſobriety, and other peculiarities, recommend or prohibit them upon different occaſions. The ſame conſiderations direct the choice alſo of their appendages; and in conſequence of a judicious aſſemblage and arrangement of ſuch as are proper for the purpoſe, the *ſpirit* of the morning, the *exceſs* of noon, or the *temperance* of evening, may be improved or corrected by the application of the ſcene to the ſeaſon.

In a *morning*, the freſhneſs of the air allays the force of the ſun-beams, and their brightneſs is free from glare: the moſt ſplendid objects do not offend the eye, nor ſuggeſt the idea of heat in its extreme; but they correſpond with the glitter of the dew which beſpangles all the produce of the earth, and with the cheerfulneſs diffuſed over the whole face of the creation. A variety of buildings may therefore be introduced to enliven the view: their colour may be the pureſt white, without danger of exceſs, though they face the eaſtern ſun; and thoſe which are in other aſpects ſhould be ſo contrived, that their turrets, their pinnacles, or other points, may catch glances of the rays, and contribute to illuminate the ſcene. The trees ought in general to be of the lighteſt greens, and ſo ſituated as not to darken much of the landſkip by the length of their ſhadows. Vivacity in the ſtreams, and tranſparency in a lake, are more important at this than at any other hour of the day: and an open expoſure is commonly the moſt delightful, both for the effect of particular objects, and the general character of the ſcene.

At *noon*, every expedient ſhould be uſed to correct the exceſs of the ſeaſon. The ſhades are ſhortened, they muſt therefore be thick; but open plantations are generally preferable to a cloſe covert: they afford a paſſage, or at leaſt admittance to the air; which, tempered by the coolneſs of the place, ſoft to the touch, and refreſhing at once to all the ſenſes, renders the ſhade a delightful climate, not a mere refuge from heat. Groves, even at a diſtance, ſuggeſt the ideas which they realize on the ſpot; and, by multiplying the appearances, improve the ſenſations of relief from the extremity of the weather. Grottos, caves, and cells, are on the ſame account agreeable circumſtances in a ſequeſtered receſs; and though the chill within be hardly ever tolerable, the eye catches only an idea of coolneſs from the ſight of them. Other buildings ought in general to be caſt into ſhade, that the glare of the reflection from them may be obſcured. The large expanſe of a lake is alſo too dazzling: but a broad river moving gently, and partially darkened with ſhadow, is very refreſhing; more ſo perhaps than a little rill, for the vivacity of the latter rather diſturbs the repoſe which generally prevails at mid-day. Every breeze then is ſtill; the reflexion of an aſpen-leaf ſcarcely trembles on the water; the animals remit their ſearch of food, and man ceaſes from his labour: the ſteam of heat ſeems to oppreſs all the faculties of the mind, and all the active powers of the body; and any very lively motion diſcompoſes the languor in which we then delight to indulge. To hear, therefore, the murmurs of a brook purling underneath a thicket, or the echo of falling waters through a wood, is more agreeable than the ſight of a current; the idea conveyed by the ſound is free from any agitation: but if no other ſtream than a rill can be introduced, the refreſhment which attends the appearance of water muſt not be denied to the ſcene.

In the *evening*, all ſplendor fades: no buildings glare; no water dazzles. The calmneſs of a lake ſuits the quiet of the time: the light hovers there, and prolongs the duration of day. An open reach of a river has a ſimilar, though a fainter, effect; and a continued ſtream all expoſed, preſerves the laſt rays of the ſun along the whole length of its courſe, to beautify the landſkip: but a briſk current is not ſo conſiſtent as a lake with the tranquillity of evening. And other objects ſhould in general conform to the temper of the time. Buildings of a duſky hue are moſt agreeable to it: but a very particular effect from a ſetting ſun will recommend thoſe of a brighter colour; and they may alſo be ſometimes uſed, among other means, to correct the uniformity of twilight. No contraſt of light and ſhade can then be produced: but if the plantations, which by their ſituation are the firſt to be obſcured, be of the darkeſt greens, if the buildings which have a weſtern aſpect be of a light colour, and if the management of the lawns and the water be adapted to the ſame purpoſe, a diverſity of tints will be preſerved long after the greater effects are faded.

68 Of th ſons o year.

The delights, however, of the morning and evening are confined to a few months of the year; at other times, two or three hours before, and as much after, noon, are all that are pleaſant; and even then the heat is ſeldom ſo extreme as to require relief from its exceſs. The diſtinctions, therefore, between the three parts of the day may in general be reckoned among the characteriſtics of ſummer. The occaſional effects which by the poſiſition of objects may occur at any hour, are common to all the ſeaſons of the year: and ſuch as ariſe from the accidental colours of plants, though they are more frequent and more beautiful in one ſeaſon than another, yet exiſt in all; and very agreeable groupes may be formed by an aſſemblage of them. A degree of importance may be given even to the flowers of a border, if, inſtead of being indiſcriminately mixed, they are arranged according to their heights, their ſizes, and their colours, ſo as to diſplay their beauties, and to blend or contraſt their varieties to the greateſt advantage. The bloom of ſhrubs differs from that of flowers only in the ſcale; and the tints occaſioned by the hue of the berry, the foliage, or the bark, are ſometimes little inferior to bloom. By collecting into one ſpot ſuch plants as have at the ſame time their accidental colours, conſiderable effects may be produced from the concurrence of many little cauſes.

Thoſe which ariſe from bloom are the moſt ſtriking, and the moſt certain; and they abound chiefly in the *ſpring*. Bloom is a characteriſtic of the ſeaſon; and a villa near town, which is deſigned principally for that time of the year, is not adapted to its uſe if this property be not amply provided for. In ſuch a place, therefore, ſhrubberies, with an intermixture of flowers, are peculiarly proper. In the ſummer-months, a border between the thicket and the greenſward, breaks the connexion, and deſtroys the greater effect: it ought not to be then introduced, except to enliven ſmall ſpots, and as the beſt ſpecies of parterre. But in the ſpring, the thicket is hardly formed: its principal beauty is bloom; and flowers before or among the ſhrubs, are agreeable to the character of the ſeaſon. An orchard, which, at other times, is unſightly, is then delightful; and, if a farm joins to the garden, ſhould not be forgotten. But evergreens appear in general to great diſadvantage. Moſt of them have a ruſſet or a dark hue, which ſuffers by being conſtraſted to the lively verdure of the young ſhoots on the deciduous trees. That verdure is, however, ſo light, and ſo univerſal, that effects, from a mixture of greens, can ſeldom be produced; and thoſe which depend on a depth of ſhade will often be diſappointed. But buildings, views of water, and whatever tends to animate the ſcene, accord with the ſeaſon; which is full of youth and vigour, freſh and ſprightly, brightened by the verdure of the herbage and the woods, gay with bloſſoms and flowers, and enlivened by the ſongs of the birds in all their variety, from the rude joy of the ſky-lark, to the delicacy of the nightingale.

In *ſummer*, both the buildings and the water are agreeable, not as objects only, but alſo as circumſtances of refreſhment: the pleaſantneſs, therefore, of the rooms in the former, of the ſeats and the walks near the latter, is to be regarded. The plantations alſo ſhould be calculated at leaſt as much for places of retreat, as for ornaments of the view; and a continuation of ſhade be preſerved, with very few and ſhort interruptions, through all the parts of the garden. Communications by gravel walks are of leſs conſequence: they do not ſuggeſt that idea of utility which attends them in winter or autumn; and their colour, which in ſpring is a lively contraſt to the verdure through which it winds, is in the intemperate blaze of a ſummer day glaring and painful. They ſhould, therefore, be concealed as much as poſſible; and the other conſiderations which belong to the noon-tide hour ſhould be particularly attended to, at the ſame time that the delights of the morning and the evening are alſo liberally provided for. But, excluſive of all ſuch incidental circumſtances, the ſcenes of nature in general appear at this ſeaſon to the greateſt advantage: though the bloom of the ſpring be faded, and the verdure of the herbage may be ſometimes affected by drought; yet the richneſs of the produce of the earth, and the luxuriance of the foliage in the woods; the ſenſations of refreſhment, added to the beauty of water; the ideas of enjoyment which accompany the ſight of every grove, of every building, and every delightful ſpot; the characters of rocks, heightened by their appendages, and unallayed by any diſconſolate reflections; the connexion of the ground with the plantations, the permanency of every teint, and the certainty of every effect; all concur, in ſummer, to raiſe the ſeveral compoſitions to their higheſt ſtate of perfection.

But maturity is always immediately ſucceeded by decay: flowers bloom and fade; fruits ripen and rot; the graſs ſprings and withers; and the foliage of the woods ſhoots, thickens, and falls. In the latter months of *autumn*, all nature is on the decline; it is a comfortleſs ſeaſon: not a bloſſom is left on the ſhrubs or the trees; and the few flowers which ſtill remain in the borders, dripping with wet, and ſickening even as they blow, ſeem hardly to ſurvive the leaves of the plant which are ſhrivelling beneath them. But the change of the leaf precedes the fall; and thence reſults a variety of colours, ſuperior to any which the ſpring or the ſummer can boaſt of. To ſhew and to improve that variety ſhould be principally attended to, in a place, ſuch as a ſporting ſeat, which is frequented only in autumn. It appears to advantage, whenever the ſurface of a wood can be commanded; and it may be produced to a conſiderable degree, even in a ſhrubbery, if the plants are ſo diſpoſed as to riſe in gradation one behind another. By obſerving the tints which the leaves aſſume when they change, the choice may be directed to the improvement of their variety; and by attending to the times when they fall, a ſucceſſion of theſe tranſitory beauties may be provided, from the earlieſt to the lateſt in the ſeaſon. Many ſhrubs and trees are at this time alſo covered with berries, which furniſh ſtill further varieties of colour; both evergreens and deciduous plants abound with them; and the verdure of the former is beſides a welcome ſubſtitute to that which is daily fading away. Open buildings, airy groves, views of water, and the other delights of ſummer, now loſe their charms; and more homely circumſtances of comfort and convenience are preferable to all their beauties.

A place which is the reſidence of a family all the year is very defective, if ſome portion of it be not ſet apart for the enjoyment of a fine day, for air, and exerciſe, in *winter*. To ſuch a ſpot ſhelter is abſolutely eſſential; and evergreens being the thickeſt covert, are therefore the beſt: their verdure alſo is then agreeable to the eye; and they may be arranged ſo as to produce beautiful mixtures of greens, with more certainty than deciduous trees, and with almoſt equal variety: they may be collected into a wood; and through that wood gravel-walks may be led, along openings of a conſiderable breath, free from large trees which would intercept the rays of the ſun, and winding in ſuch a manner as to avoid any draft of wind, from whatever quarter it may blow. But when a retreat at all times is thus ſecured, other ſpots may be adapted only to occaſional purpoſes; and be ſheltered towards the north or the eaſt on one hand, while they are open to the ſun on the other. The few hours of cheerfulneſs and warmth which its beams afford are ſo valuable, as to juſtify the ſacrifice even of the principles of beauty to the enjoyment of them; and therefore no objections of ſameneſs or formality can prevail againſt the pleaſantneſs of a ſtraight walk, under a thick hedge or a ſouth wall. The eye may, however, be diverted from the ſkreen, by a border before it, where the aconite and the ſnowdrop, the crocus and hepatica, brought forward by the warmth of the ſituation, will be welcome harbingers of ſpring; and on the oppoſite ſide of the walk, little tufts of lauruſtines, and of variegated evergreens, may be planted. The ſpot thus enlivened by a variety of colours, and even a degree of bloom, may be ſtill further improved by a green-houſe. The entertainment which exotics afford peculiarly belongs to this part of the year; and if amongſt them be interſperſed ſome of our earlieſt flowers, they will there blow before their time, and anticipate the gaiety of the ſeaſon which is advancing. The walk may alſo lead to the ſtoves, where the climate and the plants are always the ſame. And the kitchen-garden ſhould not be far off; for that is never quite deſtitute of produce, and always an active ſcene: the appearance of buſineſs is alone engaging; and the occupations there are an earneſt of the happier ſeaſons to which they are preparative. By theſe expedients even the winter may be rendered cheerful in a place, where ſhelter is provided againſt all but the bittereſt inclemencies of the ſky, and agreeable objects and intereſting amuſements are contrived for every hour of tolerable weather.

69
Extent and ſtudy of gardening.

To conclude: Whatever contributes to render the ſcenes of nature delightful, is amongſt the ſubjects of gardening; and animate as well as inanimate objects, are circumſtances of beauty or character. Several of theſe have been occaſionally mentioned; others will readily occur; and nothing is unworthy of the attention of a gardener, which can tend to improve his compoſitions, whether by immediate effects, or by ſuggeſting a train of pleaſing ideas. The whole range of nature is open to him, from the parterre to the foreſt; and whatever is agreeable to the ſenſes or the imagination, he may appropriate to the ſpot he is to improve: it is a part of his buſineſs to collect into one place, the delights which are generally diſperſed thro' different ſpecies of country.

But in this application, the genius of the place muſt always be particularly conſidered: to force it, is hazardous; and an attempt to contradict it, is always unſucceſsful. The beauties peculiar to one character, cannot be transferred to its oppoſite: even where the characters are the ſame, it is difficult to copy directly from the one into the other; and by endeavouring to produce a reſemblance of a ſcene which is juſtly admired, the proper advantages of the place are often neglected for an imitation much inferior the original. The excellence of the latter probably depends on the happy application of the circumſtances to the ſubject; and the ſubjects of both are never exactly alike. The art of gardening, therefore, is not to be ſtudied in thoſe ſpots only where it has been exerciſed; though they are in this country very numerous, and very various. Yet all together they contain but a ſmall proportion of the beauties which nature exhibits: and unleſs the gardener has ſtored his mind with ideas from the infinite variety of the country at large, he will feel the want of that number which is neceſſary for choice; he will have none ready to apply to the ſubject immediately before him; and will be reduced to copy an imitation. But improved places are of ſingular uſe to direct the judgment in the choice, and the combinations, of the beauties of nature: an extenſive knowledge of them is to be acquired in the country where they caſually occur; diſcernment of their excellencies, and a taſte for the diſpoſition of them, is to be formed in places where they have been ſelected, and arranged with deſign.

For the particular Operations in Gardening, ſee Planting, Pruning, Grafting, Inoculating, Kitchen-*Garden*, Orchard, Green-*Houſe*, Hot-*Houſe*, Inarching, Espalier, &c. and the culture and management of different plants under their reſpective names.

G A R

GARDINER (Stephen), biſhop of Wincheſter, and lord chancellor of England, born at Bury St Edmunds in Suffolk, natural ſon to Richard Woodville, brother to queen Elizabeth wife to Edward IV. was learned in the canon and civil laws, and in divinity. He ſigned the divorce of Henry VIII. from Katharine of Spain; abjured the pope's ſupremacy; and writ *De vera et falſa obedientia*, in behalf of the king: yet in Edward's reign he oppoſed the reformation, and was puniſhed with impriſonment; but queen Mary coming to the throne, ſhe enlarged him. He drew up the articles of marriage between the queen and Philip of Spain, which were very advantageous to England. He was violent againſt the reformers; but on his death-bed was diſſatisfied with his life, and often repeated theſe words: *Erravi cum Petro, ſed non flevi cum Petro.* He died in 1555.

GARGARISM, (from γαργαρίζω, "to waſh the mouth;" a gargle. Its uſe is for waſhing the mouth and throat with, when inflammations, ulcerations, &c. are there. A ſmall quantity may be taken into the mouth, and moved briſkly about, and then ſpit out; or if the patient cannot do this to any advantage, the liquor may be injected by a ſyringe. When gargles are required, their uſe ſhould be more frequently repeated than is done in common practice.

GARLAND, a ſort of chaplet made of flowers, feathers, and ſometimes precious ſtones, worn on the head, in manner of a crown.—The word is formed of the French *guirlande*, and that of the barbarous Latin *garlanda*, or Italian *ghirlanda*. Menage traces its origin from *gyrus*, through *gyrulus*, to *gyrulare*, *gyrlandum*, *ghirlandum*, and at length *ghirlanda* and *guirlande*; ſo that *guirlande* and *garland* are deſcended in the ſixth or ſeventh degree from *gyrus*.—Hicks rejects this derivation, and brings the word from *gardel handa*, which in the northern languages ſignify a *noſegay artfully wrought with the hand.*

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Garland alſo denotes ornaments of flowers, fruits, and leaves, intermixed; anciently much uſed at the gates of temples, where feaſts and ſolemn rejoicings were held; or at any other place where marks of public joy or gaiety were required, as at triumphal arches, tournaments, &c.

GARLIC. See Allium.

GARNET, in natural hiſtory, a very beautiful gem, of a red colour, with an admixture of blue.

When pure and free from blemiſhes, it is little inferior, in appearance, to the oriental ruby, tho' only of a middle degree of hardneſs between the ſappliire and common cryſtal. It is found of various ſizes, from that of a pin's head to an inch in diameter.

Among our lapidaries and jewellers, genuine garnets are known by different names according to their different degrees of colour. 1. The garnet, ſimply ſo called, is the fineſt and moſt valuable kind, being of a very deep blood-red, with a faint admixture of blue. 2. The rock-ruby, a name very improperly given to the garnet, when it is of a very ſtrong but not deep red, and has a fairer caſt of the blue: this is a very beautiful gem. 3. The ſorane or ſerain garnet is that of a yet brighter red, approaching to the colour of native cinnabar, with a faint blue tinge. 4. The almandine, a garnet only a little paler than that called the *rock-ruby*.

Garnets are very properly diſtinguiſhed into the oriental and occidental kinds, as being found in Europe as well as the Eaſt Indies. The oriental ones are principally brought from Calicut, Cananor, and Cambay; and the European ones are common in Italy, Hungary, and Bohemia.

Some authors have ſuppoſed the deeper-coloured garnet to be the ſame with the carbuncle of the ancients: from which it really differs; ſince, on receiving the ſun's beams, it never gives ſo true a fire-colour as the carbuncle.

GARNET-*Colour*. To give this colour to glaſs, the workmen take equal quantities of cryſtal and Rochetta fritt; and to every hundred weight of this mixture they add a pound of manganeſe, and a pound of prepared zaffre: theſe are to be powdered ſeparately, then mixed and added by degrees to the fritt while in the furnace: great care is to be taken to mix the manganeſe and zaffre very perfectly; and when the matter has ſtood 24 hours in fuſion, it may be worked.

To imitate GARNETS. The making the counterfeit garnet in paſte is done as follows.—Take prepared cryſtal two ounces, common red-lead ſix ounces, manganeſe 16 grains, zaffre three grains; mix all well, put them into a crucible, cover it with lute, and ſet it in a potter's kiln for 24 hours. Or take cryſtal two ounces, minium five ounces and a half, manganeſe 15 grains, zaffre four grains: mix them well together; and let all be baked, in a pot well luted, in a potter's kiln 24 hours.

GARONNE, a large river of France, which taking its riſe in the Pyrenean mountains, runs north-weſt by the city of Tholouſe, divides the provinces of Guienne and Gaſcony, and, viſiting the city of Bourdeaux, falls into the bay of Baſcay, about 60 miles below that city. It has alſo a communication with the Mediterranean, by means of the royal canal of Lewis XIV. The tide flows up this river 20 miles above Bourdeaux.

GARRICK (David), Eſq; the great Roſcius of this age and country, who for near 40 years hath ſhone the brighteſt luminary in the hemiſphere of the ſtage, was born at the Angel Inn at Hereford, in the year 1716. His father, Captain Peter Garrick, was a French refugee, and had a troop of horſe which were then quartered in that city. This rank he maintained in the army for ſeveral years, and had a majority at the time of his death; that event, however, prevented him from ever enjoying it. Mr Garrick received the firſt rudiments of his education at the free-ſchool at Litchfield; which he afterwards completed at Rocheſter, under the celebrated Mr Colſon, ſince mathematical profeſſor at Cambridge. Dr Johnſon and he were fellow-ſtudents at the ſame ſchool; and it is a curious fact, that theſe two celebrated geniuſes came up to London, with the intention of puſhing themſelves into active life, in the ſame coach. On the 9th of March 1736, he was entered at the honourable ſociety of Lincoln's-Inn. The ſtudy of the law, however, he ſoon quitted; and followed for ſome time the employment of a wine-merchant: but that too diſguſting him, he gave way at laſt to the irreſiſtible bias of his mind, and joined a travelling company of comedians at Ipſwich in Suffolk, where he went by the name of *Lyddel*. Having in this poor ſchool of Apollo got ſome acquaintance with the theatric art, he burſt at once upon the world, in the year 1740-1, in all the luſtre of perfection, at the little theatre in Goodman's Fields, then under the direction of Henry Giffard.

The character he firſt performed was Richard the Third; in which, like the ſun burſting from behind a cloud, he diſplayed, in the earlieſt dawn, a ſomewhat more than meridian brightneſs. His excellence dazzled and aſtoniſhed every one; and the ſeeing a young man, in no more than his 24th year, and a novice in reality to the ſtage, reaching at one ſingle ſtep to that height of perfection which maturity of years and long practical experience had not been able to beſtow on the then capital performers of the Engliſh ſtage, was a phenomenon that could not but become the object of univerſal ſpeculation and of as univerſal admiration. The theatres at the weſt end of the town were deſerted; Goodman's Fields, from being the rendezvous of citizens and citizens wives alone, became the reſort of all ranks of men; and Mr Garrick continued to act till the cloſe of the ſeaſon.

Having very advantageous terms offered him for the performing in Dublin during ſome part of the ſummer (1741), he went over thither, where he found the ſame juſt homage paid to his merit which he had received from his own countrymen. To the ſervice of the latter, however, he eſteemed himſelf more immediately bound; and therefore, in the enſuing winter, engaged himſelf to Mr Fleetwood, then manager of Drury-Lane: in which theatre he continued till the year 1745, when he again went over to Ireland, and continued there the whole ſeaſon, joint manager with Mr Sheridan in the direction and profits of the theatre-royal in Smock-Alley. From thence he returned to England, and was engaged for the ſeaſon of 1746 with Mr Rich at Covent-Garden. This was his laſt performance as an hired actor: for in the cloſe of that ſeaſon, Mr Fleetwood's patent for the management of Drury-Lane being expired, and that gentleman having no inclination further to purſue a deſign by which, from his want of acquaintance with the proper conduct of it, or ſome other cauſe, he had conſiderably impaired his fortune; Mr Garrick, in conjunction with Mr Lacy, purchaſed the property of that theatre, together with the renovation of the patent; and in the winter of 1747, opened it with the greateſt part of Mr Fleetwood's company, and with the great additional ſtrength of Mr Barry, Mrs Pritchard, and Mrs Cibber, from Covent-Garden.

In this ſtation Mr Garrick continued till his retirement in the ſpring of 1776; and both by his conduct as a manager, and his unequalled merit as an actor, from year to year added to the entertainment and conſulted the taſte of the public with the greateſt aſſiduity. They were grateful in their acknowledgments; and by a well-deſerved and warm encouragement, raiſed him to a ſtate of fame, eaſe, and affluence, which he enjoyed for many years.

Were we to trace Mr Garrick through the ſeveral occurrences of his life,—a life ſo active, ſo buſy, and ſo full of occurrences as his, we ſhould ſwell this account to many pages. Suffice it to ſay, he continued in the unmoleſted enjoyment of his fame and unrivalled excellence to the moment of his retirement. His univerſality

Garrick.

Garrick ‖ Garter.

ſality of excellence was never once attacked by competition. Tragedy, comedy, and farce, the lover and the hero, the jealous huſband who ſuſpects his wife without cauſe, and the thoughtleſs lively rake who attacks it without deſign, were all alike his own. Rage and ridicule, doubt and deſpair, tranſport and tenderneſs, compaſſion and contempt; love, jealouſy, fear, fury, and ſimplicity; all took in turn poſſeſſion of his features, while each of them in turn appeared to be the ſole poſſeſſor of his heart. In the ſeveral characters of Lear and Hamlet, Richard, Dorilas, Romeo, and Luſignane; in his Ranger, Bayes, Drugger, Kitely, Brute, and Benedick, you ſaw the muſcular conformations that your ideas attached to them all. In ſhort, nature, the miſtreſs from whom alone this great performer borrowed all his leſſons, being in herſelf inexhauſtible, this her darling ſon, marked out for her trueſt repreſentative, found an unlimited ſcope for change and diverſity in his manner of copying from her various productions. There is one part of theatrical conduct which ought unqueſtionably to be recorded to Mr Garrick's honour, ſince the cauſe of virtue and morality, and the formation of public manners, are conſiderably dependent upon it; and that is, the zeal with which he aimed to baniſh from the ſtage all thoſe plays which carry with them an immoral tendency, and to prune from thoſe which do not abſolutely, on the whole, promote the intereſts of vice, ſuch ſcenes of licentiouſneſs and liberty, as a redundancy of wit and too great livelineſs of imagination have induced ſome of our comic writers to indulge themſelves in, and which the ſympathetic diſpoſition of our age of gallantry and intrigue has given ſanction to. The purity of the Engliſh ſtage has certainly been much more fully eſtabliſhed during the adminiſtration of this theatrical miniſter, than it had ever been during preceding managements. He ſeems to have carried his modeſt, moral, chaſte, and pious principles with him into the very management of the theatre itſelf, and reſcued performers from that obloquy which ſtuck on the profeſſion. Of thoſe who were accounted blackguards, unworthy the aſſociation of the world, he made gentlemen, united them with ſociety, and introduced them to all the domeſtic comforts of life. The theatre was no longer eſteemed the receptacle of all vice; and the moral, the ſerious, the religious part of mankind did not heſitate to partake of the rational entertainment of a play, and paſs a cheerful evening undiſguſted with the licentiouſneſs, and uncorrupted by the immorality, of the exhibition.

Notwithſtanding the numberleſs and laborious avocations attendant on his profeſſion as an actor, and his ſtation as a manager; yet ſtill his active genius was perpetually burſting forth in various little productions in the dramatic and poetical way, whoſe merit cannot but make us regret his want of time for the purſuance of more extenſive and important works. It is certain, that his merit as an author is not of the firſt magnitude: but his great knowledge of men and manners, of ſtage-effect, and his happy turn for lively and ſtriking ſatire, made him generally ſucceſsful; and his prologues and epilogues in particular, which are almoſt innumerable, poſſeſs ſuch a degree of happineſs, both in the conception and execution, as to ſtand unequalled. His Ode on the death of Mr Pelham run through four editions in leſs than ſix weeks. His Ode on Shakeſpeare is a maſterly piece of poetry; and when delivered by himſelf, was a moſt capital exhibition. His alterations of Shakeſpeare and other authors have been at times ſucceſsful, and at times exploded. The cutting out the grave-diggers ſcene from Hamlet will never be forgot to him by the inhabitants of the gallery at Drury. Though neceſſary to the chaſteneſs of the ſcene, they cannot bear to loſe ſo much true ſterling wit and humour; and it muſt be owned, that exuberances of that kind, though they hurt the uniformity, yet increaſe the luxuriance of the tree. Among his alterations the following are part: Every Man in his Humour, altered from Ben Johnſon; Romeo and Juliet, Winter's Tale, Catherine and Petruchio, Cymbeline, Hamlet, &c. altered and made up from Shakeſpeare; Gameſters, a comedy, from Shirley; Iſabella, from Southerne. To theſe we add, as original productions, The Farmer's Return, and Linco's Travels, interludes; Guardian, Lethe, Lying Valet, Miſs in her Teens, Male Coquet, Iriſh Widow, and other comedies in two acts; Enchanter, a muſical entertainment; Lilliput; the Chriſtmas Tale is aſcribed to him, and many others. At this time a complete edition of his works is preparing for the preſs, under the direction of his friends, and in which the whole will be aſcertained.

We now bring him to the period of his retirement in the ſpring of 1776; when, full of fame, with the acquirement of a ſplendid fortune, and growing into years, he thought proper to ſeek the vale of life, to enjoy that dignified and honourable eaſe which was compatible with his public ſituation, and which he had ſo well earned by the activity and the merits of his dramatic reign. But very ſhort, indeed, was the period allotted to him for this precious enjoyment: for on the 20th day of January 1779, he departed this life; leaving no one rival in excellence upon earth to compenſate for his loſs, or a hope of our ever meeting with his like again.

GARRISON, in the art of war, a body of forces, diſpoſed in a fortreſs, to defend it againſt the enemy, or to keep the inhabitants in ſubjection; or even to be ſubſiſted during the winter-ſeaſon: hence, *garriſon* and *winter-quarters* are ſometimes uſed, indifferently, for the ſame thing; and ſometimes they denote different things. In the latter caſe, a garriſon is a place wherein forces are maintained to ſecure it; and where they keep regular guard, as a frontier town, a citadel, caſtle, tower, &c. The garriſon ſhould be always ſtronger than the townſmen.

Du Cange derives the word from the corrupt Latin *garniſio*, which the latter writers uſe to ſignify all manner of munition, arms, victuals, &c. neceſſary for the defence of a place, and ſuſtaining of a ſiege.

Winter-quarters ſignify a place where a number of forces are laid up in the winter ſeaſon, without keeping the regular guard.

GARTER, a ligature for tying up the ſtocking; but particularly uſed for the badge of a noble order of knights, hence denominated the

Order of the GARTER, a military order of knighthood, the moſt noble and ancient of any lay-order in the world, inſtituted by Edward III. This order conſiſts of 26 knights-companions, generally princes and peers, whereof the king of England is the ſovereign or chief. They are a college or corporation, having a great and little ſeal.

Their officers are a prelate, chancellor, regiſter, king at arms, and uſher of the black rod. They have alſo a dean with 12 canons, and petty canons, vergers, and 26 penſioners or poor knights. The prelate is the head. This office is veſted in the biſhop of Wincheſter, and has ever been ſo. Next to the prelate is the chancellor; which office is veſted in the biſhop of Saliſbury, who keeps the ſeals, &c. The next is the regiſter, who by his oath is to enter upon the regiſtry, the ſcrutinies, elections, penalties, and other acts of the order, with all fidelity. The fourth officer is Garter and King-at-arms, being two diſtinct offices united in one perſon. Garter carries the rod and ſceptre at the feaſt of St George, the protector of this order, when the ſovereign is preſent. He notifies the elections of new knights, attends the ſolemnity of their inſtallations, carries the garter to the foreign princes, &c. He is the principal officer within the college of arms, and chief of the heralds. See King *at Arms*.

All theſe officers, except the prelate, have fees and penſions. The college of the order is ſeated in the caſtle of Windſor, with the chapel of St George, and the charter-houſe, erected by the founder for that purpoſe. The habit and enſign of the order are, a garter, mantle, cape, george, and collar. The four firſt were aſſigned the knights-companions by the founder; and the george and collar by Henry VIII. The garter (Plate CXV. fig. 2. N° 1.) challenges pre-eminence over all the other parts of the dreſs, by reaſon that from it the noble order is denominated; that it is the firſt part of the habit preſented to foreign princes, and abſent knights, who, and all other knights-elect, are therewith firſt adorned; and it is of ſo great honour and grandeur, that by the bare inveſtiture with this noble enſign, the knights are eſteemed companions of the greateſt military order in the world. It is worn on the left leg between the knee and calf, and is enamelled with this motto, Honi soit qvi mal y pense; i. e. *Shame to him that thinks evil hereof:* The meaning of which is, that king Edward having laid claim to the kingdom of France, retorted ſhame and defiance upon him that ſhould dare to think amiſs of the juſt enterpriſe he had undertaken, for recovering his lawful right to that crown; and that the bravery of thoſe knights whom he had elected into this order, was ſuch as would enable him to maintain the quarrel againſt thoſe that thought ill of it.

The mantle (*ibid.* N° 2.) is the chief of theſe veſtments made uſe of upon all ſolemn occaſions. The colour of the mantle is by the ſtatutes appointed to be blue. The length of the train of the mantle only diſtinguiſhes the ſovereign from the knights-companions. To the collar of the mantle is fixed a pair of long ſtrings, anciently wove with blue ſilk only, but now twiſted round, and made of Venice gold and ſilk, of the colour of the robe, with knobs, or buttons, and taſſels at the end. The left ſhoulder of the mantle has, from the inſtitution, been adorned with a large garter, with the device, Honi soit, &c. Within this is the croſs of the order, which was ordained to be worn at all times by king Charles I. At length the ſtar was introduced, being a ſort of croſs irradiated with beams of ſilver; (*ibid.* N° 3.)

The collar (*ibid.* N° 4.) is appointed to be compoſed of pieces of gold in faſhion of garters, the ground enamelled blue, and the motto gold.

The manner of electing a knight-companion into this moſt noble order, and the ceremonies of inveſtiture, are as follow. When the ſovereign deſigns to elect a companion of the garter, the chancellor belonging to this order draws up the letters, which, paſſing both under the ſovereign's ſign-manual and ſignet of the order, are ſent to the perſon by Garter principal king at arms; and are in this manner, or to the ſame effect: "We, with the companions of our moſt noble order of the garter, aſſembled in chapter, holden this preſent day at our caſtle at Windſor, conſidering the virtuous fidelity you have ſhewn, and the honourable exploits you have done in our ſervice, by vindicating and maintaining our right, &c. have elected and choſen you one of the companions of our order. Therefore, we require you to make your ſpeedy repair unto us, to receive the enſigns thereof, and be ready for your inſtallation upon the — day of this preſent month, &c."

The garter, which is of blue velvet bordered with fine gold-wire, having commonly the letters of the motto of the ſame, is, at the time of election, buckled upon the left leg, by two of the ſenior companions, who receive it from the ſovereign, to whom it was preſented upon a velvet cuſhion, by Garter king at arms, with the uſual reverence, whilſt the chancellor reads the following admonition, enjoined by the ſtatutes: "To the honour of God omnipotent, and in memorial of the bleſſed martyr St George, tie about thy leg, for thy renown, this noble garter; wear it as the ſymbol of the moſt illuſtrious order, never to be forgotten or laid aſide; that thereby thou mayeſt be admoniſhed to be courageous; and, having undertaken a juſt war, in which thou ſhalt be engaged, thou mayeſt ſtand firm, valiantly fight, and ſucceſſively conquer."

The princely garter being then buckled on, and the words of its ſignification pronounced, the knight-elect is brought before the ſovereign, who puts about his neck, kneeling, a ſky-coloured ribbon, (*ibid.* N° 5.) whereunto is appendant, wrought in gold within the garter, the image of St George on horſeback, with his ſword drawn, encountering with the dragon. In the mean time the chancellor reads the following admonition: "Wear this ribbon about thy neck, adorned with the image of the bleſſed martyr and ſoldier of Chriſt, St George, by whoſe imitation provoked, thou mayeſt ſo overpaſs both proſperous and adverſe adventures, that having ſtoutly vanquiſhed thy enemies both of body and ſoul, thou mayeſt not only receive the praiſe of this tranſient combat, but be crowned with the palm of eternal victory."

Then the knight elected kiſſes the ſovereign's hand; thanks his majeſty for the great honour done him; riſes up, and ſalutes all the companions ſeverally, who return their congratulations. N° 2. (*ibid.*) exhibits a view of a knight of the garter in the habit of this order.

Garth.

Since the inſtitution of this order, there have been eight emperors and twenty-eight kings, beſides numerous ſovereign princes, enrolled as companions thereof. Its origin is ſomewhat differently related. The common account is, that the counteſs of Saliſbury at a ball happening to drop her garter, the king took it up and preſented it to her with theſe words, "*Honi ſoit qui mal y penſe*;" i. e. Evil to him that evil thinks. This accident, it is ſaid, gave riſe to the order and the motto; it being the ſpirit of the times to mix love and war together: but as in the original ſtatutes of this order there is not the leaſt conjecture to countenance ſuch a feminine inſtitution, credit cannot be given to this tradition: the true motive is therefore attributed by very reſpectable hiſtorians, to a nobler origin; which is, that king Edward III. having iſſued forth his own garter for the ſignal of a battle, it ended ſo fortunately, that he thence took occaſion to inſtitute that order, not only as an incentive to honour and martial virtue, but alſo as a ſymbol of unity and ſociety.

GARTH (Sir Samuel), an excellent Engliſh poet and hyſician, was deſcended from a good family in Yorkſhire. He was admitted into the college of phyſicians at London in 1693. He at that time zealouſly promoted and encouraged the erecting of the diſpenſary for the relief of the ſick poor, by giving them advice gratis, and medicines at low rates. This work of charity having expoſed him and many other phyſicians to the envy and reſentment of ſeveral perſons of the ſame faculty as well as apothecaries, he ridiculed them, with a peculiar ſpirit and vivacity, in a poem called the *Diſpenſary*, in ſix cantos, highly eſteemed. He was one of the moſt eminent members of the famous ſociety called the *Kit-Kat Club*, which conſiſted of noblemen and gentlemen diſtinguiſhed by their excellent parts and affection to the houſe of Hanover. Upon the acceſſion of George I. he was knighted, and made phyſician in ordinary to his majeſty, and phyſician-general to the army. Nor were theſe more than juſt rewards even of his phyſical merit. He had gone through the office of cenſor of the college in 1702; and had practiſed always with great reputation, and a ſtrict regard to the honour and intereſt of the faculty, never ſtooping to proſtitute the dignity of his profeſſion, through mean and ſordid views of ſelf-intereſt, to any, even the moſt popular and wealthy apothecaries. In a ſteady adherence to this noble principle, he concurred with the much celebrated Dr Radcliffe, with whom he was alſo often joined in phyſical conſultations. He had a very extenſive practice, but was very moderate in his views of advancing his own fortune; his humanity and good-nature inclining him more to make uſe of the great intereſt he had with perſons in power, for the ſupport and encouragement of other men of letters. He choſe to live with the great in that degree of independency and freedom, which became a man poſſeſſed of a ſuperior genius, whereof he was daily giving freſh proofs to the public. One of his laſt performances in polite letters, was his tranſlation of the whole fourteenth book, and the ſtory of Cinnus in the fifteenth book, of Ovid's Metamorphoſes. Theſe, together with an Engliſh verſion of the reſt, were publiſhed in 1717; and he has prefixed an excellent preface to the whole, wherein he not only gives an idea of the work, and points out its principal beauties, but ſhews the uſes of the poem, and how it may be read to moſt profit. The diſtemper which ſeized him the enſuing year, and ended not but with his life, cauſed a general concern; which was particularly teſtified by lord Lanſdown, brother-poet, though of a different party, in ſome admirable verſes written on the occaſion. He died, after a ſhort illneſs which he bore with great patience, in January 1719.

Gas.

GAS, the name given by Van Helmont, and after him by other chemiſts, to thoſe elaſtic fluids extricated from different terreſtrial ſubſtances, and which are not condenſible by cold. Of theſe a good number have been obſerved by Van Helmont: ſuch as, the *gas ventoſum*, or atmoſpherical air; the *gas ſylveſtre*, or fluid extricated during fermentations and efferveſcences, called by later authors, *fixed*, *factitious*, and *fixable* air; *gas pingue*, or the fluid expelled from inflammable ſubſtances by heat; *gas flammeum*, or the fluid produced in the deflagration of nitre. To theſe other authors have added *inflammable* air or gas, *nitrous-acid* gas, *marine* gas, *alkaline* gas, &c.

An account of the moſt remarkable properties of all theſe different fluids is given under the articles Air, Chemistry, Damps, &c. Of their compoſition very little is known with certainty. Dr Prieſtley ſome time ago diſcovered a method of procuring very pure atmoſpherical air from a mixture of nitrous acid wtih red lead, or with any dephlogiſticated earth, as related under the article Air, n° 44. Hence he concluded, that the nitrous acid, and likewiſe earth, entered into the compoſition of the air we breathe. The proofs of this, however, from ſubſequent experiments, ſeem to be but ſlightly founded. It is certain, that part of the earth, which in Dr Prieſtley's firſt experiments was thought to enter into the compoſition of his dephlogiſticated air, was afterwards found to ſeparate from it, and to have been elevated merely by the force of the air extricating itſelf from the terreſtrial ſubſtance. With reſpect to the acid, the caſe is ſtill more dubious. It was found that dephlogiſticated air might be procured from red-lead and oil of vitriol; to which purpoſe the following experiment is recorded in the Appendix to the Chemical Dictionary. "Forty-eight pennyweights of red-lead were put into a long necked retort, the contents of which were ten cubic inches; and upon this red-lead, 24 pennyweights of oil of vitriol were poured. The noſe of the retort was then immerſed under water, and over it an inverted jar filled with water was placed. The mixture of oil of vitriol and red-lead became very hot, and ten cubic inches of air were ſoon thrown into the jar without the application of external heat. Upon applying the flame of a lamp to the bottom of the retort, bubbles of air paſſed copiouſly into the jars, which were ſucceſſively changed, that the air received at different times of the operation might be examined. The quantity of air which had been expelled from the above mixture of red-lead and vitriolic acid, was found to be 36 cubic inches, after the proper allowances for the air contained in the retort had been made; and this air was found to have all the properties of that procured by Dr Prieſtley from nitrous acid and red lead."

From ſome late experiments made by Dr Prieſtley him-

Fig. 1. SEA GAGE

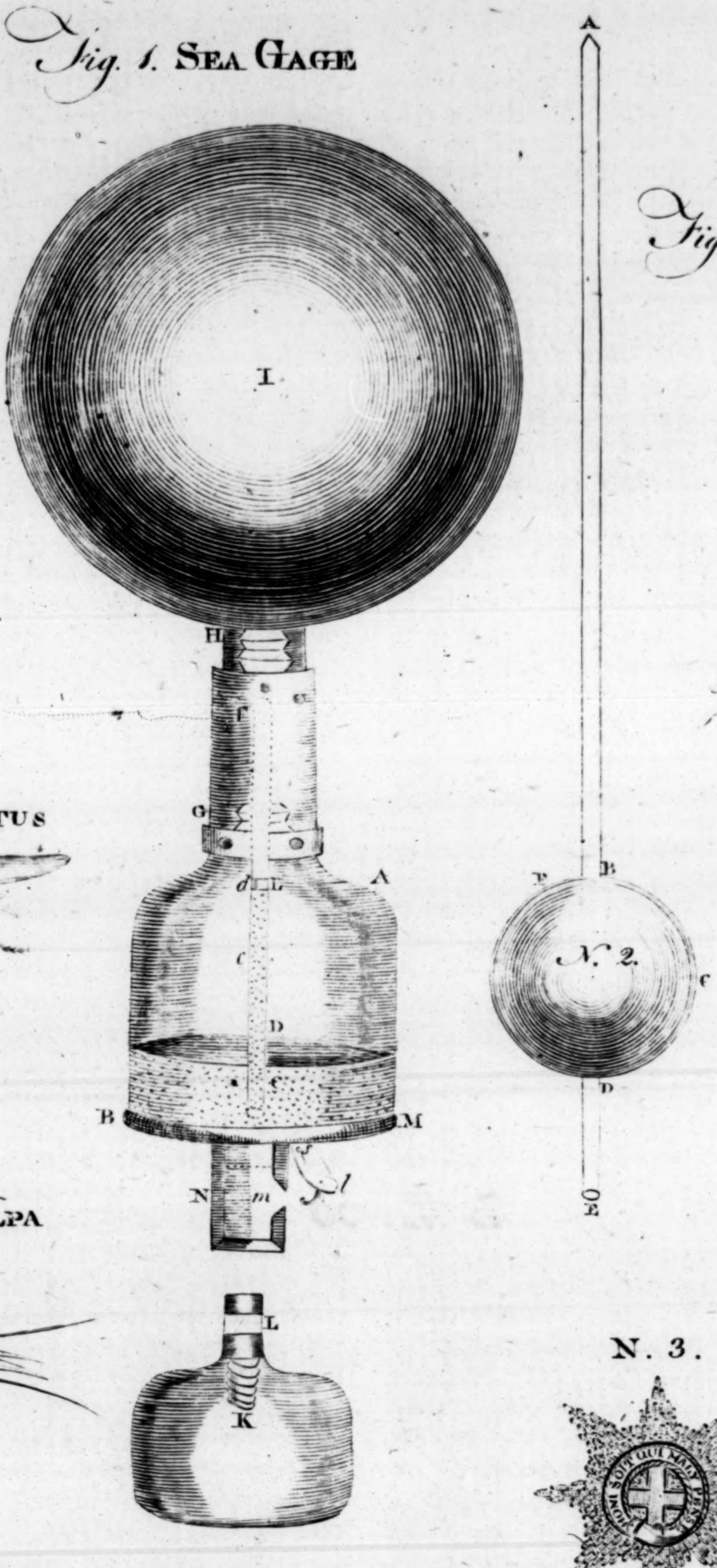
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Fig. 5. GRYLLUS LAURIFOLIUS

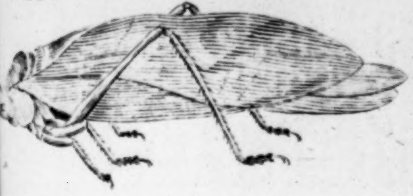


Fig. 4. GRYLLUS ACUMINATUS

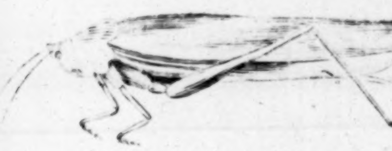


Fig. 6. GRYLLUS GRYLLOTALPA

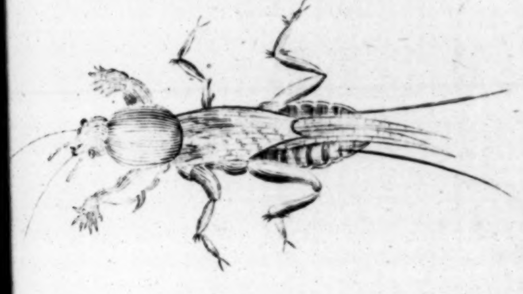
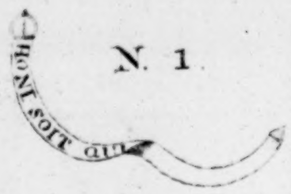


Fig. 2. Order of the GARTER.

N. 1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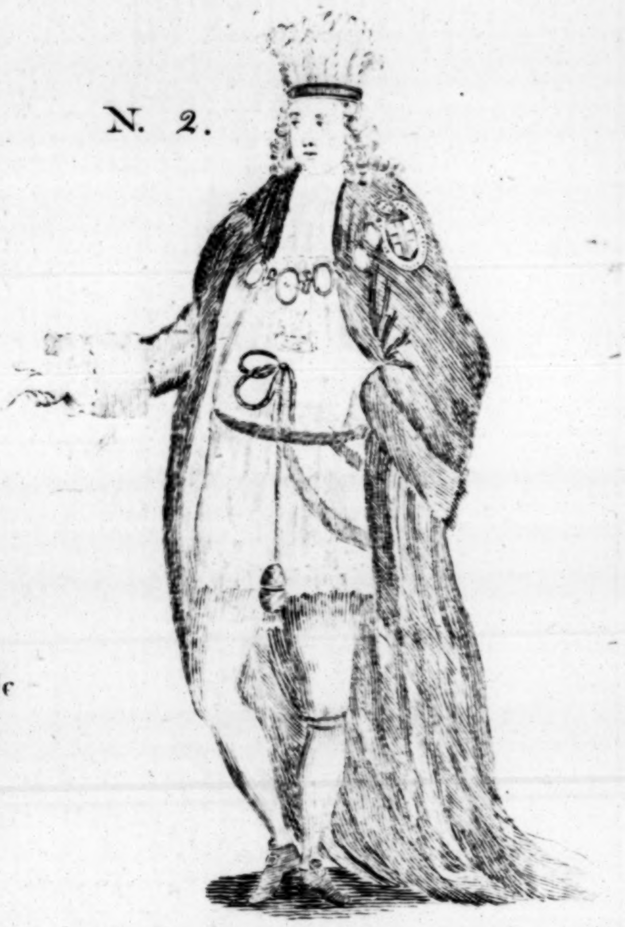
N. 2.



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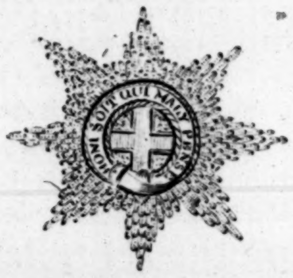
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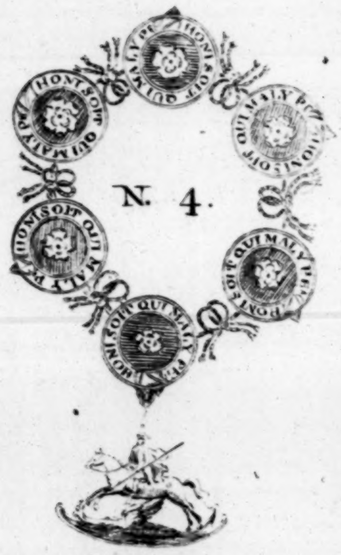
N. 4.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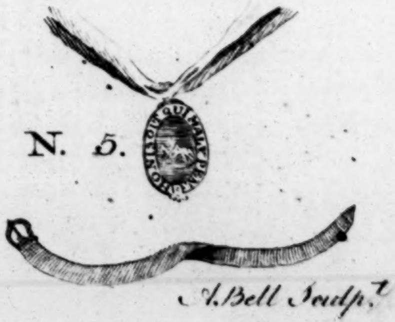
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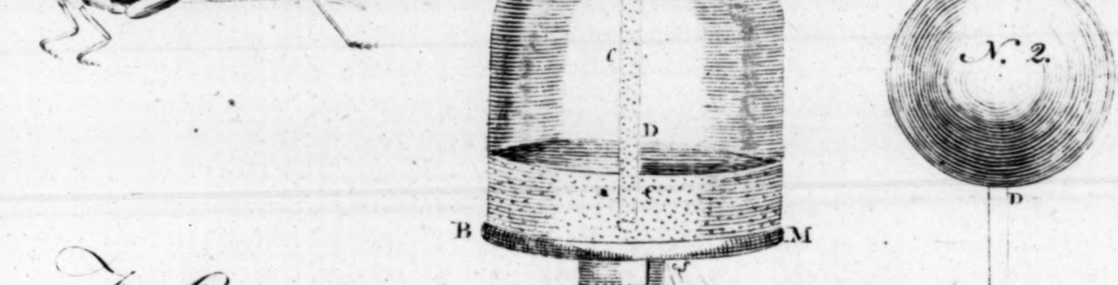
Fig. 3. GAUGING ROD.


Barrel
Kilderkin
Firkin
Beer
Diagonal
Wine

A. Bell Sculp.t

3 MA 53

himſelf, it appears, that very pure air may be obtained by means of the vitriolic acid, or indeed without any acid at all. In the courſe of his experiments, the doctor found, that dephlogiſticated air might be obtained from the green, blue, and white vitriols. Suſpecting, however, the purity of theſe vitriols which were prepared by others, he prepared ſome green vitriol himſelf by diſſolving clean iron-filings in the vitriolic acid diluted with water. Diſtilling the matter in a retort, he had the ſame reſults as before; the dephlogiſticated air which came over laſt, being very turbid, and exceedingly pure.—He now ſuſpected the purity of his oil of vitriol, which at preſent is generally procured from ſulphur with the addition of nitre. He therefore next employed the vitriolic acid prepared in Neumann's manner, in which no nitre is uſed: but dephlogiſticated air was ſtill produced from the combination of iron filings with this purer acid. And leſt the mixture of theſe two ſubſtances might be ſuſpected of having attracted pure air, in conſequence of their expoſure to the atmoſphere during their combination, he conducted the experiment in the following ſcrupulous manner. He diſſolved five pennyweights one grain of iron in a ſufficient quantity of pure oil of vitriol which had been carefully prepared for this purpoſe by Mr Winch, ſo as to be free from any admixture of the nitrous acid. The diſtillation was performed in the ſame retort in which the ſolution had been made, and in the continuation of the ſame proceſs; ſo that all communication with the external air was moſt effectually prevented. Conducting the proceſs with theſe attentions, and diſtilling the matter to dryneſs, the ſucceeding products were, firſt, the common air a little phlogiſticated; then a little fixed air, and much vitriolic-acid air; and laſtly, a conſiderable quantity of dephlogiſticated air. The reſiduum ſtill weighed more than the iron filings employed; and had the heat been increaſed, more air might perhaps have been procured.

Adding freſh oil of vitriol to this reſiduum, and treating it as before, but in a gun-barrel, a ſtill larger quantity of dephlogiſticated air was produced; ſo that the oil of vitirol appeared capable of generating dephlogiſticated air as often as it was mixed with iron, as well as the nitrous acid when mixed with red-lead, &c. in his former experiments.

On putting an ounce of manganeſe into a ſmall retort, with a very long narrow neck, and expoſing it to a red ſand-heat, 40 ounce-meaſures of air were expelled in different portions. Part of this, in every portion, was fixed air, and at firſt almoſt wholly ſo: but four-fifths of the laſt produce was the pureſt dephlogiſticated air. From an ounce of calaminaris without addition, 316 ounce-meaſures of gas were expelled by a red heat: the whole of this, however, was fixed air, except about four ounce-meaſures, which were nearly as good as common air.

In making ſome experiments on vegetation, the doctor diſcovered, that dephlogiſticated air was in ſome caſes produced naturally. Having obſerved bubbles of air that ſeemed to iſſue ſpontaneouſly from the roots of ſeveral plants growing in water, he was at firſt led to ſuſpect that this air had percolated through the plant; which had probably ſeized upon and retained the phlogiſton of the air, and then emitted the purer part. He found this conjecture verified with regard to the purity of the air; for, on examining ſome of it, he found that one meaſure of it, and one of nitrous air, occupied the ſpace only of one meaſure.—Soon after, he found that the plants had no ſhare in the production of this air; for, on taking them out of the vials, the remaining water continued to emit air as plentifully as when they were growing in it. He obſerved too, that the vials and other veſſels in which this pure air had been emitted from the water had their bottoms and ſides more or leſs covered with a green matter, from which the air evidently ſeemed to proceed. It appeared to him, however, that this green matter could neither be of an animal nor vegetable nature; but that it was a ſubſtance *ſui generis*; and that neither the external air nor animalcules could have any ſhare in the formation of it: for it was produced in vials cloſely corked, and in the middle veſſel of Mr Parker's apparatus *. But from ſome experiments made by others, it appears that the green matter will not be depoſited in vials cloſely corked, unleſs ſome air is included; and the quantity of the depoſit bears ſome proportion to that of the air left in the vial. In open vials completely filled, and inverted in water, the water contained in the vials has an intermediate communication with the atmoſphere, and the proceſs goes on as deſcribed above: but if that communication is ſtopped from the beginning, by inverting the vials in quickſilver (a fluid impermeable to air), no green matter or pure air is produced.

On filling a number of vials with different kinds of water, as river-water, rain-water, pump-water, which contained a conſiderable quantity of fixed air, he found that no green matter was produced in any of them, except in thoſe which contained the pump-water. Afterwards, however, he found that both the green matter and pure air was produced in great plenty from water ſtrongly impregnated with fixed air. —One meaſure of the pureſt air he ever obtained in this way, when mixed with two meaſures of nitrous air, occupied the ſpace only of 0.44 of a meaſure; "which (ſays Dr Prieſtley) is quite as pure as dephlogiſticated air is, at a medium."

The moſt remarkable circumſtance in this production of air is the inſtrumentality of the ſun's *light* independent of his mere *heat*. Concerning this, the doctor has the following obſervations:

"Whatever air is naturally contained in water, or in ſubſtances diſſolved in water, as calcareous matter, &c. becomes, after long ſtanding, but eſpecially when expoſed to the ſun, depurated, ſo as at length to become abſolutely dephlogiſticated; and that this air, being continually emitted by all water expoſed to the action of the ſun's rays, muſt contribute to the melioration of the ſtate of the atmoſphere in general.

"When water has been long kept in the ſhade, it has not generally yielded any other kind of air than it would have yielded at firſt; and though, when kept in an open veſſel, the air has been better, it has never been ſo good as when expoſed a much ſhorter time to the ſun.

"No degree of warmth will ſupply the place of the ſun's light: and though, when the water is once prepared by expoſure to the ſun, warmth will ſuffice to expel that air; yet, in this caſe, the air has never been ſo pure as that which has been yielded ſpontaneouſly, without additional heat. The reaſon of this may be, that, beſides the air already depurated, and on that account ready to quit its union with the water, heat expels, together with it, the air that was phlogiſticated, and held in a cloſer union with the water; which air, the *action of light*, whatever that is, would in time have depurated alſo.

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* See *Air*, nº 53.

“ The quantity of air yielded by water ſpontaneouſly, far exceeds that which can be expelled from it by heat. If the water naturally contains fixed air, yet, in conſequence of this expoſure to the ſun's light, it is all diſſipated, and the natural reſiduum of it becomes pure dephlogiſticated air. For no fixed air at all, but the pureſt dephlogiſticated air is at length procured from it; and water impregnated with fixed air yields, after this expoſure, the greateſt quantity of dephlogiſticated air.” From ſome experiments made by Dr Dobſon of Liverpool, and Mr Becket of Briſtol, it appears that air purer than the common atmoſphere can be extracted from ſea-water, and the water of the hot well at Briſtol.

A new ſpecies of inflammable gas has been diſcovered by Dr Ingenhouſz. This is procured by putting a ſingle drop of vitriolic ether into an inflammable air-piſtol, containing about ten cubic inches: it communicates to the common air contained in the piſtol, a ſtrong exploſive force. It is very remarkable, that the gravity of this inflammable gas exceeds that extracted from iron, in the proportion of 150 to 25. It is even heavier than common air, in the proportion of 150 to 138: ſo that, if too great a quantity of it contained in the air-piſtol, and the conſequent excluſion of too much of the common air, prevent it from taking fire, it will fall out, on holding the piſtol a few ſeconds inverted, with its mouth open; and, in conſequence of the entrance of a proper quantity of common air in its room, the exploſion will take place.—Another very remarkable circumſtance is, that though ether itſelf is ſo very volatile, and evaporates ſo quickly; yet this elaſtic vapour, generated from it, will remain ſome hours in an open glaſs, without ſuch diminution from evaporation, or its mixing with the atmoſphere, as to deſtroy its inflammable quality.

From theſe experiments we cannot conclude any thing with certainty. They only evince, in one caſe, the tranſmutation of the *gas ſylveſtre* of Helmont, our fixed air, into atmoſpherical air. With regard to this laſt, it ſeems alſo to be pretty plain, that, in ſome caſes, the element of *fire*, in others that of *light*, enters largely into its compoſition. But whether theſe elements are, in ſuch caſes, combined with any part of the terreſtrial matter, or whether they are only new-modelled by ſome different arrangement of their parts, muſt be determined by future experiments.

GASCOIGNE (Sir William), chief juſtice of the court of king's bench under Henry IV. A moſt learned and upright judge: who, being inſulted on the bench by the then prince of Wales, afterwards Henry V. with equal intrepidity and coolneſs committed the prince to priſon; and by this ſeaſonable fortitude, laid the foundation of the future glory of that great monarch, who, from this event, dated his reformation from the licentiouſneſs of his youth. It is not well authenticated that the prince ſtruck Sir William, as recorded by Shakeſpeare; but all authors agree, that he interrupted the courſe of juſtice, to ſcreen a lewd ſervant. Sir William died in 1413.

GASCOIGNE (George), an Engliſh poet of ſome fame in the early part of the reign of Queen Elizabeth, was born at Walthamſtow in Eſſex, of an ancient family, and educated at both univerſities, but principally at Cambrige. From thence he removed to Gray's Inn, and commenced ſtudent of the law; but, having a genius too volatile for that ſtudy, he travelled abroad, and for ſome time ſerved in the army in the Low Countries. He afterwards went to France; where he became enamoured of a Scottiſh lady, and married her. Being at length, ſays Wood, *weary of thoſe vanities*, he returned to England; and ſettled once more in Gray's Inn, where he wrote moſt of his dramatic and other poems. The latter part of his life he ſpent in his native village of Walthamſtow, where he died in the year 1578. He had the character of a polite gentleman, an eloquent and witty companion, *et vir inter poetas ſui ſeculi præſtantiſſimus*. His plays, firſt printed ſeparately, were afterwards, with ſeveral other poems, &c. reprinted in two volumes 4to. the firſt volume in 1577, the ſecond in 1587.

GASCOIN, or GASCOIGN, denotes the hinder thigh of a horſe, which begins at the ſtifle, and reaches to the ply or bending of the ham.

GASCONADE, a boaſt or vaunt of ſomething very improbable. The term has its riſe from the Gaſcoons, or people of Gaſcony in France, who it ſeems have been diſtinguiſhed for bragging and rhodomontado.

GASCONY, the moſt ſouth-weſt province of France, is bounded by Guienne on the north, by Languedoc on the eaſt, by the Pyrenees which ſeparate it from Spain on the ſouth, and by the bay of Biſcay on the weſt. It had its name from the ancient inhabitants called *Gaſcones*, or *Vaſcones*; by the moderns *Baſques*, or *Vaſques*. After theſe were ſubdued by the Franks, they had for ſome time dukes of their own, who were ſubject to the dukes of Aquitaine; but both were at laſt diſpoſſeſſed by the kings of France. The country produces corn, wine, fruits, tobacco, hemp, brandy, prunes, &c. The inhabitants are noted for a corrupt and vicious pronunciation of the French tongue, as well as their vain-glorious boaſting.

GASSENDI (Peter), one of the moſt celebrated philoſophers France has produced, was born at Chanterſier, about three miles from Digne in Provence, in 1592. When a child, he took particular delight in gazing at the moon and ſtars, as often as they appeared in clear unclouded weather. This pleaſure frequently drew him into bye-places, in order to feaſt his eye freely and undiſturbed; by which means his parents had him often to ſeek, not without many anxious fears and apprehenſions. They therefore put him to ſchool at Digne; where, in a ſhort time, he made ſuch an extraordinary progreſs in learning, that ſome perſons, who have ſeen ſpecimens of his genius, reſolved to have him removed to Aix, in order to ſtudy philoſophy under Feſay, a learned minor friar. This propoſal was ſo diſagreeable to his father, who intended to breed him up in his own way to country-buſineſs, as being more profitable than that of a ſcholar, that he would conſent to it only upon condition that he ſhould return home in two years at fartheſt. Accordingly young Gaſſendi, at the end of the appointed time, repaired to Chanterſier: but he had not been long there, when he was invited to be profeſſor of rhetoric at Digne, before he was quite 16 years of age; and he had been engaged in that office but three years, when his maſter Feſay dying, he was made profeſſor in his room at Aix. When he had been there a few years, he compoſed his Paradoxical Exercitations; which, coming to the hands of Nicholas Peireſc, that great patron of learning joined with Joſeph Walter prior of Valette in promoting him; and he, having entered into holy orders, was firſt made canon of the church of Digne and doctor of divinity, and then obtained the wardenſhip or rectorſhip of that church. Gaſſendi's fondneſs for aſtronomy grew up with his years; and his reputation daily increaſing, he was, in 1645, appointed royal profeſſor of mathematics at Paris. This inſtitution being chiefly deſigned for aſtronomy, our author read lectures on that ſcience to a crowded audience. However, he did not hold this place long; for a dangerous cough and inflammation of the lungs obliged him, in 1647, to return to Digne for the benefit of his native air.—Gaſſendi wrote againſt the metaphyſicial meditations of Des Cartes; and divided with that great man the philoſophers of his time, almoſt all of whom were Carteſians or Gaſſendians. He joined to his knowledge of philoſophy and the mathematics, an acquaintance with the languages and a profound erudition. He wrote, 1. Three volumes on Epicurus's Philoſophy; and ſix others, which contain his own philoſophy. 2. Aſtronomical works. 3. The lives of Nicholas de Peireſc, Epicurus, Copernicus, Tycho Brahe, Peurbachius, and Regiomontanus. 4. Epiſtles, and other treatiſes. All his works were collected together, and printed at Lyons in 1658, in ſix volumes folio. He died at Paris in 1655, aged 63.

GASTEROSTEUS, the STICKLE-BACK, in ichthyology, a genus of fiſhes belonging to the order of thoracici. There are three rays in the membrane of the gills; the body is carinated; and there are ſome diſtinct prickles before the back-fin. There are 11 ſpecies diſtinguiſhed by the number of prickles on the back. One of theſe ſpecies, the aculeatus, ſtickleback, banſticle, or ſharpling, is common in many of the Britiſh rivers. In the fens of Lincolnſhire, and ſome rivers that proceed from them, they are found in prodigious quantities. At Spalding there are, once in ſeven or eight years, amazing ſhoals that appear in the Welland, and come up the river in form of a vaſt column. They are ſuppoſed to be the multitudes that have been waſhed out of the fens by the floods of ſeveral years, and collected in ſome deep hole, till, overcharged with numbers, they are periodically obliged to attempt a change of place. The quantity is ſo great, that they are uſed to manure the land, and trials have been made to get oil from them. A notion may be had of this vaſt ſhoal, by being informed, that a man being employed by the farmer to take them, has got for a conſiderable time four ſhillings a-day by ſelling them for a halfpenny per buſhel.—This ſpecies ſeldom reaches the length of two inches; it hath three ſharp ſpines on the back, that can be raiſed or depreſſed at pleaſure. The colour of the back and ſides is an olive-green; the belly white; but in ſome the lower jaws and belly are of a bright crimſon.

GAST-HOUND. See GAZE-*Hound*.

GASTRELL (Francis), biſhop of Cheſter, was born in 1662, appointed preacher to the ſociety of Lincoln's Inn in 1694, and made biſhop of Cheſter in 1714. He preached a courſe of ſermons for Boyle's lectures; engaged in the Trinitarian controverſy with Mr Collins and Dr Clarke; and publiſhed two excellent pieces, the one intitled, *Chriſtian Inſtitutes*, and the other, *A moral proof of a future ſtate*. He vindicated the rights of the univerſity of Oxford, againſt the archbiſhop of Canterbury, in the appointment of the warden of Mancheſter college; and oppoſed the violent proceedings againſt biſhop Atterbury in the houſe of lords, though he diſliked the biſhop as a man of arbitrary principles. He died in 1725.

GASTRIC, in general, ſomething belonging to the ſtomach.

GASTRIC *Juice*, a thin pellucid liquor, which diſtills from certain glands in the ſtomach, for the dilution, &c. of the food.

From ſome late experiments it appears, that this juice is the chief inſtrument of digeſtion; but in what manner this operation is performed by it, remains yet a ſecret. It is not poſſeſſed of any corroſive acrimony, for this would act upon all ſubſtances indiſcriminately; but the gaſtric juice is found to act only upon particular ſubſtances. The moſt remarkable particularity of this kind is, that though it very readily diſſolves animal ſubſtances when deprived of the vital principle, it abſolutely refuſes to touch thoſe which are alive. This would ſeem to favour the opinion formerly in vogue, that digeſtion was performed by means of a kind of fermentation induced into the ſubſtances ſwallowed for food; as very probably the parts of living animals may be capable of reſiſting thoſe fermentations which readily take place in dead ones. But whether or not this is the caſe, muſt be determined by future experiments.

GASTROCNEMIUS, in anatomy. See ANATOMY, *Table of the Muſcles*.

GASTROMANCY, a method of devination by water, practiſed by the ancient Greeks. See DIVINATION.

GASTRORAPHY, in ſurgery, the operation of ſewing up wounds of the abdomen. See SURGERY.

GATE, in architecture, a large door, leading or giving entrance into a city, town, caſtle, palace, or other conſiderable building; or a place giving paſſage to perſons, horſes, coaches, or waggons, &c. As to their proportion, the principal gates for entrance thro' which coaches and waggons are to paſs, ought never to be leſs than ſeven feet in breadth, nor more than 12, which laſt dimenſion is fit only for large buildings. The height of a gate is to be 1½ of the breadth, and ſomewhat more; but as for common gates in inns, under which waggons go loaded with hay, ſtraw, &c. the height of them may be twice their breadth. See ARCHITECTURE.

GATES *of Hell*. This expreſſion is uſed in ſcripture, to denote figuratively, either the *grave*, or the *powers of darkneſs*, i. e. the devil and his angels.

The Mahometans uſe the expreſſion literally, and ſuppoſe that hell has ſeven gates. The firſt is that where Muſſulmans, who incur the guilt of ſin, will be tormented. The ſecond is for the Chriſtians. The third is for the Jews. The fourth for the Sabians. The fifth for the Magians, or worſhippers of fire. The ſixth for Pagans and idolaters. And the ſeventh for hypocrites, who make an outward ſhew of religion, but have none.

GATAKER (Thomas), a learned critic and divine, was born at London in 1574, and ſtudied at St John's college, Cambridge. He was afterwards choſen preacher at Lincoln's Inn; which he quitted in 1611, for the rectory of Rotherhithe in Surry. In 1620, he made a tour through the Low Countries; and, in 1624, publiſhed at London a book intitled, "Tranſubſtantiation declared by the confeſſion of the Popiſh writers to have no neceſſary foundation in God's word:" he wrote likewiſe a defence of this diſcourſe. In 1642, he was appointed one of the aſſembly of divines, and was engaged with them in writing annotations upon the bible. He died in July 1654, in the 80th year of his age. Beſides the above works, he publiſhed, 1. A diſſertation upon the ſtyle of the New Teſtament. 2. *De nomine tetragrammata*. 3. *De diphthongis, ſive bivocalibus*. 4. An edition and tranſlation of the emperor Marcus Antoninus's meditations. 5. A collection of ſermons, in folio; and many other works. His piety and charity were very exemplary; and his modeſty ſo great, that he declined all eccleſiaſtical dignity and court-preferments. His extenſive learning was admired by Salmaſius and other great men abroad; his houſe was a private ſeminary for young gentlemen of this nation, and many foreigners reſorted to him to receive advice in their ſtudies.

GAUDEN (Dr Joſeph), ſon of John Gauden vicar of Mayfield in Eſſex, was born there in 1605. At the commencement of the civil war, he was chaplain to Robert earl of Warwick; who taking part with the parliament againſt the king, was followed by his chaplain. Upon the eſtabliſhment of the preſbyterian model of church-goverment, he complied with the ruling powers, and was nominated one of the aſſembly of divines who met at Weſtminſter in 1643, and took the covenant; yet having offered ſome ſcruples and objections to it, his name was afterward ſtruck out of the liſt. Nor did he eſpouſe the parliament-cauſe any longer than they adhered to their firſt avowed principles of reforming only, inſtead of deſtroying, monarchy and epiſcopacy. In this ſpirit he was one of thoſe divines who ſigned a proteſtation to the army, againſt the violent proceedings that affected the life of the king: and a few days after his execution publiſhed the famous Εικων Βασιλικη, *A Portraiture of his ſacred Majeſty in his ſolitude and ſufferings*; which ran through 50 editions in the courſe of a year. Upon the return of Charles II. he was promoted to the ſee of Exeter; and in 1662 was removed to Worceſter, much to his regret, having flattered himſelf with the hopes of a tranſlation to Wincheſter: and his death happened the ſame year. He wrote many controverſial pieces ſuited to the circumſtances of the times, and to his own views from them.—The *Eikon Baſilike* above mentioned he publiſhed as the king's private meditations: though on this point there has been a long controverſy. After the biſhop's death, his widow, in a letter to one of her ſons, calls it "The Jewel;" and ſaid, her huſband had hoped to make a fortune by it; and that ſhe had a letter of a very great man's, which would clear up that he writ it. This aſſertion, as the earl of Clarendon had predicted, was eagerly eſpouſed by the anti-royaliſts, in the view of diſparaging Charles I. But it has been obſerved, that Gauden had too luxuriant an imagination, which betrayed him into a rankneſs of ſtyle in the Aſiatic way; and from thence, as biſhop Burnet argues with others, it may be certainly concluded, that not he, but the king himſelf, was the true author of the Εικων Βασιλικη; in which there is a nobleneſs and juſtneſs of thought, with a greatneſs of ſtyle, that made it be looked on as the beſt written book in the Engliſh language.

GAVEL, or GABLE, among builders. See GABLE.

GAVEL, in law: tribute, toll, cuſtom, or yearly revenue; of which we had in old time ſeveral kinds. See GABEL.

GAVEL-*Kind*, a tenure or cuſtom belonging to lands in the county of Kent. The word is ſaid by Lambard to be compounded of three Saxon words, *gyſe*, *eal*, *kyn*, "*omnibus cognatione proximis data*." Verſtegan calls it *gavelkind*, quaſi "give all kind," that is, to each child his part: and Taylor, in his hiſtory of *gavelkind*, derives it from the Britiſh *gavel*, i. e. a hold or tenure, and *cenned*, "*generatio* aut *familia*;" and ſo *gavel cenned* might ſignify *tenura generationis*.—It is univerſally known what ſtruggles the Kentiſh men made to preſerve their ancient liberties, and with how much ſucceſs thoſe ſtruggles were attended. And as it is principally here that we meet with the cuſtom of gavelkind, (though it was and is to be found in ſome other parts of the kingdom), we may fairly conclude, that this was a part of theſe liberties; agreeably to Mr Selden's opinion, that gavelkind, before the Norman conqueſt, was the general cuſtom of the realm. The diſtinguiſhing properties of this tenure are various: ſome of the principal are theſe. 1. The tenant is of age ſufficient to alienate his eſtate by feoffment, at the age of 15. 2. The eſtate does not eſcheat in caſe of an attainder and execution for felony; their maxim being, "the father to the bough, the ſon to the plough." 3. In moſt places he had a power of deviſing lands by will, before the ſtatute for that purpoſe was made. 4. The lands deſcend, not to the eldeſt, youngeſt, or any one ſon only, but to all the ſons together; which was indeed anciently the moſt uſual courſe of deſcent all over England, tho' in particular places particular cuſtoms prevailed.

GAVELET, in law, an ancient and ſpecial ceſſavit uſed in Kent, where the cuſtom of gavelkind continues, by which the tenant, if he withdraws his rent and ſervices due to the lord, forfeits his lands and tenements.

The proceſs of the gavelet is thus. The lord is firſt to ſeek by the ſteward of his court, from three weeks to three weeks, to find ſome diſtreſs upon the tenement, till the fourth court; and if at that time he find none, at this fourth court it is awarded, that he take the tenement in his hand in name of a diſtreſs, and keep it a year and a day without manuring; within which time, if the tenant pay his arrears, and make reaſonable amends for the with-holding, he ſhall have and enjoy his tenement as before: if he come not before the year and day be paſt, the lord is to go to the next county-court, with witneſſes of what had paſſed at his own court, and pronounce there his proceſs, to have further witneſſes; and then by the award of his own court, he ſhall enter and manure the tenement as his own: ſo that if the tenant deſired afterwards to have and hold it as before, he muſt agree with the lord; according to this old ſaying: "Has he not ſince any thing given, or any thing paid, then let him pay five pound for his were, e're he become healder again." Other copies have the firſt part with ſome variation; "Let him nine times pay, and nine times repay."

Gavelet, in London, is a writ uſed in the huſtings, given to lords of rents in the city of London. Here the parties, tenant and demandant, appear by *ſcire facias*, to ſhew cauſe why the one ſhould not have his tenement again on payment of his rent, or the other recover the lands on default thereof.

GAUGAMELA, (anc. geog.), a village of Aturia, lying between the rivers Lycus and Tigris; famous for Alexander's victory over Darius. It is ſaid to have been allowed to Darius Hyſtaſpes for the maintenance of a camel; and hence the name. It was not far from a more conſiderable place called *Arbela*; whence the latter gave the name to the victory. See Arbela.

GAUGE-POINT of a ſolid meaſure, the diameter of a circle whoſe area is equal to the ſolid content of the ſame meaſure.

GAUGER, a king's officer, who is appointed to examine all tuns, pipes, hogſheads, and barrels of wine, beer, ale, oil, honey, &c. and give them a mark of allowance, before they are ſold in any place within the extent of his office.

GAUGING. See Geometry.

GAUL, the name given by the Romans to the preſent kingdom of France.—The original inhabitants were deſcended from the Celtes or Gomerians, by whom the greateſt part of Europe was peopled; the name of *Galli*, or *Gauls*, being probably given them long after their ſettlement in that country.

The ancient hiſtory of the Gauls is entirely wrapped up in obſcurity and darkneſs; all we know concerning them for a long time is, that they multiplied ſo faſt, that, their country being unable to contain them, they poured forth in vaſt multitudes into other countries, which they generally ſubdued, and ſettled themſelves in. It often happened, however, that theſe colonies were ſo moleſted by their neighbours, that they were obliged to ſend for aſſiſtance to their native country. This was always very eaſily obtained. The Gauls were, upon every occaſion, ready to ſend forth great numbers of new adventurers; and as theſe ſpread deſolation where-ever they came, the very name of *Gauls* proved terrible to moſt of the neighbouring nations.—The earlieſt excurſion of theſe people of which we have any diſtinct account, was into Italy, under a famed leader, named *Belloveſus*, about 622 years before Chriſt. He croſſed the Rhone and the Alps, till then unattempted; defeated the Hetrurians; and ſeized upon that part of their country, ſince known by the names of *Lombardy* and *Piedmont*.—The ſecond grand expedition was made by the Cœnomani, a people dwelling between the rivers Seine and Loire, under a general named *Elitonis*. They ſettled in thoſe parts of Italy, now known by the names of *Breſciano*, *Cremoneſe*, *Mantuan*, *Carniola*, and *Venetian*.—In a third excurſion, two other Gauliſh nations ſettled on both ſides of the river Po; and in a fourth, the Boii and Lingones ſettled in the country between Ravenna and Bologna. The time of theſe three laſt expeditions is uncertain.

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The fifth expedition of the Gauls was more remarkable than any of the former, and happened about 200 years after that of Belloveſus. The Senones, ſettled between Paris and Meaux, were invited into Italy by an Hetrurian lord, and ſettled themſelves in Umbria. Brennus their king laid ſiege to Cluſium, a city in alliance with Rome: and this produced a war with the Romans, in which the latter were at firſt defeated, and their city taken and burnt; but at length the whole army was cut off by Camillus, inſomuch that not a ſingle perſon eſcaped.

Some other expeditions the Gauls undertook againſt the Romans: in which, though they always proved unſucceſsful, by reaſon of their want of military diſcipline; yet their fierceneſs and courage made them ſo formidable to the republic, that, on the firſt news of their march, extraordinary levies of troops were made, ſacrifices and public ſupplications offered to the gods, and the law which granted an immunity from military ſervice to prieſts and old men, was, for the time, aboliſhed.

2 Expedition againſt the Greeks.

Againſt the Greeks, the expeditions of the Gauls were very little more ſucceſsful than againſt the Romans. The firſt of theſe we hear of, was about 279 years before Chriſt, in the year after Pyrrhus had invaded Italy. At this time, the Gauls finding themſelves greatly overſtocked at home, ſent out three great colonies to conquer new countries for themſelves. One of theſe armies was commanded by *Brennus*, another by *Cerethrius*, and the third by *Belgius*. The firſt entered Pannonia or Hungary; the ſecond Thrace; and the third marched into Illyricum and Macedonia. Here Belgius at firſt met with great ſucceſs; and enriched himſelf by plunder to ſuch a degree, that Brennus envying him, reſolved to enter the ſame countries, in order to ſhare the ſpoil. In a ſhort time, however, Belgius met with ſuch a total defeat, that his army was almoſt entirely deſtroyed; upon which Brennus haſtened to the ſame place. His army at firſt conſiſted of 150,000 foot and 15,000 horſe: but two of his principal officers revolted, and carried off 20,000 men, with whom they marched into Thrace; where, having joined Cerethrius, they ſeized on Byzantium and the weſtern coaſt of Propontis, making the adjacent parts tributary to them.—To retrieve this loſs, Brennus ſent for freſh ſupplies from Gaul; and having increaſed his army to 150,000 foot, and upwards of 60,000 horſe, he entered Macedonia, defeated the general who oppoſed him, and ravaged the whole country. He next marched towards the ſtraits of Thermopylæ, with a deſign to invade Greece; but was ſtopped by the forces ſent to defend that paſs againſt him. He paſſed the mountains, however, as Xerxes had formerly done; upon which the guards retired, to avoid being ſurrounded. Brennus then, having ordered Acichorius, the next to him in command, to follow at a diſtance with part of his army, marched with the bulk of the forces to Delphi, in order to plunder the rich temple there. This enterpriſe proved exceedingly unfortunate: a great number of his men were deſtroyed by a dreadful ſtorm of hail, thunder, and lightning; another

3 Miſerable fate of their army.

another part of his army was deſtroyed by an earthquake; and the remainder, ſome how or other, imagining themſelves attacked by the enemy, fought againſt each other the whole night, ſo that in the morning ſcarce one half of them remained. The Greek forces then poured in upon them from all parts; and that in ſuch numbers, that though Acichorius came up in due time with his forces, Brennus found himſelf unable to make head againſt the Greeks, and was defeated, with great ſlaughter. He himſelf was deſperately wounded; and ſo diſheartened by his miſfortune, that, having aſſembled all his chiefs, he adviſed them to kill all the wounded and diſabled, and to make the beſt retreat they could; after which, he put an end to his own life. On this occaſion, it is ſaid that 20,000 of theſe unhapy people were executed by their own countrymen. Acichorius then ſet out with the remainder for Gaul; but by being obliged to march through the country of their enemies, the calamities they met with by the way were ſo grievous, that not one of them reached their own country. A juſt judgement, ſay the Greek and Roman authors, for their ſacrilegious intentions againſt Delphi.

4
Gaul invaded by the Romans.

The Romans having often felt the effects of the Gauliſh ferocity and courage, thought proper at laſt, in order to humble them, to invade their country. Their firſt ſucceſsful attempt was about 118 years before Chriſt, under the command of Quintus Marcius, ſurnamed *Rex*. He opened a way betwixt the Alps and the Pyrenees, which laid the foundation for conquering the whole country. This was a work of immenſe labour of itſelf, and rendered ſtill more difficult by the oppoſition of the Gauls, eſpecially thoſe called the Stæni, who lived at the foot of the Alps. Theſe people finding themſelves overpowered by the conſular army, ſet fire to their houſes, killed their wives and children, and then threw themſelves into the flames. After this Marcius built the city of Narbonne, which became the capital of a province. His ſucceſſor Scaurus alſo conquered ſome Gauliſh nations; and in order to facilitate the ſending troops from Italy into that country, he made ſeveral excellent roads between them, which before were almoſt impaſſable. Theſe ſucceſſes gave riſe to the invaſion of the Cimbri and Teutones; an account of whoſe unfortunate expedition is given under the articles Cimbri, Rome, Teutones, &c.

5
Surpriſing ſucceſs of Julius Cæſar.

From this time, the Gauls ceaſed to be formidable to the Romans, and even ſeem to have been for ſome time on good terms with them. At laſt, however, the Helvetii kindled a war with the republic, which brought Cæſar over the Alps, and ended in the total ſubjection of the country. Orgetorix was the firſt cauſe of it; who had engaged a vaſt number of his countrymen to burn their towns and villages, and to go in ſearch of new conqueſts. Julius Cæſar, to whoſe lot the whole country of Gaul had fallen, made ſuch haſte to come and ſuppreſs them, that he was got to the Rhone in eight days; broke down the bridge of Geneva, and, in a few days more, finiſhed the famed wall between that city and mount Jura, now St Claude, which extended ſeventeen miles in length, was ſixteen feet high, fortified with towers and caſtles at proper diſtances, and a ditch that ran the whole length of it. If his own account of it may be relied upon, he did not ſet out till the beginning of April; and yet this huge work was finiſhed by the ides or 13th of the month: ſo that, ſubtracting the eight days he was a-coming, it muſt have been all done in about five days: a prodigious work, conſidering he had but one legion there, or even though the whole country had given him aſſiſtance. Whilſt this was doing, and the reinforcements he wanted were coming, he amuſed the Helvetii, who had ſent to demand a paſſage through the country of the Allobroges, till he had got his reinforcements; and then flatly refuſed it to them: whereupon a dreadful battle enſued; in which they loſt one hundred and thirty thouſand men, in ſpite of all their valour; beſides a number of priſoners, among whom was the wife and daughter of Orgetorix, the leader of this unfortunate expedition. The reſt ſubmitted, and begged they might be permitted to go and ſettle among the Ædui, from whom they originally ſprung; and, at the requeſt of theſe laſt, were permitted to go.

The Gauls were conſtantly in a ſtate of variance with one another; and Cæſar, who knew how to make the moſt of theſe inteſtine broils, ſoon became the protector of the oppreſſed, a terror to the oppreſſor, and the umpire of all their contentions. Among thoſe who applied to him for help, were his allies the Ædui; againſt whom Arioviſtus, king of the Germans, joined with the Arverni, who inhabited the banks of the Loire, had taken the country of the Sequani from them, and obliged them to ſend hoſtages to him. Cæſar forthwith ſent to demand the reſtitution of both, and, in an interview which he ſoon after obtained of that haughty and treacherous prince, was like to have fallen a ſacrifice to his perfidy; upon which he bent his whole power againſt him, forced him out of his ſtrong intrenchments, and gave him a total overthrow. Arioviſtus eſcaped, with difficulty, over the Rhine; but his two wives, and a daughter, with a great number of Germans of diſtinction, fell into the conqueror's hand. Cæſar, after this ſignal victory, put his army into winter-quarters, whilſt he went over the Alps to make the neceſſary preparations for the next campaign. By this time all the Belgæ in general were ſo terrified at his ſucceſs, that they entered into a confederacy againſt the Romans, as their common enemy. Of this, Labienus, who had been left in Gaul, ſent Cæſar notice; upon which, he immediately left Rome, and made ſuch diſpatch, that he arrived upon their confines in about fifteen days. On his arrival, the Rhemi ſubmitted to him; but the reſt, appointing Galba, king of the Sueſſones, general of all their forces, which amounted to one hundred and fifty thouſand men, marched directly againſt him. Cæſar, who had ſeized on the bridge of the Axona, now Aiſne, led his light horſe and infantry over it; and, whilſt the others were incumbered in croſſing that river, made ſuch a terrible ſlaughter of them, that the river was filled with their dead, inſomuch that their bodies ſerved for a bridge to thoſe who eſcaped. This new victory ſtruck ſuch terror into the reſt, that they diſperſed themſelves; immediately after which, the Sueſſones, Bellovaci, Ambiones, and ſome others, ſubmitted to him. The Nervii, indeed, joined with the Atrebates and Veromandui, againſt them; and, having firſt ſecured ſome

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their wives and children, made a vigorous reſiſtance for ſome time; but were at length defeated, and the greateſt part of them ſlain. The reſt, with their wives and old men, ſurrendered themſelves, and were allowed to live in their own cities and towns as formerly. The Aduatici were next ſubdued; and, for their treachery to the conqueror, were ſold for ſlaves, to the number of fifty thouſand. Young Craſſus, the ſon of the triumvir, ſubdued likewiſe ſeven other nations, and took poſſeſſion of their cities; which not only completed the conqueſt of the Belgæ, but brought ſeveral nations from beyond the Rhine to ſubmit to the conqueror. The Veneti, or ancient inhabitants of Vannes in Britany, who had been likewiſe obliged to ſend hoſtages to the conqueror, were, in the mean time, making great preparations, by ſea and land, to recover their liberty. Cæſar, then in Illyricum, was forced to equip a fleet on the Loire; and, having given the command of it to Brutus, went and defeated them by land, as Brutus did by ſea; and, having put their chief men to death, ſold the reſt for ſlaves. The Unelli, with Veridorix their chief, together with the Lexovii and Aulerci, were, about the ſame time, ſubdued by Sabinus, and the Aquitani by Craſſus, with the loſs of thirty thouſand men. There remained nothing but the countries of the Morini and Menapii to be conquered, of all Gaul. Cæſar marched himſelf againſt them: but he found them ſo well intrenched in their inacceſſible fortreſſes, that he contented himſelf with burning and ravaging their country; and, having put his troops into winter-quarters, again paſſed over the Alps, to have a more watchful eye on ſome of his rivals there. He was, however, ſoon after obliged to come to defend his Gauliſh conqueſts againſt ſome nations of the Germans, who were coming to ſettle there, to the number of four hundred thouſand. Theſe he totally defeated, and then reſolved to carry his conquering arms into Germany: but for an account of his exploits there, ſee the article **Germany**.

Upon his return into Gaul, he found it labouring under a great famine, which had cauſed a kind of univerſal revolt. Cotta and Sabinus, who were left in the country of the Eburones, now Liege, were betrayed into an ambuſh by Ambiorix, one of the Gauliſh chiefs, and had moſt of their men cut off. The Aduatici had fallen upon Q. Cicero, who was left there with one legion, and had reduced him to great ſtraits: at the ſame time Labienus, with his legion, was attacked by Indutiomarus, at the head of the Rheni and Senones; but had better luck than the reſt, and, by one bold ſally upon them, put them to flight, and killed their general. Cæſar acquired no ſmall credit by quelling all theſe revolts; but each victory loſt the lives of ſo many of his troops, that he was forced to have recourſe to Pompey for a freſh ſupply, who readily granted him two of his own legions to ſecure his Gauliſh conqueſts.

But it was not long before the Gauls, ever reſtleſs under a foreign yoke, raiſed up a new revolt, and obliged him to return thither. His fear leſt Pompey ſhould gain the affections of the Roman people, had obliged him to ſtrip the Gauls of their gold and ſilver, to bribe them over to his intereſt; and this gave no ſmall handle to thoſe frequent revolts which happened during his abſence. He quickly, however, reduced the Nervii, Aduatici, Menapii, and Treviri; the laſt of whom had raiſed the revolt, under the command of Ambiorix: but he found the flame ſpread much farther, even to the greateſt part of the Gauls, who had choſen Vercingetorix their generaliſſimo. Cæſar was forced to leave Inſubria, whither he had retired to watch the motions of Pompey, and, in the midſt of winter and ſnow, to repaſs the Alps, into the province of Narbonne. Here he gathered his ſcattered troops with all poſſible ſpeed; and, in ſpite of the hard weather, beſieged and took Noviodunum, now Noyons; and defeated Vercingetorix, who was come to the relief of that place. He next took the city of Avaricum, now Bourges, one of the ſtrongeſt in Gaul, and which had a garriſon of forty thouſand men; of whom he made ſuch a dreadful ſlaughter, that hardly eight hundred eſcaped. Whilſt he was beſieging Gergovia, the capital of the Arverni, he was informed that the Nitiobriges, or Agenois, were in arms; and that the Ædui were ſending to Vercingetorix ten thouſand men, which they were to have ſent to reinforce Cæſar. Upon this news, he left Fabius to carry on the ſiege, and marched againſt the Ædui. Theſe, upon his approach, ſubmitted, in appearance, and were pardoned; but ſoon after that whole nation roſe up in arms, and murdered all the Italian troops in their capital. Cæſar, at this, was in great ſtraits what meaſures to take; but reſolved at length to raiſe the ſiege of Gergovia, and at once attack the enemy's camp, which he did with ſome ſucceſs: but when he thought to have gone to Noviodunum, or Noyons, where his baggage, military cheſt, &c. were left, he heard that the Ædui had carried it off, and burnt the place. Labienus, juſtly thinking that Cæſar would want his aſſiſtance in the condition he now was, went to join him, and in his way defeated a Gauliſh general, named *Camulogeno*, who came to oppoſe his march: but this did not hinder the revolt from ſpreading itſelf all over Celtic Gaul, whither Vercingetorix had ſent for freſh ſuppies, and, in the mean time, attacked Cæſar; but was defeated, and forced to retire to Aleſia, a ſtrong place, now Aliſe in Burgundy, as is ſuppoſed. Hither Cæſar haſtened, and beſieged him; and, having drawn a double circumvallation, with a deſign to ſtarve him in it, as he was likely to have done, upon that account refuſed all offers of a ſurrender from him. At length, the long-expected reinforcement came, conſiſting of one hundred and ſixty thouſand men, under four generals: theſe made ſeveral fruitleſs attacks on Cæſar's trenches; but were defeated in three ſeveral battles, which at length obliged Vercingetorix to ſurrender at diſcretion. Cæſar uſed all his priſoners with great ſeverity, except the Ædui and Arverni, by whoſe means he hoped to gain their nations, which were the moſt potent of Celtic Gaul: nor was he diſappointed; for both of them ſubmitted to him, and the former received him into their capital, where he ſpent the winter, after he had put his army into winter-quarters. This campaign, as it proved one of the hardeſt he ever had, ſo he gained more glory by it than any Roman general had done before: yet could not all by this procure from the ſervile ſenate, now wholly dedicated to his rival, a prolongation of his proconſulſhip; upon which he is reported to have laid his hand upon his ſword, and ſaid, that that ſhould do it.

10 They are again ſubdued.

He was good as his word; and the Gauls, upon their former ill ſucceſs, reſolving to have as many ſeparate armies as provinces, in order to embarraſs him the more, Cæſar, and his generals Labienus and Fabius, were forced to fight them one after another; which they did, however, with ſuch ſucceſs, that, notwithſtanding the hardneſs of the ſeaſon, they ſubdued the Bituriges, Carnuti, Rhemi, and Bellovaci, with their general Correus, by which he at once quieted all the Belgic provinces bordering on Celtic Gaul. The next who followed were the Treviri, the Eburones, and the Andes, under their general Dunmarus. The laſt place which held out againſt him was Uxellodunum; which was defended by the two laſt acting generals of the Gauls, Drapes the Senonian, and Luterius the Cadurcean. The place being ſtrong, and well garriſoned, Cæſar was obliged to march thither, from the fartheſt part of Belgic Gaul; and ſoon after reduced it, for want of water. Here again he cauſed the right-hands of all that were fit to bear arms to be cut off, to deter the reſt from revolting afreſh. Thus was the conqueſt of Gaul finiſhed from the Alps and Pyrenees to the Rhine, all which vaſt tract was now reduced to a Roman province under the government of a prætor. During his ſeveral expeditions into Gaul, Cæſar is ſaid to have taken 800 cities; to have ſubdued 300 different nations; and to have defeated, in ſeveral battles, three millions of men, of whom one million were killed, and another taken priſoners.—The hiſtory of the country, from the time of its conqueſt by the Romans to the preſent, is given under the articles Rome and France.

11 Gaul reduced to a Roman province.

12 Character, &c. of the ancient Gauls.

The Gauls anciently were divided into a great number of different nations, which were continually at war with one another, and at variance among themſelves. Cæſar tells us, that not only all their cities, cantons, and diſtricts, but even almoſt all families, were divided and torn by factions; and thus undoubtedly facilitated the conqueſt of the whole. The general character of all theſe people was an exceſſive ferocity and love of liberty. This laſt they carried to ſuch an extreme, that either on the appearance of ſervitude, or incapacity of action through old age, wounds, or chronic diſeaſes, they put an end to their own lives, or prevailed upon their friends to kill them. In cities, when they found themſelves ſo ſtraitly beſieged that they could hold out no longer, inſtead of thinking how to obtain honourable terms of capitulation, their chief care very often was to put their wives and children to death, and then to kill one another, to avoid being led into ſlavery. This exceſſive love of liberty and contempt of death, according to Strabo, very much facilitated their conqueſt by Cæſar; for pouring their numerous forces upon ſuch an experienced enemy as Cæſar, their want of conduct very ſoon proved the ruin of the whole.

The chief diverſion of the Gauls was hunting; and indeed, conſidering the vaſt foreſts with which their country abounded, and the multitude of wild beaſts which lodged in them, they were under an abſolute neceſſity to hunt and deſtroy them, to prevent the country from being rendered totally uninhabitable. Beſides this, however, they had alſo their hippodromes, horſe and chariot races, tilts and tournaments; at all of which the bards aſſiſted with their poems, ſongs, and muſical inſtruments.—For an account of their religion, ſee the article Druid.

The Gauls were exceſſively fond of feaſting, in which they were very profuſe; as, like all other northern nations, they were great lovers of good eating and drinking. Their chief liquors were beer and wine. Their tables were very low. They eat but little bread, which was baked flat and hard, and eaſily broken in pieces: but devoured a great deal of fleſh, boiled, roaſted, or broiled; and this they did in a very ſlovenly manner, holding the piece in their hands, and tearing it with their teeth. What they could not part by this way, they cut with a little knife which hung at their girdle. When the company was numerous, the *Coryphee*, or chief of the feaſt, who was either one of the richeſt, or nobleſt, or braveſt, ſat in the middle, with the maſter of the houſe by his ſide; the reſt took their places next according to their rank, having their ſervants holding their ſhields behind them. Theſe feaſts ſeldom ended without bloodſhed; but if by chance the feaſt proved a peaceable one, it was generally accompanied not only with muſic and ſongs, but likewiſe with dances, in which the dancers were armed cap-a-pee, and beat time with their ſwords upon their ſhields. On certain feſtivals they were wont to dreſs themſelves in the ſkins of beaſts, and in that attire accompany the proceſſions in honour of their deities or heroes. Others dreſſed themſelves in maſquerade habits, ſome of them very indecent, and played ſeveral antic and immodeſt tricks. This laſt cuſtom continued long after their converſion to Chriſtianity.

GAUNT-BELLIED, in the manege, is ſaid of a horſe whoſe belly ſhrinks up towards his flanks.

GAUNTLOPE, pronounced *gauntlet*, a military puniſhment for felony, or ſome other heinous offence.

In veſſels of war, it is executed in the following manner. The whole ſhip's crew is diſpoſed in two rows, ſtanding face to face, on both ſides of the deck, ſo as to form a lane whereby to go *forward* on one ſide, and return *aſt* on the other; each perſon being furniſhed with a ſmall twiſted cord, called a *knittle*, having two or three knots upon it. The delinquent is then ſtripped naked above the waiſt, and ordered to paſs forward between the two rows of men, and aſt on the other ſide, a certain number of times, rarely exceeding three; during which every perſon gives him a ſtripe as he runs along. In his paſſage through this painful ordeal, he is ſometimes tripped up, and very ſeverely handled while incapable of proceeding. This puniſhment, which is called *running the gauntlet*, is ſeldom inflicted, except for ſuch crimes as will naturally excite a general antipathy among the ſeamen; as, on ſome occaſions, the culprit would paſs without receiving a ſingle blow, particularly in caſes of mutiny and ſedition, to the puniſhment of which our ſailors ſeem to have a conſtitutional averſion.

In the land-ſervice, when a ſoldier is ſentenced to run the gauntlope, the regiment is drawn out in two ranks facing each other; each ſoldier, having a ſwitch in his hand, laſhes the criminal as he runs along naked from the waiſt upwards. While he runs, the drums beat at each end of the ranks. Sometimes he runs three, five, or ſeven times, according to the nature of the offence. The major is on horſeback, and takes care that each ſoldier does his duty.

Gavotta ‖ Gay.

GAVOTTA, or GAVOTTE, is a kind of dance, the air of which has two briſk and lively ſtrains in common time, each of which ſtrains is twice played over. The firſt has uſually four or eight bars; and the ſecond contains eight, twelve, or more. The firſt begins with a minim, or two crotchets, or notes of equal value, and the hand riſing; and ends with the fall of the hand upon the dominant or mediant of the mode, but never upon the final, unleſs it be a rondeau: and the laſt begins with the riſe of the hand, and ends with the fall upon the final of the mode.

Tempi di GAVOTTA, is when only the time or movement of a gavotte is imitated, without any regard to the meaſure, or number of bars or ſtrains.—Little airs are often found in ſonatas, which have this phraſe to regulate their motions.

GAUZE, or GAWSE, in commerce, a very ſlight, thin, open kind of ſtuff, made of ſilk, ſometimes of thread. There are alſo figured gauzes, and ſome with gold or ſilver on ſilk ground.

Gay.

GAY (John), a celebrated Engliſh poet, deſcended from an ancient family in Devonſhire, was born at Exeter, and received his education at the free ſchool of Barnſtaple in that county, under the care of Mr. William Rayner.—He was bred a mercer in the Strand; but having a ſmall fortune, independent of buſineſs, and conſidering the attendance on a ſhop as a degradation of thoſe talents which he found himſelf poſſeſſed of, he quitted that occupation, and applied himſelf to other views, and to the indulgence of his inclination for the muſes. In 1712 we find him ſecretary, or rather domeſtic ſteward, to the ducheſs of Monmouth, in which ſtation he continued till the beginning of the year 1714; at which time he accompanied the earl of Clarendon to Hanover, whither that nobleman was diſpatched by queen Anne. In the latter end of the ſame year, in conſequence of the queen's death, he returned to England, where he lived in the higheſt eſtimation and intimacy of friendſhip with many perſons of the firſt diſtinction both in rank and abilities.—He was even particularly taken notice of by queen Caroline, then princeſs of Wales, to whom he had the honour of reading in manuſcript his tragedy of the *Captives;* and in 1726 dedicated his *Fables*, by permiſſion, to the duke of Cumberland.—From this countenance ſhewn to him, and numberleſs promiſes made him of preferment, it was reaſonable to ſuppoſe, that he would have been genteelly provided for in ſome office ſuitable to his inclination and abilities. Inſtead of which, in 1727, he was offered the place of gentleman-uſher to one of the youngeſt princeſſes; an office which, as he looked on it as rather an indignity to a man whoſe talents might have been ſo much better employed, he thought proper to refuſe; and ſome pretty warm remonſtrances were made on the occaſion by his ſincere friends and zealous patrons the duke and ducheſs of Queenſberry, which terminated in thoſe two noble perſonages withdrawing from court in diſguſt. Mr Gay's dependencies on the promiſes of the great, and the diſappointments he met with, he has figuratively deſcribed in his fable of the *Hare with many friends*. However, the very extraordinary ſucceſs he met with from public encouragement made an ample amends, both with reſpect to ſatisfaction and emolument, for thoſe private diſappointments.—For, in the ſeaſon of 1727-8, appeared his *Beggar's Opera*; the vaſt ſucceſs of which was not only unprecedented, but almoſt incredible.—It had an uninterrupted run in London of ſixty-three nights in the firſt ſeaſon, and was renewed in the enſuing one with equal approbation. It ſpread into all the great towns of England; was played in many places to the thirtieth and fortieth time, and at Bath and Briſtol fifty; made its progreſs into Wales, Scotland, and Ireland, in which laſt place it was acted for twenty-four ſucceſſive nights; and laſt of all it was performed at Minorca. Nor was the fame of it confined to the reading and repreſentation alone, for the card-table and drawing-room ſhared with the theatre and cloſet in this reſpect; the ladies carried about the favourite ſongs of it engraven upon their fan-mounts, and ſcreens and other pieces of furniture were decorated with the ſame. In ſhort, the ſatire of this piece was ſo ſtriking, ſo apparent, and ſo perfectly adapted to the taſte of all degrees of people, that it overthrew the Italian opera, that Dagon of the nobility and gentry, which had ſo long ſeduced them to idolatry, and which Dennis, by the labours and outcries of a whole life, and many other writers by the force of reaſon and reflection, had in vain endeavoured to drive from the throne of public taſte. The profits of this piece was ſo very great, both to the author and Mr Rich the manager, that it gave riſe to a quibble, which became frequent in the mouths of many, viz. *That it had made* Rich gay, *and* Gay rich; and it has been aſſerted, that the author's own advantages from it were not leſs than two thouſand pounds. In conſequence of this ſucceſs, Mr Gay was induced to write a ſecond part to it, which he entitled *Polly*. But the diſguſt ſubſiſting between him and the Court, together with the miſrepreſentations made of him as having been the author of ſome diſaffected libels and ſeditious pamphlets, occaſioned a prohibition and ſuppreſſion of it to be ſent from the lord chamberlain, at the very time when every thing was in readineſs for the rehearſal of it. A very conſiderable ſum, however, accrued to him from the publication of it afterwards in quarto.—Mr Gay wrote ſeveral other pieces in the dramatic way, and many very valuable ones in verſe. Among the latter, his *Trivia*, or the *Art of walking the ſtreets of London*, though his firſt poetical attempt, is far from being the leaſt conſiderable, and is what recommended him to the eſteem and friendſhip of Mr Pope: but, as among his dramatic works his *Beggar's Opera* did at firſt, and perhaps ever will, ſtand as an unrivalled maſter-piece, ſo, among his poetical works, his *Fables* hold the ſame rank of eſtimation, the latter having been almoſt as univerſally read as the former was repreſented, and both equally admired. Mr Gay's diſpoſition was ſweet and affable, his temper generous, and his converſation agreeable and entertaining. But he had one foible, too frequently incident to men of great literary abilities, and which ſubjected him at times to inconveniencies which otherwiſe he needed not to have experienced, viz. an exceſs of indolence, without any knowledge of œconomy. So that, though his emoluments were, at ſome periods of his life, very conſiderable, he was at others greatly ſtraitened in his circumſtances; nor could he prevail on himſelf to follow the advice of his friend dean Swift, whom we find in many of his letters endeavouring to perſuade him to the purchaſing of an annuity, as a reſerve for the exigencies that might attend on old age.—Mr Gay choſe rather to throw himſelf on patronage, than ſecure to himſelf an independent competency by the means pointed out to him; ſo that, after having undergone maay viciſſitudes of fortune, and being for ſome time chiefly ſupported by the liberality of the duke and ducheſs of Queenſberry, he died at their houſe in Burlington-gardens, in December 1732. He was interred in Weſtminſter-abbey, and a monument erected to his memory, at the expence of his aforementioned noble benefactors, with an inſcription expreſſive of their regards and his own deſerts, and an epitaph in verſe by Mr Pope.

GAZA (Theodore), a famous Greek in the 15th century, was born in 1398. His country being invaded by the Turks, he retired into Italy; where he at firſt ſupported himſelf by tranſcribing ancient authors, an employment the learned had frequent recourſe to before the invention of printing. His uncommon parts and learning ſoon recommended him to public notice; and particularly to cardinal Beſſarion, who procured him a benefice in Calabria. He was one of thoſe to whom the revival of polite literature in Italy was principally owing. He tranſlated from the Greek into Latin, Ariſtotle's Hiſtory of Animals, Theophraſtus on Plants, and Hippocrates's Aphoriſms; and put into Greek, Scipio's Dream, and Cicero's Treatiſe on Old Age. He wrote ſeveral other works in Greek and Latin; and died at Rome, in 1475.

GAZA, (anc. geog.) a principal city, and one of the five ſatrapies of the Philiſtines. It was ſituated about 100 ſtadia from the Mediterranean, on an artificial mount, and ſtrongly walled round. It was deſtroyed by Alexander the Great, and afterwards by Antiochus. In the time of the Maccabees it was a ſtrong and flouriſhing city; but was deſtroyed a third time by Alexander Jannæus. At preſent it has a miſerable appearance. The buildings are mean, both as to the form and matter. Some remains of its ancient grandeur appear in the handſome pillars of Parian marble which ſupport ſome of the roofs; while others are diſpoſed of here and there, in different parts of almoſt every beggarly cottage. On the top of the hill, at the north-eaſt corner of the town, are the ruins of large arches ſunk low into the earth, and other foundations of a ſtately building, from whence ſome of the baſhaws have carried off marble pillars of an incredible ſize. The caſtle is a contemptible ſtructure, and the port is ruined. E. Long. 34. 55. N. Lat. 31. 28.

GAZE-HOUND, or *Gaſt-hound*, one that makes more uſe of his ſight than of his noſe. Such dogs are much uſed in the north of England: they are fitter in an open champaign country, than in buſhy and woody places. If at any time a well-taught gaze-hound takes a wrong way, he will return upon a ſignal and begin the chace afreſh. He is alſo excellent at ſpying out the fatteſt of a herd; and having ſeparated it from the reſt, will never give over the purſuit till he has worried it to death.

GAZELLA, in zoology, a ſpecies of CAPRA.

GAZETTE, a newſpaper, or printed account of the tranſactions of all the countries in the known world, in a looſe ſheet or half-ſheet. This name is with us confined to that paper of news publiſhed by authority. The word is derived from *gazetta*, a Venetian coin, which was the uſual price of the firſt news-paper printed there, and which was afterwards given to the paper itſelf.

The firſt gazette in England was publiſhed at Oxford, the court being there, in a folio half-ſheet, Nov. 7, 1665. On the removal of the court to London, the title was changed to the *London Gazette*. The Oxford gazette was publiſhed on Tueſdays, the London on Saturdays; and theſe have continued to be the days of publication ever ſince.

GAZNA, a city of Aſia, once much celebrated, and the capital of a very extenſive empire; but which is now either entirely ruined, or become of ſo little conſideration, that it is not taken notice of in our books of geography.—This city was anciently an empory and fortreſs of Sableſtan, not far from the confines of India. During the vaſt and rapid conqueſts of the Arabs, all this country had been reduced under their ſubjection. On the decline of the power of the khalifs, however, the vaſt empire eſtabliſhed by Mahomet and his ſucceſſors was divided into a number of independent principalities, moſt of which were but of ſhort duration. In the year of the Hegira 384, anſwering to the 994th of the Chriſtian æra, the city of Gazna, with ſome part of the adjacent country, was governed by Mahmud Gazni; who became a great conqueror, and reduced under his ſubjection a conſiderable part of India, and moſt of Perſia.

This empire continued in the family of Mahmud Gazni for upwards of 200 years. None of his ſucceſſors, however, were poſſeſſed of his abilities; and therefore the extent of the empire, inſtead of increaſing, was very conſiderably diminiſhed ſoon after Mahmud's death. The Seljuks made themſelves maſters of Khoraſan, and could not be driven out; the greateſt part of the Perſian dominions alſo fell off; and in the 547th year of the Hegira, the race of Gazni ſultans were entirely ſet aſide by one Gauri, who conquered Khoſru Shah the reigning prince, and beſtowed his dominions on his own nephew Gayathoddin Mohammed. Theſe new ſoltans proved greater conquerors than the former, and extended their dominions farther than even Mahmud Gazni himſelf had done. They did not, however, long enjoy the ſovereignty of Gazna; for in 1218, Jenghiz Khan, having conquered the greateſt part of China and almoſt all Tartary, began to turn his arms weſtward; and ſet out againſt the ſultan of Gazna at the head of 700,000 men.

To oppoſe this formidable army, Mohammed, the reigning ſoltan, could muſter only 400,000 men; and, in the firſt battle, 160,000 of his troops are ſaid to have periſhed. After this victory, Jenghiz Khan advanced; Mohammed not daring to riſk a ſecond battle, the loſs of which would have been attended with the entire ruin of his kingdom. He therefore diſtributed his army among the ſtrongeſt fortified towns he had in his dominions; all of which Jenghiz Khan took one after another. The rapid progreſs of his conqueſts, indeed, almoſt exceeds belief. In 1219 and 1220, he had reduced Zarnuk, Nur, Bokhara, Otrar, Saganak, Uzkant, Alſhaſh, Jund, Tonkat, Khojend, and Samarcand.—Mohammed, in the mean time, fled firſt to Bokhara; but on the approach of Jenghiz Khan's army, quitted that place, and fled to Samarcand. When this laſt city was alſo in danger of being inveſted, the ſoltan did not think proper to truſt himſelf in it more than in the other, though it was garriſoned by 110,000 of his braveſt troops; and therefore fled through by-ways into the province of Ghilan in Perſia, where he took refuge in a ſtrong fortreſs called *Eſtabad*. But being alſo found out in this retreat, he fled to an iſland in the Caſpian ſea called *Abiſkun*; where he ended his days, leaving his empire, ſuch as it was, to his ſon Jaloloddin.

The new ſoltan was a man of great bravery and experience in war; but nothing was able to ſtop the progreſs of the Moguls. In 1220 and 1221, they made themſelves maſters of all the kingdoms of Karazm and Khoraſan, committing every where ſuch maſſacres as were never heard of before or ſince that time. In the mean time Jaloloddin aſſembled his forces with the utmoſt diligence, and defeated two detachments of the Mogul army. This happened while Jenghiz Khan was beſieging Bamiyan; but anſwered little other purpoſe, than ſerving to bring upon that city the terrible deſtruction, of which an account is given under the article BAMIYAN. Immediately after the reduction of that city, Jenghiz Khan marched towards Gazna; which was very ſtrongly fortified, and where he expected to have found Jaloloddin. But he had left the place 15 days before; and, as Jenghiz Khan's army was much reduced, he might perhaps have ſtood his ground, had it not been for an accident. He had been lately joined by three Turkiſh commanders, each of whom had a body of 10,000 men under his command. After his victories over the Moguls, theſe officers demanded the greateſt ſhare of the ſpoils; which being refuſed, they ſeparated themſelves from the ſoltan. He uſed his utmoſt endeavours to make them hearken to reaſon; and ſent ſeveral meſſages and letters to them, repreſenting the inevitable ruin which muſt attend their ſeparation, as Jenghiz Khan was advancing againſt them with his whole army. At laſt they were perſuaded to lay aſide their animoſities: but it was now too late; for Jenghiz Khan, being informed of what paſſed, detached 60,000 horſe to prevent their joining the ſoltan's army; who finding himſelf deprived of this powerful aid, retired towards the river Indus. When he was arrived there, he ſtopped in a place where the ſtream was moſt rapid and the place confined, with a view both to prevent his ſoldiers from placing any hopes of ſafety in flight, and to hinder the whole Mogul army from attacking him at once. Ever ſince his departure from Gazna he had been tormented with a colic: yet, at a time when he ſuffered moſt, hearing that the enemy's vanguard was arrived at a place in the neighbourhood called *Herder*, he quitted his litter, and, mounting a horſe, marched with ſome of his choſen ſoldiers in the night; ſurpriſed the Moguls in their camp; and having cut them almoſt all in pieces, without the loſs of a ſingle man on his ſide, returned with a conſiderable booty.

Jengziz Khan, finding by this that he had a vigilant enemy to deal with, proceeded with great circumſpection. When he came near the Indus, he drew out his army in battalia: to Jagatay, one of his ſons, he gave the command of the right wing; to Oktay, another ſon, he gave the command of the left; and put himſelf in the centre, with 6000 of his guards. On the other ſide, Jaloloddin prepared for battle like one who had no reſource but in victory. He firſt ſent the boats on the Indus farther off; reſerving only one to carry over his mother, wife, and children: but unluckily the boat ſplit when they were going to embark, ſo that they were forced to remain in the camp. The ſoltan took to himſelf the command of the main body of the army. His left wing, drawn up under ſhelter of a mountain which hindered the whole right wing of the Moguls from engaging at once, was commanded by his vizir; and his right by a lord named *Amin Malek*. This lord began the fight; and forced the enemy's left wing, notwithſtanding the great diſparity of numbers, to give ground. The right wing of the Moguls likewiſe wanting room to extend itſelf, the ſoltan made uſe of his left as a body of reſerve, detaching from thence ſome ſquadrons to the aſſiſtance of the troops who ſtood in need of them. He alſo took one part of them with him when he went at the head of his main body to charge that of Jenghiz Khan; which he did with ſo much reſolution and vigour, that he not only put it in diſorder, but penetrated into the place where Jenghiz Khan had originally taken his ſtation: but that prince, having had a horſe killed under him, was retired from thence, to give orders for all the troops to engage.

This diſadvantage had like to have loſt the Moguls the battle; for a report being immediately ſpread that the enemy had broken through the main body, the troops were ſo much diſcouraged, that they would certainly have fled, had not Jenghiz Khan encouraged them by riding from place to place in order to ſhew himſelf. At laſt, however, Jaloloddin's men, who were in all but 30,000, having fought a whole day with ten times their number, were ſeized with fear, and fled. One part of them retired to the rocks which were on the ſhore of Indus, where the enemy's horſe could not follow them; others threw themſelves into the river, where many were drowned, though ſome had the good fortune to croſs over in ſafety; while the reſt, ſurrounding their prince, continued the fight through deſpair. The ſoltan, however, conſidering that he had ſcarce 7000 men left, began to think of providing for his own ſafety: therefore, having bidden a final adieu to his mother, wife and children, he mounted a freſh horſe, and ſpurred him into the river, which he croſſed in ſafety, and even ſtopped in the middle of it to inſult Jenghiz Khan, who was now arrived at the bank. His family fell into the hands of the Moguls; who killed all the males, and carried the women into captivity.

Jaloloddin being now ſecurely landed in India, got up into a tree, in order to preſerve himſelf from wild beaſts. Next day, as he walked melancholy among the rocks, he perceived a troop of his ſoldiers, with ſome officers, three of whom proved to be his particular friends. Theſe, at the beginning of the defeat, had found a boat in which they had ſailed all night, with much danger from the rocks, ſhelves, and rapid current of the river. Soon after, he ſaw 300 horſe coming towards him; who informed him of 4000 more that had eſcaped by ſwimming over the river; and theſe alſo ſoon after joined the reſt. In the mean time an officer of his houſehold, named Jamalarrazad, knowing that his maſter and many of his people were eſcaped, ventured to load a very large boat with arms, proviſions, money, and ſtuff to clothe the ſoldiers; with which he croſſed the river. For this important ſervice Jaloloddin made him ſteward of his houſehold, and ſurnamed him the *Choſen* or the *Glory of the faith*. For ſome time after, the ſultan's affairs ſeemed to go on proſperouſly: he gained ſome battles in India; but the princes of that country, envying his proſperity, conſpired againſt him, and obliged him to repaſs the Indus. Here he again attempted to make head againſt the Moguls; but was at laſt defeated and killed by them, and a final end put to the once mighty empire of Gazna.

The metropolis was reduced by Oktay; who no ſooner entered the country in which it was ſituated, than he committed the moſt horrid cruelties. The city was well provided with all things neceſſary for ſuſtaining a ſiege; had a ſtrong garriſon, and a brave and reſolute governor. The inhabitants, expecting no mercy from Jenghiz Khan, who they knew had ſworn their ruin, were reſolved to make a deſperate defence. They made frequent ſallies on the beſiegers, ſeveral times overthrew their works, and broke above 100 of their battering rams. But one night, after an obſtinate fight, part of the city-walls fell down; and a great number of Moguls having filled up the ditch, entered the city ſword-in-hand. The governor perceiving all was loſt, at the head of his braveſt ſoldiers ruſhed into the thickeſt of his enemies, where he and his followers were all ſlain. However, Gazna was not entirely deſtroyed, nor were the people all killed; for after the maſſacre had continued four or five hours, Oktay ordered it to ceaſe, and taxed thoſe who were left alive at a certain rate, in order to redeem themſelves and the city. It doth not, however, appear that after this time the city of Gazna ever made any conſiderable figure.—It was taken by the Moguls in the year 1222.

GECCO, in natural hiſtory, a name given by the Indians to their terrible poiſon, which kills when mixed with the blood in ever ſuch a ſmall quantity. They ſay that this gecco is a venomous froth or humour vomited out of the mouths of their moſt poiſonous ſerpents; which they procure in this fatal ſtrength, by hanging up the creatures by the tails, and whipping them to enrage them: they collect this in proper veſſels as it falls; and when they would uſe it, they either poiſon a weapon with it, or wounding any part of the fleſh introduce the ſmalleſt quantity imaginable into it; and this is ſaid to be immediate death.

GECKO. See LACERTA.

GEDDES (James), born of a reſpectable family in Scotland in 1710, was educated for and practiſed at the bar ſeveral years; but died of a conſumption before he arrived at the age of 40. He publiſhed *An eſſay on the compoſition and manner of writing of the ancients*; and left behind him ſeveral other tracts.

GELATINA, JELLY, a form of food, or medicine, prepared from the juices of ripe fruits, boiled to proper conſiſtence with ſugar, or of the ſtrong decoctions of the horns, bones, or extremities of animals boiled to ſuch a degree as to be ſtiff and firm when cold, without the addition of ſugar.

The jellies of fruits are cooling, ſaponaceous, and aceſcent; and therefore are good as medicines in all diſorders of the primæ viæ ariſing from alkaleſcent juices, eſpecially when not given alone, but diluted with water. On the contrary, the jellies made from animal-ſubſtances are all alkaleſcent, and are therefore good in all caſes where an acidity of the humours prevails: the alkaleſcent quality of theſe, however, is in a great meaſure taken off by adding lemon-juice and ſugar to them. There were formerly a kind of jellies much in uſe, called *compound jellies*; theſe had the reſtorative medicinal drugs added to them, but they are now ſcarce ever heard off.

GELATINA *Avenæ*, *Oat-jelly*; a jelly of common oats, recommended by many of the German phyſicians in all hectic diſorders, to be taken with broth of ſnails and craw-fiſh.—It is made by boiling a large quantity of oats, freed from the huſk, with ſome hartſhorn ſhavings and currants, together with a leg of veal cut in pieces, and with the bones all broken: theſe are to be ſet over the fire with a large quantity of water, till the whole is reduced to a kind of jelly; which when ſtrained and cold will be very firm and hard. A few ſpoonfuls of this are to be taken every morning, diluted with a baſin of either of the abovementioned broths, or any other warm liquor.

GELD, in the Engliſh old cuſtoms, a Saxon word ſignifying *money*, or *tribute*. It alſo denoted a compenſation for ſome crime committed: Hence *wergeld*, in their ancient laws, was uſed for the value of a man ſlain; and *orfgeld*, of a beaſt.

GELDENHAUR (Gerard), in Latin *Geldenharius*, an hiſtorian and Proteſtant divine in the 16th century. He was a native of Nimeguen, and ſtudied claſſical learning at Deventer. He went through his courſe of philoſophy at Louvaine, where he contracted a very ſtrict friendſhip with ſeveral learned men, and particularly with Eraſmus. He became reader and hiſtorian to Charles of Auſtria, and afterwards to Maximilian of Burgundy. At length he embraced the Proteſtant religion; taught hiſtory at Marpurg; and afterwards divinity till his death, in 1542. He wrote, 1. Hiſtory of Holland. 2. Hiſtory of the Low Countries; 3. Hiſtory of the biſhops of Utrecht; and other works.

GELDERLAND. See GUELDERLAND.

GELDERS. See GUELDRES.

GELDING, the operation of caſtrating any animal, particularly horſes.

The operation conſiſts in cutting out the teſticles; in performing which, three things are to be obſerved: firſt, regard is to be had to their age; next to the ſeaſon of the year; and laſtly to the ſtate of the moon. For the firſt, if the operation is to be performed on a colt, he may be gelded at nine or fifteen days old, if the teſticles be come down; in regard the ſooner he is gelt the better it will be for his growth, ſhape, and courage; though a horſe may be gelt at any age, if proper care is taken in the cure. As for the ſecond, the beſt time is about April or May, or elſe about the latter end of September. And for the third, the wane of the moon is the moſt proper time for performing this operation.

The manner of gelding is as follows. The beaſt be-

being caſt down on ſome ſoft place, the operator takes the ſtones between his foremoſt and his great finger, and ſlitting the cod preſſes the ſtones forth; then taking a pair of nippers made very ſmooth, either of ſteel, box, or braſil-wood, he claps the ſtrings of the ſtones between them, very near to where the ſtones are ſet on, and preſſes them ſo hard that there may be no flux of blood; then with a thin, drawing, cauteriſing iron, ſears away the ſtone. This done, he takes a hard plaſter made of roſin, wax, and waſhed turpentine, well diſſolved together, and melts it on the head of the ſtrings: he then ſears them, and melts more of the ſalve, till ſuch time as he has laid a good thickneſs of it upon the ſtrings.

When this is done to one ſtone, the nippers are looſened, and the like is done to the other; and the two ſlits of the cod are then filled with white ſalt, and the outſide of the cod is anointed with hog's greaſe: and thus they let him riſe, and keep him in a warm ſtable, without tying him up. If he ſwells much in his cods or ſheath, they chaſe him up and down, and make him trot for an hour in a day, which ſoon recovers him.

The manner of gelding a hog is as follows: The operator, after having made two croſs ſlits or inciſions on the midſt of the ſtones, preſſes them out, and anoints the ſore with tar. But another general method, yet ſomewhat more dangerous if not well done, is, firſt to cut the ſtone on the top, and after having drawn that one forth, the operator puts in his fingers at the ſame ſlit, and with a lancet cuts the ſkin between the two ſtones, and by that ſlit preſſes out the other ſtone. Then having cleanſed out the blood, he anoints the part with freſh greaſe: and thus there is but one inciſion made in the cod. Boar-pigs ought to be gelt about ſix months old; yet they are commonly gelded about three weeks or a month old.

GELENHAUSEN, a ſmall imperial town of Wetteravia in Germany, with a caſtle built by the emperor Frederic I. E. Long. 8. 13. N. Lat. 50. 20.

GELENIUS (Sigiſmund), a learned and excellent man, born of a good family at Prague, about the year 1498. Eraſmus conceiving an eſteem for him at Baſil, recommended him to John Frobenius as a corrector for his printing-houſe; which laborious charge he accepted, and had a great number of Hebrew, Greek, and Latin books to correct: he alſo tranſlated many works himſelf from the Greek into Latin; and publiſhed a dictionary in four languages, Greek, Latin, German, and Sclavonian. Profitable and honourable employments were offered him in other places, but nothing could tempt him to quit his peaceful ſituation at Baſil. He died in 1555. All his tranſlations are highly eſteemed.

GELLERT (Chriſtian), one of the fineſt geniuſes Germany has produced, was born at Hænichen, near Freyburg in Saxony in 1715; and ſtudied at Leipſic, at which univerſity he was for many years profeſſor of philoſophy and the belles lettres. He early diſtinguiſhed himſelf by his talent for poetry; and contracted a ſtrict friendſhip with the moſt learned and polite writers in Germany. All his works are filled with ſentiment, and bear the impreſſion of the ſweetneſs of his diſpoſition. The moſt conſiderable of them are his comedies, his ſpiritual ſongs and moral poems, and particularly his ſacred odes, his fables, and his tales. He died in 1769, much lamented.

GELLI (John Baptiſt), an eminent Italian writer, was born of mean parents at Florence, in the year 1498. He was bred a taylor: but had ſuch an extraordinary genius, that he acquired ſeveral languages, and made an uncommon progreſs in the belles lettres; and though he continued always to work at his trade, became acquainted with all the wits and learned men at Florence, and his merit was univerſally known. He was choſen a member of the academy there, and the city made him a burgeſs. He acquired the higheſt reputation by his works, which are, 1. *I. Capricci del Bottaio*, quarto; which contains ten dialogues. 2. *La Circe*, octavo: This, which alſo contains ten dialogues, and treats of human nature, has been tranſlated into Latin, French, and Engliſh. 3. Diſſertations in Italian on the poems of Dante and Petrarch. 4. The comedies of *La Sporta* and *La Errore*; and other works. He died in 1563.

GELLIBRAND (Henry), a laborious aſtronomer of the laſt century, was born in 1597. Though he was not without good views in the church, yet he became ſo enamoured with mathematical ſtudies, that on the death of his father he became a ſtudent at Oxford, contented himſelf with his private patrimony, and devoted himſelf ſolely to them. On the death of Mr Gunter, he was recommended by Mr Briggs to the truſtees of Greſham college, for the aſtronomical profeſſorſhip there; to which he was elected in 1627. His friend Mr Briggs dying in 1630, before he had finiſhed his *Trigonometrica Britannica*, it was finiſhed by Gellibrand at his requeſt. He wrote ſeveral other things, chiefly tending to the improvement of navigation; and died in 1636.

GELLIUS (Aulus), or (as he is ſometimes called) *Agellius*; a celebrated grammarian, who lived in the 2d century under Marcus Aurelius and ſome ſucceeding emperors. He wrote a collection of obſervations on authors, for the uſe of his children; and called it *Noctes Atticæ*, becauſe compoſed in the evenings of a winter he ſpent at Athens. The chief value of it, is for preſerving many facts and monuments of antiquity not to be found elſewhere. Critics and grammarians have beſtowed much pains on this writer.

GELLY. See GELATINA.

GEM, in natural hiſtory, a common name for all precious ſtones; of which there are two claſſes, the pellucid and ſemipellucid.

The bodies compoſing the claſs of pellucid gems are bright, elegant, and beautiful foſſils, naturally and eſſentially compound, ever found in ſmall detached maſſes, extremely hard, pellucid, and of great luſtre; compoſed of a very firm and pure matter, without any admixture of earthy ſubſtance; giving fire with ſteel, not fermenting with acid menſtruums, and very difficultly calcinable in the fire. Of this claſs there are two genera; the chroſtaſima, and the chroaſtaces. See CHROSTASIMA and CHROASTACES.

The bodies compoſing the claſs of ſemipellucid gems, are ſtones naturally and eſſentially compound, not inflammable nor ſoluble in water, found in detached maſſes, and compoſed of cryſtalline mater, debaſed by earth: however, they are but ſlightly debaſed, and are of great beauty and brightneſs, of a moderate de-

degree of tranſparency, and are uſually found in ſmall maſſes.

Of this claſs there are two orders: the firſt of which conſiſts of the ſemipellucid gems, of but two variegations, and frequently of one plain ſimple colour; tho' ſometimes veined: this order contains four genera, viz. the ſardæ, the chalcedonies, the hydrophanæ, and the pramnion. See the articles SARDÆ, CHALCEDONII, HYDROPHANÆ, and PRAMNION.

The ſecond order of ſemipellucid gems, conſiſting of thoſe remarkable for their veins, zones, and variegations, contains alſo four genera, viz. the achatæ, the onyches, the ſardonyches, and the camæa. See the articles ACHATÆ, ONYCHES, SARDONYCHES, and CAMÆA.

The knowledge of gems depends principally on obſerving their hardneſs and colour. Their hardneſs is commonly allowed to ſtand in the following order: the diamond the hardeſt of all; then the ruby, ſapphire, jacinth, emerald, amethyſt, garnet, carneol, chalcedony, onyx, jaſper, agate, porphyry, and marble. This difference, however, is not regular and conſtant, but frequently varies. Good cryſtals may be allowed to ſucceed the onyx; but the whole family of metallic glaſſy fluors ſeem to be ſtill ſofter.—In point of colour, the diamond is valued for its tranſparency, the ruby for its purple, the ſapphire for its blue, the emerald for its green, the jacynth for its orange, the amethyſt carneol for its carnation, the onyx for its tawny, the jaſper, agate, and porphyry for their vermilion, green, and variegated colours, and the garnet for its tranſparent blood-red.

All theſe gems are ſometimes found coloured and ſpotted, and ſometimes quite limpid and colourleſs. In this caſe the diamond-cutter or poliſher knows how to diſtinguiſh their different ſpecies by their different degrees of hardneſs upon the mill. For the cutting or poliſhing of gems, the fine powder of the fragments of thoſe that are next in degree of hardneſs is always required to grind away the ſofter; but as none of them are harder than the diamond, this can only be poliſhed by its own powder.

Imitation or Counterfeiting of GEMS *in Glaſs*.—The art of imitating gems in glaſs, is too conſiderable to be paſſed without notice: ſome of the leading compoſitions therein, we ſhall briefly mention upon the authority of Neri.

Theſe gems are made of paſtes; and are noway inferior to the native ſtones, when carefully made and well poliſhed, in brightneſs or tranſparence, but want their hardneſs.

The general rules to be obſerved in making the paſtes are theſe: 1. That all the veſſels in which they are made be firmly luted, and the lute left to dry before they are put into the fire. 2. That ſuch veſſels be choſen for the work, as will bear the fire well. 3. That the powders be prepared on a porphyry ſtone; not in a metal mortar, which would communicate a tinge to them. 4. That the juſt proportion in the quantity of the ſeveral ingredients be nicely obſerved. 5. That the materials be all well mixed; and, if not ſufficiently baked the firſt time, to be committed to the fire again, without breaking the pot: for if this be not obſerved, they will be full of bliſters and air-bladders. 6. That a ſmall vacuity be always left at the top of the pot, to give room to the ſwelling of the ingredients.

To make paſte of extreme hardneſs, and capable of all the colours of the gems, with great luſtre and beauty.—Take of prepared cryſtal, ten pounds; ſalt of polverine, ſix pounds; ſulphur of lead, two pounds; mix all theſe well together into a fine powder; make the whole with common water into a hard paſte; and make this paſte into ſmall cakes of about three ounces weight each, with a hole made in their middle; dry them in the ſun, and afterwards calcine them in the ſtraiteſt part of a potter's furnace. After this, powder them, and levigate them to a perfect fineneſs on a porphyry-ſtone, and ſet this powder in pots in a glaſs-furnace to purify for three days: then caſt the whole into water, and afterwards return it into the furnace, where let it ſtand 15 days, in which time all foulneſs and bliſters will diſappear, and the paſte will greatly reſemble the natural jewels. To give this the colour of the emerald, add to it braſs thrice calcined; for a ſea-green, braſs ſimply calcined to a redneſs; for a ſapphire, add zaffer, with manganeſe; and for a topaz, manganeſe and tartar. All the gems are thus imitated in this, by the ſame way of working as the making of coloured glaſſes; and this is ſo hard, that they very much approach the natural gems.

The colour of all the counterfeit gems made of the ſeveral paſtes, may be made deeper or lighter, according to the work for which the ſtones are deſigned; and it is a neceſſary general rule, that ſmall ſtones for rings, &c. require a deeper colour, and large ones a paler. Beſides the colours made from manganeſe, verdigreaſe, and zaffer, which are the ingredients commonly uſed, there are other very fine ones which care and ſkill may prepare. Very fine red may be made from gold, and one not much inferior to that from iron; a very fine green from braſs or copper; a ſky-colour from ſilver, and a much finer one from the granates of Bohemia.

GEMARA, in Jewiſh antiquities, a collection of deciſions and determinations on the law, written after the Miſna was completed.

It was called *gema*, or *perfection*; becauſe it was conſidered as ſo perfect an explication of the law, that after it no further additions could be made, or any thing more deſired. It is otherwiſe called the *talmud*. See TALMUD.

GEMINI, the TWINS, in aſtronomy, one of the 12 ſigns of the zodiac, the third in order, beginning with Aries. See ASTRONOMY, nº 206.

GEMINIANI, a celebrated muſician and compoſer, was born at Lucca in the year 1680. He received his firſt inſtructions in muſic from Aleſſandro Scarlatti; and after that became a pupil of Carlo Ambroſio Lunati, ſurnamed *Il Gobbo*, a moſt celebrated performer on the violin; after which he became a diſciple of Corelli, and under him finiſhed his ſtudies on that inſtrument. In the year 1714, he came to England; where in a ſhort time he ſo recommended himſelf by his exquiſite performance, that all who profeſſed to love and underſtand muſic, were captivated with hearing him. Many of the nobility laid claim to the honour of being his patrons; but he ſeemed chiefly to attach himſelf to Baron Kilmanſegge, chamberlain to king George I. as elector of Hanover, and a favourite of miniani.

of that prince. In 1716, he publiſhed and dedicated to his patron 12 ſonatas *a violino violone e cembalo*: the firſt ſix with fugues and double ſtops as they are vulgarly called; the laſt with airs of various meaſures, ſuch as allemandes, courants, and jiggs. This publication was ſo well reliſhed by his patron, that he mentioned Geminiani to the king as an excellent performer; in conſequence of which our muſician had the honour to perform before his majeſty, in concert with the celebrated Handel who played on the harpſichord.

But though Geminiani was exceedingly admired, yet he had not a talent at aſſociating muſic with poetry, nor do we find that he ever became a public performer: he was therefore obliged to depend for his ſubſiſtence on the friendſhip of his patrons, and the profits which accrued to him from teaching. He had alſo the misfortune to be an enthuſiaſt in painting; and the verſatility of his temper was ſuch, that, in order to gratify this paſſion, he not only ſuſpended his ſtudies, and neglected to exerciſe his talents, but involved himſelf in debts. In 1727, he was offered the place of maſter and compoſer of the ſtate-muſic in Ireland; but this could not be conferred on a Catholic, and Geminiani refuſed to change his religion: upon which it was given to Matthew Dubourg, a young man who had been one of his pupils, and was a celebrated performer on the violin. Geminiani then ſet himſelf to compoſe parts to the *opera quinta* of Corelli; or, in other words, to make concertos of the firſt ſix of his ſolos. This work he completed, and, with the help of a ſubſcription, at the head of which were the names of the royal family, publiſhed in 1726. In 1732, he publiſhed his *opera ſeconda*, which contains a celebrated minuet that goes by his name. He publiſhed many other pieces, the profits of which did not much mend his circumſtances; but this perhaps was owing to his rambling diſpoſition and enthuſiaſtic fondneſs of painting. He was alſo an utter ſtranger to the buſineſs of an orcheſtra, and had no idea of the labour and pains neceſſary in the inſtruction of fingers for the performance of muſic to which they were ſtrangers. The conſequence of this was, that a *concerto ſpirituale*, which he had advertiſed for his own benefit in 1748, failed in the performance. The audience, however, compaſſionated his diſtreſs, and ſat very ſilent till the books were changed; when the performance was continued with compoſitions of the author's own, and which he executed in ſuch a manner as was never forgot. The profits ariſing from this performance enabled him to take a journey to Paris; where he ſtaid long enough to get plates engraven for a ſcore of ſolos, and the parts of two operas of concertos. About the year 1755 he returned to England, and advertiſed them for ſale.

In 1761, Geminiani went over to Ireland; and was kindly entertained there by Mr Matthew Dubourg, who had been his pupil, and was then maſter of the king's band in Ireland. This perſon through the courſe of his life had ever been diſpoſed to render him friendly offices; and it was but a ſhort time after Geminiani's arrival at Dublin, that he was called upon to do him the laſt. It ſeems that Geminiani had ſpent many years in compiling an elaborate treatiſe on muſic, which he intended for publication; but ſoon after his arrival at Dublin, by the treachery of a female ſervant, who, it was ſaid, was recommended to him for no other end than that ſhe might ſteal it, it was conveyed away, and could not be recovered. The greatneſs of this loſs, and his inability to repair it, made a deep impreſſion on his mind; and, as is conjectured, haſtened his end; at leaſt he ſurvived it but a ſhort time, ending his days on the 17th of September 1762. The following liſt compriſes the whole of his publications, except two or three articles of ſmall account. Twelve ſolos for a violin, *opera prima*; ſix concertos in ſeven parts, *opera ſeconda*; ſix concertos in ſeven parts, *opera terza*; twelve ſolos for a violin, *opera quarta*; ſix ſolos for a violoncello, *opera quinta*; the ſame made into ſolos for a violin; ſix concertos from his *opera quarta*; ſix concertos in eight parts, *opera ſettima*; rules for playing in taſte; a treatiſe on good taſte; the art of playing the violin; 12 ſonatas from his firſt ſolos, *opera undecima*; Ripieno parts to ditto; leſſons for the harpſichord; *Guida Armonica*; ſupplement to ditto; the art of accompaniment, two books; his firſt two operas of concertos in ſcore; and the enchanted foreſt.—Of his ſolos the *opera prima* is eſteemed the beſt. Of his concertos ſome are excellent, others of them ſcarce paſs the bounds of mediocrity. The ſixth of the third opera not only ſurpaſſes all the reſt, but, in the opinion of the beſt judges of harmony, is the fineſt inſtrumental compoſition extant.

Gemma.

GEMMA, or **Bud**, in botany; a compendium or epitome of a plant ſeated upon the ſtem and branches, and covered with ſcales, in order to defend the tender rudiments incloſed from cold and other external injuries, till, their parts being unfolded, they acquire ſtrength, and render any further protection unneceſſary.

Buds, together with bulbs, which are a ſpecies of buds generally ſeated upon or near the root, conſtitute that part of the herb called by Linnæus *hybernacula*; that is, the winter-quarters of the future vegetable: a very proper appellation, as it is during that ſevere ſeaſon that the tender rudiments are protected in the manner juſt mentioned.

Plants, conſidered in analogy to animals, may properly enough be reckoned both viviparous and oviparous. Seeds are the vegetable eggs; buds, living fœtuſes, or infant-plants, which renew the ſpecies as certainly as the ſeed.

Buds are placed at the extremity of the young ſhoots, and along the branches, being fixed by a ſhort foot-ſtalk upon a kind of brackets, the remainder of the leaves, in the wings or angles of which the buds in queſtion were formed the preceding year. They are ſometimes placed ſingle; ſometimes two by two, and thoſe either oppoſite or alternate; ſometimes collected in greater numbers in whirls or rings.

With reſpect to their conſtruction, buds are compoſed of ſeveral parts artificially arranged. Externally, we find a number of ſcales that are pretty hard, frequently armed with hairs, hollowed like a ſpoon, and placed over each other like tiles. Theſe ſcales are fixed into the inner plates of the bark, of which they appear to be a prolongation. Their uſe is to defend the internal parts of the bud; which, being unfolded, will produce, ſome, flowers, leaves, and ſtipulæ; others, footſtalks and ſcales. All theſe parts, while they remain in the bud, are tender, delicate, folded over each other, and covered with a thick clammy juice, which is ſometimes reſinous and odoriferous, as in the tacahamac-tree. This juice ſerves not only to defend the more tender parts of the embryo-plant from cold, the aſſaults of inſects, and other external injuries; but likewiſe from exceſſive perſpiration, which, in its young and infant ſtate, would be very deſtructive. It is conſpicuous in the buds of horſe-cheſnut, poplar and willow trees.

In general, we may diſtinguiſh three kinds of buds; that containing the flower, that containing the leaves, and that containing both flower and leaves.

The firſt, termed *gemma floriſera*, and by the French *bouton a fleur* or *a fruit*, contains the rudiments of one or ſeveral flowers, folded over each other, and ſurrounded with ſcales. In ſeveral trees, this kind of bud is commonly found at the extremity of certain ſmall branches, which are ſhorter, rougher, and leſs garniſhed with leaves, than the reſt. The external ſcales of this ſpecies of bud are harder than the internal; both are furniſhed with hairs, and in general more ſwelled than thoſe of the ſecond ſort. The bud containing the flower too is commonly thicker, ſhorter, almoſt ſquare, leſs uniform, and leſs pointed; being generally terminated obtuſely. It is called by Pliny *oculus gemma;* and is employed in that ſpecies of grafting called *inoculation*, or *budding*.

The ſecond ſpecies of bud, that, viz. containing the leaves, termed *gemma foliiſera*, and by the French *bouton a feuilles* or *a bois*, contains the rudiments of ſeveral leaves, which are variouſly folded over each other, and outwardly ſurrounded by ſcales, from which the ſmall ſtipulæ that are ſeated at the foot of the young branches are chiefly produced. Theſe buds are commonly more pointed than the former ſort. In the hazel-nut, however, they are perfectly round; and in horſe-cheſnut, very thick.

The third ſort of bud is ſmaller than either of the preceding; and produces both flowers and leaves, tho' not always in the ſame manner. Sometimes the flowers and leaves are unfolded at the ſame time. This mode of the flower and leaf bud, is termed by Linnæus *gemma foliiſera & floriſera*. Sometimes the leaves proceed or emerge out of this kind of bud upon a ſmall branch, which afterwards produces flowers. This mode of the flower and leaf bud is termed by Linnæus *gemma foliiſero-floriſera*, and is the moſt common bud of any.

Such buds as produce branches adorned only with leaves, are called *barren*; ſuch as contain both leaves and flowers, *fertile*. From the bulk of the bud we may often, with eaſe, foretel whether it contains leaves only, or leaves and flowers together, as in cherry and pear trees.

Neither the buds produced on or near the root, called by ſome authors *turiones*, nor thoſe produced on the trunk, and from the angles or wings of the leaves, contain, in ſtrict propriety, an entire delineation of the plant; ſince the roots are wanting; and in various buds, as we have ſeen, ſhoots are contained with leaves only, and not with flowers: but as a branch may be conſidered as a part ſimilar to the whole plant, and, if planted, would, in proceſs of revegetation, exhibit or produce roots and flowers, we may in general allow, that the bud contains the whole plant, or the principles of the whole plant, which may be unfolded *ad libitum;* and thus reſembles the ſeed, in containing a delineation of the future plant in embryo: for although the bud wants a radicle, or plumula, of which the ſeed is poſſeſſed, yet it would undoubtedly form one, if planted in the earth. But as the medullary part adhering to the bud is too tender, and by the abundance of juice flowing into it from the earth would be diſpoſed to putrefaction, the buds are not planted in the ſoil, but generally inſerted within the bark of another tree; yet placed ſo that the production of the marrow, or pith, adhering to them, may be inſerted into the pith of the branch in which the fiſſure or cleft is made; by which means there is a large communication of juice. This propagation by gems or buds, called *inoculation*, is commonly practiſxd with the firſt ſort of buds above deſcribed.

From the obvious uſes of the buds, we may collect the reaſon why the ſupreme Author of nature has granted this ſort of protection to moſt of the trees that are natives of cold climates; and, on the other hand, denied it to ſuch as, enjoying a warm benign atmoſphere, have not the tender parts of their embryo-ſhoots expoſed to injuries and depredations from the ſeverities of the weather. Of this latter kind are the plants of the following liſt; ſome of them very large trees; others, ſmaller woody vegetables, of the ſhrub and under-ſhrub kind: Citron, orange, lemon, caſſava, mock orange, blad-apple, ſhrubby ſwallow-wort, alaternus, ſhrubby geraniums, berry-bearing alder, Chriſt's-thorn, Syrian mallow, baobab or Ethiopian ſour-gourd, Juſticia, wild ſena, the acacias and ſenſitive plant, coral-tree, ſtinking bean-trefoil, medicago, oleander, viburnum, ſumach, ivy, tamariſk, heath, Barbadoes cherry, lavatera, rue, ſhrubby night-ſhades, Guinea-henweed, cypreſs, lignum-vitæ, and ſavine a ſpecies of juniper.

On annual plants, whoſe root as well as ſtalk periſhes after a year, true buds are never produced; in their ſtead, however, are protruded ſmall branches, like a little feather, from the wings of the leaves, which wither without any farther expanſion, if the plants climb, and have no lateral branches; but if, either by their own nature, or from abundance of ſap, the plants become branched, the ramuli juſt mentioned obtain an increaſe ſimilar to that of the whole plant.

The ſame appearance obtains in the trees of warm countries, ſuch as thoſe enumerated in the above liſt, in which a plumula, or ſmall feather, ſends forth branches without a ſcaly covering; as, in ſuch countries, this tender part requires no defence or protection from cold. A ſcaly covering then is peculiar to buds, as it protects the tender embryo encloſed from all external injuries. When we therefore ſpeak of trees having buds that are naked or without ſcales, our meaning is the ſame as if we had ſaid that they have no buds at all.

The buds that are to be unfolded the following year, break forth from the evolved buds of the preſent year, in ſuch a manner as to put on the appearance of ſmall eminences in the wings or angles of the leaves. Theſe eminences or knots grow but little during the ſummer; as, in that ſeaſon, the ſap is expended on the increaſe of the parts of the plant: but in autumn, when the leaves begin to wither and fall off, the buds, placed on the wings, increaſe; and the embryo-plant, contained in the bud is ſo expanded, that the leaves and flowers, the parts to be evolved the following year, are diſtinctly viſible. Thus in horſe-cheſnut the leaves, and in cornel-tree the flowers, are each to be obſerved in their reſpective buds.

As each bud contains the rudiments of a plant, and would, if ſeparated from its parent vegetable, become every way ſimilar to it; Linnæus, to ſhew the wonderful fertility of nature, has made a calculation, by which it appears, that, in a trunk ſcarce exceeding a ſpan in breadth, ten thouſand buds (that is, herbs) may be produced. What an' infinite number, then, of plants might be raiſed from a very large tree!

GEMMATIO, from *gemma* "a bud;" a term uſed by Linnæus, expreſſive of the form of the buds, their origin, and their contents. It includes both thoſe properly called *buds*, and thoſe which are ſeated at the roots, ſtyled *bulbs*.

As to the origin of buds, they are formed either of the footſtalks of the leaves, of *ſtipulæ*, or of ſcales of the bark. Their contents have been already diſcovered, in the preceding article, to be either flowers, leaves, or both.

GENDARMES, or GENS D'ARMES, in the French armies, a denomination given to a ſelect body of horſe, on account of their ſucceeding the ancient Gendarmes, who were thus called from their being completely clothed in armour; (ſee *Scots* GENDARMES, *infra*.) Theſe troops are commanded by captain-lieutenants, the king and the princes of the blood being their captains: the king's troop, beſides a captain-lieutenant, has two ſublieutenants, three enſigns, and three guidons.

Grand GENDARMES, at preſent are a troop compoſed of 250 gentlemen; the king himſelf is their captain, and one of the firſt peers their captain-lieutenant, who has under him two lieutenants, three enſigns, three guidons, and other officers.

Small GENDARMERY, are, the Scots Gendarmes, the queen's, the dauphin's, the gendarmes of Anjou, Burgundy, the Engliſh and Flemiſh gendarmes, having each a captain-lieutenant, ſub-lieutenant, enſign, guidon, and quarter-maſter.

Scots GENDARMES were originally inſtituted by Charles VII. of France, about the middle of the 5th century, and formed a part of his guard; in which ſtation alſo they acted under other princes. It was their prerogative to take precedence of all the companies of the gendarmerie of France; and, on particular occaſions, they even preceded the two companies of the king's mouſquetaires. The ſons of the Scottiſh monarchs were the uſual captains of this company; and, after Mary's acceſſion to the throne, its command belonged to them as a right. It was thence that James VI. made a claim of it for his ſon prince Henry. This honour, and its emoluments, were alſo enjoyed by Charles I. and the next in command to this prince was Louis Stuart duke of Lennox. George Gordon, marquis of Huntley, ſucceeded the duke of Lennox in the year 1624, and took the title of captain or commander in chief when Charles I. mounted the Engliſh throne. It is not certain whether Charles II. was ever captain of this company; but it was conferred on his brother the duke of York, who was captain of the Scots gendarmes till the year 1667, when he reſigned his commiſſion into the hands of the French king. Since that time, no native of Great Britain has enjoyed this command. See *Scots* GUARDS.

GENDER, among grammarians, a diviſion of nouns, or names, to diſtinguiſh the two ſexes.

This was the original intention of gender: but, afterwards, other words, which had no proper relation either to the one ſex or the other, had genders aſſigned them, rather out of caprice than reaſon; which is at length eſtabliſhed by cuſtom. Hence genders vary according to the languages, or even according to the words introduced from one language into another. Thus, *arbor*, in Latin, is feminine; but *arbre*, in French, is maſculine: and *dens*, in Latin, is maſculine; but *dent*, in French, is feminine.

The oriental languages frequently neglect the uſe of genders: and the Perſian language has none at all; which is no diſadvantage, the diſtinction of genders being in great meaſure uſeleſs.

The Latins, Greeks, &c. generally content themſelves to expreſs the different genders by different terminations, as *bonus equus*, "a good horſe;" *bona equa*, "a good mare," &c. But in Engliſh, we frequently go further, and expreſs the difference of ſex by different words: as boar, ſow; boy, girl; buck, doe; bull, cow; cock, hen; dog, bitch, &c.—We have only about 24 feminines, diſtinguiſhed from the males, by the variation of the termination of the male into *eſs*; of which number are abbot, abbeſs; count, counteſs; actor, actreſs; heir, heireſs; prince, princeſs, &c. which is all that our language knows of any thing like genders.

The eaſtern languages, as well as the vulgar languages of the weſt, have only two genders; the maſculine and feminine. The Greek and Latin have likewiſe the neuter, common, and the doubtful gender; and beſide theſe, they have the epicene, or promiſcuous, which under one ſingle gender and termination includes both the kinds.

GENDRE (Lewis le), an eſteemed hiſtorian, born at Roan. He became canon of Notre Dame at Paris, ſubchantor of the ſame church, and abbot of Notre Dame at Claire Fontaine in the dioceſe of Chartres. He wrote a great number of works; the principal of which are, 1. The manners and cuſtoms of the French, in the different times of that monarchy. 2. An hiſtory of France, in three volumes folio, and in ſeven volumes duodecimo. 3. The life of Cardinal d'Amboiſe. He died in 1733, aged 78.

GENDRE (Gilbert Charles le), marquis of St Aubin, counſellor in the parliament of Paris, and afterwards maſter of requeſts in the king's houſehold. He wrote ſeveral works; but is chiefly diſtinguiſhed by his *Traite de l'opinion*, 9 vols 12mo. a curious performance, proving, by hiſtoric examples, the empire of opinion over the works of art and ſcience. He died at Paris in 1746, aged 59.

GENEALOGY, an enumeration of a ſeries of anceſtors; or a ſummary account of the relations and alliances of a perſon or family, both in the direct and collateral line.

The word is Greek, γενεαλογια; which is formed of γενος, "race, or lineage," and λογος, "diſcourſe."

In divers chapters and military orders, it is required that the candidates produce their genealogy, to ſhew that they are noble by ſo many deſcents.

GENEALOGICA ARBOR, or TREE *of Conſanguinity*, ſignifies a genealogy or lineage drawn out under the figure of a tree, with its root, ſtock, branches, &c. The genealogical degrees are uſually repreſented in circles, ranged over, under, and aſide each other. This the Greeks called *ſtemmata*, a word ſignifying crown, garland, or the like. See the articles CONSANGUINITY and DESCENT, and the plates there referred to.

GENEP, a ſtrong town of Germany, in the circle of Weſtphalia, ſubject to the king of Pruſſia. E. Long. 4. 29. N. Lat. 51. 42.

GENERAL, an appellation given to whatever belongs to a whole genus.

GENERAL *Charge*, in law. See CHARGE *to enter Heir*.

GENERAL *Terms*, among logicians, thoſe which are made the ſigns of general ideas. See ABSTRACTION and IDEA.

All things that exiſt, Mr Locke obſerves, being particulars, it might be expected that words ſhould be ſo too in their ſignification: but we find it quite contrary; for moſt of the words that make all languages are general terms. This is the effect of reaſon and neceſſity. For,

Firſt, it is impoſſible that every particular thing ſhould have a diſtinct name; becauſe it is impoſſible to have diſtinct ideas of every particular thing; to retain its name, with its peculiar appropriation to that idea.

Secondly, it would be uſeleſs, unleſs all could be ſuppoſed to have the ſame ideas in their minds. For names, applied to particular things, whereof I alone have the ideas in my mind, could not be ſignificant or intelligible to another who is not acquainted with all thoſe particular things which have fallen under my notice.

Thirdly, it would be of no great uſe for the improvement of knowledge; which, though founded in particular things, enlarges itſelf by general views; to which things, reduced into ſorts under general names, are properly ſubſervient.

In things where we have occaſion to conſider and diſcourſe of individuals and particulars, we uſe proper names; as in perſons, countries, cities, rivers, mounains, &c. Thus we ſee, that jockeys have particular names for their horſes, becauſe they often have occaſion to maintain this or that particular horſe when he is out of ſight.

Afterwards obſerving that a great number of things reſemble each other in ſhape, and other qualities, we frame a general idea that takes in only the qualities in which thoſe many particulars agree; and to this idea we give the name *man*, for example: in which there is nothing new; that which is peculiar to each individual being left out, and only that which is common to all retained. And thus we come to have a general idea and a general name. By the ſame method the mind proceeds to more general notions and names; as thoſe of animal, ſubſtance, being, thing, and ſuch univerſal terms as ſtand for any ideas whatſoever.

As to the ſignification of general words, it is evident they do not barely ſignify one particular thing; neither do they ſignify a plurality; but they ſignify a genus, kind, or ſort of things. See the articles ABSTRACTION and GENUS.

GENERAL *Warrant*. See WARRANT.

GENERAL *of an Army*, in the art of war, he who commands in chief.

A general ought to be a man of great courage and conduct, to have great experience, and to be of good quality. His conduct appears in eſtabliſhing his magazines in convenient places; in examining the country, that he may not engage his troops too far while he is ignorant of the means of bringing them off; in ſubſiſting them; and in knowing how to take the moſt advantageous poſts, either for fighting or ſhunning a battle. His experience inſpires his army with confidence, and an aſſurance of victory; and his quality, by creating reſpect, augments his authority. By his liberality he gets intelligence of the ſtrength and deſigns of the enemy, and by this means is enabled to take the moſt ſucceſsful meaſures. A general ought likewiſe to be fond of glory, to have an averſion to flattery, to render himſelf beloved, and to keep a ſtrict diſcipline.

The office of a general is, to regulate the march and encampment of the army: in the day of battle, to chooſe out the moſt advantageous ground; to make the diſpoſition of the army; to poſt the artillery; and, where there is occaſion, to ſend his orders by his aids-de-camp. At a ſiege, he is to cauſe the place to be inveſted; to order the approaches and attacks; to viſit the works; and to ſend out detachments to ſecure his convoys.

GENERAL *of the Artillery*. See ORDNANCE.

GENERAL *of Horſe*, and GENERAL *of Foot*, are poſts next under the general of the army, and theſe have upon all occaſions an abſolute authority over all the horſe and foot in the army.

Adjutant-GENERAL, one who attends the general, aſſiſts in council, and carries the general's orders to the army. He diſtributes the daily orders to the majors of brigade. He is likewiſe charged with the general detail of the duty of the army. The majors of brigade ſend every morning to the adjutant-general an exact return, by battalion and company, of the men of his brigade. In a day of battle the adjutant-general ſees the infantry drawn up; after which, he places himſelf by the general, to receive any orders which may regard the corps of which he has the detail. In a ſiege, he orders the number of workmen demanded, and ſigns the warrant for their payment. He receives the guards of the trenches at their rendezvous, and examines their condition; he gives and ſigns all orders for parties. He has an orderly ſerjeant from each brigade of infantry in the line, to carry ſuch orders as he may have occaſion to ſend from the general.

Lieutenant-GENERAL, is the next in command after the general; and provided he ſhould die or be killed, the order is, that the oldeſt lieutenant-general ſhall take the command. This office is the firſt military dignity after that of a general. One part of their function is, to aſſiſt the general with their counſel: they ought therefore, if poſſible, to poſſeſs the ſame qualities with the general himſelf; and the more, as they often command armies in chief.

The number of lieutenant-generals have been multiplied of late in Europe, in proportion as the armies have become numerous. They ſerve either in the field, or in ſieges, according to the dates of their commiſſions. In battle, the oldeſt commands the right wing of the army, the ſecond the left wing, the third the centre; the fourth the right wing of the ſecond line, the fifth the left wing, the ſixth the centre; and ſo on. In ſieges, the lieutenant-generals always command the right of the principal attack, and order what they judge proper for the advancement of the ſiege during the 24 hours they are in the trenches; except the attacks, which they are not to make without an order from the general in chief.

Lieutenant-GENERAL *of the Ordnance*. See ORDNANCE.

Lieutenant-GENERAL *of Artillery*, is, or ought to be, a very great mathematician, and an able engineer; to know all the powers of artillery; to underſtand the attack and defence of fortified places, in all its different branches; how to diſpoſe of the artillery in the day of battle to the beſt advantage; to conduct its march and retreat; as alſo to be well acquainted with all the numerous apparatus belonging to the train, and to the laboratory, &c.

Major-GENERAL, the next officer to the lieutenant-general. His chief buſineſs is to receive orders from the general, or in his abſence from the lieutenant-general of the day; which he is to diſtribute to the brigade-majors, with whom he is to regulate the guards, convoys, detachments, &c. On him the whole fatigue and detail of duty of the army roll. It is the major-general of the day who is charged with the encampment of the army, who places himſelf at the head of it when they march, who marks out the ground of the camp to the quarter-maſter-general, and who places the new guards for the ſafety of the camp.

The day the army is to march, he dictates to the field-officers the order of the march, which he has received from the general, and on other days gives them the parole.

In a fixed camp he is charged with the foraging, with reconnoitring the ground for it, and poſting the eſcorts, &c.

In ſieges, if there are two ſeparate attacks, the ſecond belongs to him; but if there is but one, he takes, either from the right or left of the attack, that which the lieutenant-general has not choſen.

When the army is under arms, he aſſiſts the lieutenant-general, whoſe orders he executes.

If the army marches to an engagement, his poſt is at the head of the guards of the army, until they are near enough to the enemy to rejoin their different corps; after which he retires to his own proper poſt: for the major-generals are diſpoſed on the order of battle as the lieutenant-generals are; to whom, however, they are ſubordinate, for the command of their diviſions. The major-general has one aid-de-camp, paid for executing his orders.

GENERAL is alſo uſed for a particular march, or beat of drum; being the firſt which gives notice, commonly in the morning early, for the infantry to be in readineſs to march.

GENERAL is alſo uſed for the chief of an order of monks; or of all the houſes and congregations eſtabliſhed under the ſame rule. Thus we ſay, the general of the Franciſcans, Ciſtertians, &c.

GENERATE, in muſic, is uſed to ſignify the operation of that mechanical power in nature, which every ſound has in producing one or more different ſounds. Thus any given ſound, however ſimple, produces along with itſelf, its octave, and two other ſounds extremely ſharp, viz. its twelfth above, that is to ſay, the octave of its fifth; and the other the ſeventeenth above, or, in other words, the double octave of its third major.

Whether we ſuppoſe this procreation of ſounds to reſult from an aptitude in the texture and magnitude of certain particles in the air, for conveying to our ears vibrations that bear thoſe proportions one to another, as being determined at once by the partial and total oſcillations of any muſical ſtring; or from whatever œconomy of nature we chooſe to trace it; the power of one ſound thus to produce another, when in action, is ſaid to *generate*. The ſame word is applied by Signior Tartini and his followers, to any two ſounds which, ſimultaneouſly heard, produce a third.

GENERATOR, in muſic, ſignifies the principal ſound or ſounds by which others are produced. Thus the loweſt C for the treble of the harpſichord, beſides its octave, will ſtrike an attentive ear with its twelfth above, or G in alt, and with its ſeventeenth above, or E in alt. The C, therefore, is called their *generator*, the G and E its products or harmonics. But in the approximation of chords, for G, its octave below is ſubſtituted, which conſtitutes a fifth from the generator, or loweſt C; and for E, is likewiſe ſubſtituted its fifteenth below, which, with the abovementioned C, forms a third major. To the loweſt notes, therefore, exchanged for theſe in alt by ſubſtitution, the denominations of products or harmonics are likewiſe given, whilſt the C retains the name of their *generator*. But ſtill according to the ſyſtem of Tartini, two notes in concord, which when ſounded produce a third, may be termed the *concurring generators* of that third. (See *Generation Harmonique, par M. Rameau*; ſee alſo that delineation of Tartini's ſyſtem called *The power and principles of harmony*.)

GENERATING LINE OR FIGURE, in geometry, is that which by its motion produces any other plane or ſolid figure. See GEOMETRY.

GENERATION, in phyſiology, the act of procreating and producing a being ſimilar to the parent.

According to Ariſtotle, the male animals contain the principle, and the female the matter, of generation; for though both are furniſhed indeed with a ſeminal liquor, yet the ſemen of the males alone is prolific. The moderns, on the other hand, as well thoſe who contend for the ſyſtem of generation from eggs, as they who adopt that of the animalcules in the male-ſeed, pretend that females have no ſuch ſeminal liquor at all, and that what has been commonly taken for it is ſome other animal-fluid.

Harvey is of opinion, that all females are furniſhed with eggs; and that the embryos, or young animals, are formed in the ſame manner as a chick in the egg of any bird. Generation, according to this celebrated phyſician, is effected wholly by means of the uterus, or womb, which conceives the fœtus by a kind of contagion communicated to it by the male-ſeed, much in the ſame way as the load-ſtone communicates magnetiſm to iron. This contagion, he thinks, acts not only on the uterus, but is communicated to the whole body of the female, which is altogether prolific; though the uterus, he acknowledges, is the only part that is capable of conceiving the fœtus, juſt as the brain is alone capable of forming ideas and notions. Agreeable to this doctrine of Harvey, Steno and other anatomiſts have pretended to diſcover certain eggs in the ovaries or teſticles of women; which Mr Buffon denies to be the caſe, affirming, that there are no ſuch eggs to be found there.

We cannot enter into a detail of the reaſonings for and againſt the ſyſtem of generation from eggs; and ſhall therefore only obſerve, that its advocates pretend to have diſcovered eggs in all the females on which they made obſervations; that the largeſt of thoſe found in women did not exceed the bigneſs of a pea; that they are extremely ſmall in young girls under fourteen, but that age and commerce with men makes them grow larger; that there are more than twenty ſuch eggs in each ovary or teſticle; that they are fecundated in the ovary by the ſpirituous and volatile part of the male-ſeed; that they afterwards are detached and fall into the uterus through the Fallopian tubes; that here the fœtus is formed of the internal ſubſtance of the egg, and the placenta of the exterior part.

Leewenhoek is the author of another ſyſtem of generation, from animalcules in the male-ſeed. He tells us, he diſcovered many thouſands of theſe in a drop leſs than a grain of ſand. They are found in the ſemen of all males whatever, but not in that of females; and are ſo ſmall, that 3,000,000,000 of them are not equal to a grain of ſand, whoſe diameter is but the hundredth part of an inch. When any of theſe animalcules gets into an egg fit to receive it, and this falls into the womb through the Fallopian tubes, the humours which diſtil through the veſſels of the womb, penetrating the coats of the egg, ſwell and dilate it, as the ſap of the earth does ſeed thrown into it. The placenta begins to appear like a little cloud, upon one ſide of the external coat of the egg; and, at the ſame time, the ſpine of the embryo-animalcule is grown ſo big, as to become viſible; and a little afterwards, the cerebrum and cerebellum appear like two bladders; and the eyes ſtand next, goggling out of the head; then the beating of the heart, or punctum ſaliens, is plainly to be ſeen; and the extremities diſcover themſelves laſt of all.

Theſe animalcules are of different figures, ſome like tadpoles, and others like eels *. In the ſemen of a man, and in that of a dog, there have been diſcovered two different kinds of them, the one ſuppoſed to be males, and the other females. Some even pretend to have ſeen animalcules diſengage themſelves from the membranes that ſurround them; and that they then appeared perfectly like men, with legs, arms, &c. like thoſe of the human body!

All the advocates for the ſyſtem of generation from animalcules ſtrongly oppoſe that from eggs. They contend, that theſe animalcules cannot be looked upon as the inhabitants of the ſemen, ſince they were of greater extent than the liquor itſelf; not to mention, that no ſuch animals are found in any other liquors of the body; and ſince females have nothing ſimilar to theſe animals, they think it manifeſt that the prolific principle reſides in males. When they are aſked, To what purpoſe ſerves ſuch an immenſe profuſion of human animalcules? they anſwer, that it is agreeable to the ordinary courſe of nature, both in the animal and vegetable part of the creation. They likewiſe ſtrengthen their ſyſtem, by alledging the many examples we have of ſimilar transformations in the inſect-claſs of animals, which, from caterpillars and ſmall worms, become winged animals of the butterfly or fly kinds.

By this ſyſtem, ſays Mr Buffon, the firſt woman cannot be ſaid to have contained the whole race of mankind, as being all, according to it, the true poſterity of the firſt man, and in their animalcule ſtate contained only in him. On this principle, he proceeds to invalidate the ſyſtem of generation from animalcules: for ſuppoſing the ſize of a man to be 1, then will that of one of the ſpermatic animalcules be $\frac{1}{1000000000000}$; and as a man is to an animalcule of the firſt generation in the ſame ratio that this animalcule is to an animalcule of the ſecond generation, it follows, that this laſt will be expreſſed by the fraction $\frac{1}{1000000000000000000000000}$. In this manner he computes the ſize of the animalcules of ſeveral generations, all ſuppoſed to be living animals, notwithſtanding that their minuteneſs exceeds the power of imagination to conceive; and then tells us, that the ſyſtem of generation from eggs is liable to the ſame objections, whereof the detail may be ſeen in his *Hiſt. Natur.* tom. ii. p. 157 *et ſeq.*

As to Buffon's own ſyſtem, he thinks that every part, both of animals and vegetables, contains an infinite number of organic molecules; that theſe molecules aſſume ſucceſſively different forms, and are put into different motions, according to the circumſtances they are in; but that they are much more numerous in the ſeminal liquors of both ſexes, and the ſeeds of plants, than in other parts; that theſe organic molecules make the matter of nutrition; that this matter is always active, and tends to organization, forming itſelf into different ſhapes, according to the moulds it meets with. When the quantity of this organic matter is but ſmall, as in man and moſt large animals, generation only takes place at the age of maturity, and even then the number of animals produced is but ſmall. The caſe is juſt the reverſe in animals which abound with this matter, as in fiſhes, and moſt birds.

With reſpect to the generation of mankind, the ſame author thinks it a certain fact, that the male-ſeed is received into the womb of the woman; and that, for this purpoſe, it is highly probable the internal orifice opens during the act of coition. The female-ſeed alſo makes its way into the womb, where, being mixed with that of the male, they both together contribute to the formation of the fœtus; which is either male or female, according as the ſeed of the man or woman abounds moſt with organic molecules; and the infant reſembles either father or mother, according to the different combinations of theſe molecules. Both theſe ſeminal liquors he thinks equally active in the formation of the fœtus, and that they fix and counterbalance each other; the molecules of each parent being thereby determined to form ſimilar parts to thoſe of the individual that furniſhed them, as the head, trunk, arms, legs, &c. He thinks the molecules proceeding from the genital parts fix themſelves firſt; and that the other molecules arrange themſelves ſucceſſively round theſe, in the ſame order which they before occupied in the parent. When a great quantity of the ſeminal liquors of both ſexes is received into the womb, there are formed different ſpheres of attraction, in different parts of theſe liquors; the conſequence of which is, that ſeveral fœtuſes are formed at the ſame time.

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* See *Animalcule*, nº 48—58.

Nearly akin to Mr Buffon's ſyſtem, is that of Mr Maupertuis, which he has explained in his *Venus Phyſique*. He obſerves, that all the variety obſervable among mankind, may have been accidental at firſt; but being once eſtabliſhed in the conſtitution of the parents, they become natural to their poſterity. To illuſtrate this, he gives an inſtance of a ſexdigitary family at Berlin, who had ſix fingers, or ſix toes, and frequently both; and that this peculiarity was tranſmitted equally by the father and mother, but was loſt by alliances with thoſe who had only the uſual number of fingers or toes.

He farther obſerves, that moſt animals, excepting mankind, have ſtated ſeaſons for procreation; and that the females go with young ſome a longer, others a ſhorter time. Mares go from eleven to twelve months; cows and hinds go nine months, as do alſo women; foxes and wolves, five months; and bitches go only ſeven weeks; cats nine weeks; and rabbits but thirty-one days. Moſt birds are hatched in twenty-one days; the canary-birds, and ſome others, are hatched in thirteen or fourteen days. It appears, therefore, that there is an endleſs variety in the time and manner of the generation of animals.

Whoever reads this ſhort ſketch of the different theories of generation that have hitherto been invented, will probably require no other arguments to convince him, that phyſicians and philoſophers are ſtill as ignorant of the nature of this myſterious operation as they were in the days of Noah.

Concerning the formation and nutrition of the fœtus after the female has conceived, there have alſo been great diſputes; but as this ſubject is more eaſily inveſtigated, and in ſome meaſure falls under the notice of our ſenſes, there is much leſs uncertainty concerning theſe matters than generation, or the manner in which the embryo is originally formed. The following particulars are confirmed by the greateſt number of obſervations.

About the ſeventh day, the eye may diſcover the firſt lineaments of the fœtus; but theſe lineaments are as yet very imperfect. Two little veſicles appear in an almoſt tranſparent jelly, the largeſt of which is deſtined to become the head of the fœtus, and the other ſmaller one is reſerved for the trunk. But at this period no extremities are to be ſeen; the umbilical chord appears only as a very minute thread, and the placenta does not as yet abſorb the red particles of the blood. At the end of fifteen days, not only the head but the features of the face begin to be developed.—The noſe appears like a ſmall prominent line; and we are able to diſtinguiſh another line under it, which is deſtined for the ſeparation of the lips. Two black points appear in the place of eyes, and two minute holes mark the ears. At the ſides of the trunk both above and below, we ſee four minute protuberances, which are the rudiments of the arms and legs. At the end of three weeks the body of the fœtus is ſomewhat augmented, and both the hands and feet are to be diſtinguiſhed. The upper extremities are found to increaſe faſter than the lower ones, and the ſeparation of the fingers is accompliſhed ſooner than that of the toes.

Towards the end of the firſt month, the fœtus is about an inch long, and the human form may be deciſively aſcertained: all the parts of the face may be diſtinguiſhed; the ſhape of the body is clearly marked out, the haunches and the abdomen are elevated, the fingers and toes are ſeparated from each other, and the inteſtines appear like minute threads. After ſix weeks the fœtus is grown much longer, and the human figure appears to be more perfect, but the head is ſtill larger in proportion than the other parts of the body.

At the end of the ſecond month, the fœtus meaſures two inches and a quarter; at the end of the third month, three inches and a half; and about the fourth or fifth month, uſually about five inches; and from that time to the end of the ninth month, it gradually increaſes to about the length of twelve inches, ſometimes more, and ſometimes not quite ſo much.

The fœtus during all this time aſſumes an oval figure, which correſponds with the ſhape of the uterus. Its chin is found relining on its breaſt, with its knees drawn up towards its chin, and its arms folded over them. But it ſeems likely that the poſture of ſome of theſe parts is varied in the latter months of pregnancy, ſo as to cauſe thoſe painful twitches which its mother uſually feels from time to time.—In natural caſes, its head is probably placed towards the os tincæ from the time of conception to that of its birth; though formerly it was conſidered as being placed towards the fundus uteri, till about the eighth or ninth month, when the head, by becoming ſpecifically heavier than the other parts of the body, was ſuppoſed to be turned downwards.

The capacity of the uterus increaſes in proportion to the growth of the fœtus, but without becoming thinner in its ſubſtance, as might naturally be expected.—The nouriſhment of the fœtus, during all this time, ſeems to be derived from the placenta, which appears to be originally formed by that part of the ovum which is next the fundus uteri. The remaining unconnected part of the ovum, and likewiſe the ſurface of the placenta, are covered by a membrane called *chorion* (A), within which is another pellucid membrane called *amnios* (B); and theſe two include a watery fluid, which is the *liquor amnii*, in which the

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(A) Beſides theſe two membranes, Dr Hunter has diſcovered a third, which is the exterior one, being ſuppoſed to be a lamella from the inner ſurface of the uterus. In the latter months of pregnancy it becomes gradually thinner and more connected with the chorion. He has named it *membrana caduca*.

(B) In ſome quadrupeds, the urine appears to be conveyed from the bladder through a canal called *urachus*, to the *allantois*; which is a reſervoir, reſembling a long and blind gut, ſituated between the chorion and amnios. The human fœtus ſeems to have no ſuch reſervoir, though ſome writers have ſuppoſed that it does exiſt. From the top of the bladder, a few longitudinal fibres are extended to the umbilical chord; and theſe fibres have been conſidered as the urachus, though without having ever been found pervious.

fœtus floats till the time of its birth (c).—In the firſt months of pregnancy, the involucra bear a large proportion to their contents, but this proportion is afterwards reverſed as the fœtus increaſes in bulk.

The placenta, which is the medium through which the blood is conveyed from the mother to the fœtus, and the manner in which this conveyance takes place, deſerve to be clearly deſcribed, as being a ſubject not generally underſtood.—Without ſuch an explanation it might perhaps be readily ſuppoſed, that the arteries of the uterus paſs into the ſubſtance of the placenta; and that the blood, after being conveyed through the umbilical arteries to the fœtus, is returned back by the umbilical vein to the placenta, and from thence to the uterus.—Such an idea, however, would be a very erroneous one, and we ſhall point out the true manner in which this proceſs is conducted.

The *placenta* is a broad, flat, and ſpongey ſubſtance, like a cake, cloſely adhering to the inner ſurface of the womb, uſually near the fundus, and appearing to be made up by the ramifications of the umbilical arteries and vein. The arteries of the uterus diſcharge their contents into the ſpongey cells of this cake; and the veins of the placenta, abſorbing the blood from theſe cells in the ſame manner as they abſorb it in the corpora cavernoſa penis, at length form the *umbilical vein*, which paſſes on to the liver, and from thence to the heart of the fœtus, by the vena cava. Its circulation, however, through the heart is not conducted in the fœtus as it is in the adult: in the latter, the blood is carried from the right auricle of the heart through the pulmonary artery, and is returned to the left auricle by the pulmonary vein; but a dilatation of the lungs is eſſential to the paſſage of the blood through the pulmonary artery, and this dilatation cannot take place till after the child is born and has reſpired. This deficiency, however, is ſupplied in the fœtus, by an immediate communication between the right and left auricle of the heart, through an oval opening in the ſeptum, which divides the two auricles, called *foramen ovale*. The blood is returned again from the fœtus, through two arteries called the *umbilical artetries*, which ſometimes ariſe from the iliacs, and ſometimes from the aorta deſcendens. Theſe two veſſels taking a winding courſe with the vein, form with that, and the membranes by which they are ſurrounded, what is called the *umbilical cord*. Theſe arteries, after ramifying through the ſubſtance of the placenta, open and diſcharge their blood into its cells, from whence it is abſorbed by the veins of the uterus; ſo that a conſtant depoſition and abſorption are carried on, and the fœtus is found to have a circulation independent of its mother.

GENERATION *of Fiſhes*. See FISH.

GENERATION *of Plants*. See BOTANY, ſect. v.

GENERATION *of Inſects*. See INSECTS.

Parts of GENERATION. See ANATOMY, n° 371, 372.

GENESIS, among mathematicians, ſignifies the formation or production of ſome figure or quantity.

GENESIS, among divines, a canonical book of the Old Teſtament, and the firſt of the pentateuch or five books of Moſes. The Hebrews call it *Bereſchith*, or, "In the beginning," theſe being the firſt words in the book. The Greeks gave it the name of *Geneſis*, from its beginning with the hiſtory of the creation of the world. See BIBLE.

GENET, GENNET, or *Jennet*, in the manege, denotes a ſmall-ſized well-proportioned Spaniſh horſe.

To ride *a la genette*, is to ride after the Spaniſh faſhion, ſo ſhort, that the ſpurs bear upon the horſe's flank.

GENETTE, in zoology. See VIVERRA.

GENEVA, a city near the confines of France and Switzerland, in E. Long. 6. 0. N. Lat. 46. 20. It has a ſmall territory ſubject to it, and is a republic *.

The city, called in Latin alſo *Geneva*, in German *Genſ*, and in French *Genevé*, is ſituated where the Rhone makes it exit from the lake, 65 miles from Bern, 75 from Lyons, and 106 from Turin. A part of it ſtands on an iſland in the Rhone, and part on the banks on both ſides, being a handſome well-fortified city, and pretty large. In ſome of the ſtreets are arched walks or piazzas. The Treille is a moſt charming place, planted with linden trees; and commanding a fine proſpect of the lake, and of ſeveral ranges of mountains and rocks riſing behind one another, ſome covered with vineyards and herbage, and others with ſnow, with openings betwixt them. Immediately below the city, the Rhone is joined by the Arve. Over the former of theſe rivers are four bridges. The inhabitants of Geneva are moſtly Calviniſts. Of the ſix churches, the cathedral of St Peter is the principal, in which is a monument to the memory of Henry duke of Rohan. The ſervice in ſome of theſe churches is in French, in others in Italian, and in others in German. The guildhall is a ſtately free-ſtone edifice, ſituated on an eminence, the aſcent to which is without any ſteps, ſo that a perſon may not only walk, but ride from the top to the bottom. Here is an arſenal, which is ſaid to contain arms for 12,000 men; and an univerſity, which has 12 profeſſors belonging to it, with a very valuable library. Several learned men have either been natives, or profeſſors and miniſters, of this city; particularly Calvin, Theodore Beza, the Diodati, the Turretines, the late Mr Le Clerc, and others. As the quantity of corn produced in the territory of the city is not ſufficient for the conſumption of the inhabitants, the republic has erected large granaries, which always contain a quantity to ſupply the inhabitants two years. The bakers, the inn-keepers, the garriſon, and the artificers, employed by the city, are obliged to take what corn they want from theſe granaries, at a ſmall advance of the prime coſt. Beſides the revenue ariſing from hence, the city has other incomes, amounting to about 130,000 dollars, with part of which it maintains a garriſon conſiſting of 800 men, well diſciplined, and cloathed in a blue uniform turned up with red. The environs of the city are extremely pleaſant; which, with the goodneſs of the air and proviſions, the mildneſs of the go-

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* See Switzerland.

(c) The *liquor amnii* coagulates like the lymph. It has been ſuppoſed to paſs into the œſophagus, and to afford nouriſhment to the fœtus; but this does not ſeem probable. Children have come into the world without an œſophagus, or any communication between the ſtomach and the mouth; but there has been no well-atteſted inſtance of a child's having been born without a placenta; and it does not ſeem likely that any of the fluid can be abſorbed through the pores of the ſkin, the ſkin in the fœtus being every where covered with a great quantity of mucus.

vernment, the politeneſs of the inhabitants, the numbers of foreign gentlemen always reſiding here, or paſſing from France, Germany, and other countries, to the north of the Alps, to Italy, and others lying ſouth of them, render it a moſt agreeable place: hence Mr Addiſon ſtyled it, very juſtly, the *court of the Alps*. In all the ſtreets are fountains and canals to ſupply the inhabitants with water, which is raiſed by engines from the Rhone. The trade of the city is very conſiderable, it being a great thoroughfare, and having a variety of manufactures, with a number of induſtrious and ingenious artificers, particularly in the watchmaking branch. The library belonging to the city is well furniſhed with excellent books, beſides a curious collection of medals and petrifactions, and ſome ancient manuſcripts. They are not ſo rigid in keeping the ſabbath here as the Calviniſts in England and Scotland: for they tolerate, and even authoriſe, all manner of manly exerciſes on Sundays, after divine ſervice; and then it is that the militia alſo are exerciſed. The ſun riſes later here, and ſets ſooner, than in moſt other places of the ſame latitude; which is owing to the Alps. Mr Addiſon ſays, that there are merchants in Geneva who are reckoned worth two millions of crowns, tho', perhaps, not one of them ſpends 500 pounds a-year. At the general hoſpital, beſides the city poor, poor travellers are maintained for one day, and then diſmiſſed, with ſome money in their pockets, to proceed on their journey. As to the government, it is much like that of Zurich and Bern. The number of burghers is about 1500, and the principal magiſtrates are the four ſyndics. There are no leſs than four councils, viz. the general council of the citizens and burghers, the council of 200, that of 60, and that of 25. Of the laſt, two perſons of the ſame family cannot be members at the ſame time. A ſon here, who refuſes to pay his father's debts, is incapable of any office in the ſtate. No marriages are permitted unleſs both parties are of the Proteſtant religion. A woman of 40 years of age muſt not marry a man of leſs than 30; if ſhe exceed 40, her huſband muſt at leaſt be 35: nor muſt a man above 60 marry a woman, who is not, at leaſt, 30. A widow muſt not alter her condition in leſs than ſix months after her huſband's deceaſe. The kings of France and Britain are conſtantly mentioned in their public prayers here. It is ſaid that Calvin lied buried in that part of the church-yard called the *Plain-palais*; but the particular ſpot is either not known, or pretended not to be known. Before the reformation, this city was the ſee of a biſhop, who was poſſeſſed of the ſovereignty thereof at firſt, jointly with its counts, and afterwards with the dukes of Savoy; but it got rid of both, about the period abovementioned, and entered into alliance with ſeveral of the cantons: at preſent, however, thoſe only with Bern and Zurich continue in force. The king of France always keeps a reſident here. So much are the magiſtracy afraid of opening a door to luxury and licentiouſneſs, that no theatre is permitted in the city. The lake, to which it gives name, reſembles a half-moon, whoſe convex ſide lies towards Switzerland. On that ſide it extends 18 leagues, reckoning along the ſhore, but on the Savoy ſide not above 12; and its greateſt breadth is upwards of ſeven. As for its depth, in ſome places it is ſaid to be unfathomable. Contrary to moſt other lakes, it decreaſes in winter, and increaſes in ſummer, which is owing to the melting of the ſnow in the neighbouring mountains. It is hardly ever frozen over; and has the territories of no leſs than five different ſtates bordering on it, viz. the kingdom of France, the duchy of Savoy, the canton of Bern, the biſhopric of Sion, and the republic of Geneva.

Geneva, or *Gin*, among diſtillers, an ordinary malt ſpirit, diſtilled a ſecond time, with the addition of ſome juniper-berries.

Originally, the berries were added to the malt in the grinding; ſo that the ſpirit thus obtained was flavoured with the berries from the firſt, and exceeded all that could be made by any other method. At preſent, they leave out the berries entirely, and give their ſpirits a flavour by diſtilling them with a proper quantity of oil of turpentine; which, though it nearly reſembles the flavour of juniper-berries, has none of their valuable virtues.

GENGISKHAN, the renowned ſovereign of the Moguls, a barbarous and bloody conqueror. See Jenghiz Khan, and (*Hiſtory* of the) Moguls.

GENIAL, an epithet given by the Pagans to certain gods who were ſuppoſed to preſide over generation.

The genial gods, ſays Feſtus, were earth, air, fire, and water. The twelve ſigns, together with the ſun and moon, were ſometimes alſo ranked in the number.

GENII, a ſort of intermediate beings, by the Mahometans believed to exiſt, between men and angels. They are of a groſſer fabric than the latter, but much more active and powerful than the former. Some of them are good, others bad, and they are capable of future ſalvation or damnation like men. The Orientals pretend that theſe genii inhabited the world many thouſand years before the creation of Adam, under the reigns of ſeveral princes, who all bore the common name of Solomon: but falling at length into an almoſt general corruption, Eblis was ſent to drive them into a remote part of the earth, there to be confined: that ſome of that generation ſtill remaining were by Tahmurath, one of the ancient kings of Perſia, forced to retreat into the famous mountains of *Kaf*; of which ſucceſſions and wars they have many fabulous and romantic ſtories. They alſo make ſeveral ranks and degrees among this kind of beings, (if they are not rather different ſpecies); ſome being abſolutely called *Jin*; ſome *Peri*, or fairies; ſome *Div*, or giants; and other *Tacwins*, or fates.

GENIOGLOSSI, in anatomy. See Anatomy, *Table of the muſcles*.

GENIOHYOIDÆUS, in anatomy. *Ibid.*

GENISTA, broom or dyers-weed; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are ſeveral ſpecies: of which the moſt remarkable are, the cytiſo-geniſta, or common broom; and the tinctoria, or dyers-weed.—The firſt is too well known to need deſcription. Its young flowers are ſometimes preſerved as pickles; and the plant, when burnt, affords a tolerably pure alkaline ſalt. Dr Mead relates the caſe of a dropſical patient that was cured by taking half a pint of a decoction of green broom tops, with a ſpoonful of whole white muſtard-ſeed, every morning and evening. The patient had been tapped three times, and tried the uſual remedies before. An infuſion of the ſeeds, drank freely, has been known to produce ſimilar happy effects; but theſe are by no means to be expected in every inſtance. Cows, horſes, and ſheep, refuſe the plant.—2. The tinctoria is alſo a native of Britain. It riſes with ſhrubby ſtalks three feet high, garniſhed with ſpear-ſhaped leaves placed alternate, and terminated by ſeveral ſpikes of yellow flowers, ſucceeded by pods. The branches of the plant are uſed by dyers, for giving a yellow colour; from whence it is called dyers-broom, green-wood, wood-waxen, or dyers-weed. A dram and an half of the powdered ſeeds operates as a mild purgative. A decoction of the plant is diuretic; and, like the former, has proved ſerviceable in dropſical caſes. Horſes, cows, goats, and ſheep, eat it.

GENITAL, an appellation given to whatever belongs to the parts of generation. See Anat. n° 371.

GENITES, among the Hebrews, thoſe deſcended from Abraham, without any mixture of foreign blood.

The Greeks diſtinguiſhed by the name of *genites* ſuch of the Jews as were iſſued from parents, who, during the Babyloniſh captivity, had not allied with any gentile family.

GENITIVE, in grammar, the ſecond caſe of the declenſion of nouns. The relation of one thing conſidered as belonging in ſome manner to another, has occaſioned a peculiar termination of nouns, called the *genitive caſe*: but, in the vulgar tongues, they make uſe of a ſign to expreſs the relation of this caſe. In Engliſh they prefix the particle *of*, in French *de* or *du*, &c. Though in ſtrictneſs there are no caſes in either of theſe languages; inaſmuch as they do not expreſs the different relations of things by different terminations, but by additional prepoſitions, which is otherwiſe in the Latin.

GENIUS, a good or evil ſpirit, or dæmon, whom the ancients ſuppoſed ſet over each perſon, to direct his birth, accompany him in life, and to be his guard. See Dæmon.

Among the Romans, Feſtus obſerves, the name *genius* was given to the god who had the power of doing all things, *deum qui vim obtineret rerum omnium gerendarum*; which Voſſius, *de Idol.* rather chooſes to read *genendarum*, who has the power of producing all things; by reaſon Cenſorinus frequently uſes *gerere* for *gignere*.

Accordingly, St Auguſtin *de Civitat. Dei*, relates, from Varro, that the genius was a god who had the power of generating all things; and preſided over them when produced.

Feſtus adds, that Auſuſtius ſpake of the *genius* as the Son of God, and the Father of men, who gave them life; others, however, repreſented the *genius* as the peculiar or tutelary god of each place: and it is certain, the laſt is the moſt uſual meaning of the word. The ancients had their *genii* of nations, of cities, of provinces, &c. Nothing is more common than the following inſcription on medals, GENIUS POPULI ROM. "the *genius* of the Roman people;" or GENIO POP. ROM. "to the *genius* of the Roman people." In this ſenſe, *genius* and *lar* were the ſame thing; as, in effect, Cenſorinus and Apulius affirm they were. See Lares and Penates.

The Platoniſts, and other eaſtern philoſophers, ſuppoſed the *genii* to inhabit the vaſt region, or extent of air, between earth and heaven. They were a ſort of intermediate powers, who did the office of mediators between gods and men. They were the interpreters and agents of the gods; communicated the wills of the deities to men; and the prayers and vows of men to the gods. As it was unbecoming the majeſty of the gods to enter into ſuch trifling concerns; this became the lot of the *genii*, whoſe nature was a mean between the two; who derived immortality from the one, and paſſions from the other; and who had a body framed of an aërial matter. Moſt of the philoſophers, however, held, that the genii of particular men were born with them, and died; and Plutarch attributes the ceaſing of oracles partly to the death of the genii. See Oracle.

The heathens, who conſidered the genii as the guardians of particular perſons, believed that they rejoiced and were afflicted at all the good and ill fortune that befel their wards. They never, or very rarely, appeared to them; and then only in favour of ſome perſon of extraordinary virtue or dignity. They likewiſe held a great difference between the genii of different men; and that ſome were much more powerful than others: on which principle it was, that a wizard in *Appian* bids Anthony keep at a diſtance from Octavius, by reaſon Anthony's genius was inferior to and ſtood in awe of that of Octavius. There were alſo evil genii, who took a pleaſure in perſecuting men, and bringing them evil tidings: ſuch was that in *Paterculus*, &c. which appeared to Brutus the night before the battle of Philippi. Theſe were alſo called *larvæ*, and *lemures*. See Larvæ and Lemures.

Genius, in matters of literature, &c. a natural talent or diſpoſition to do one thing more than another; or the aptitude a man has received from nature to perform well and eaſily that which others can do but indifferently and with a great deal of pains.

To know the bent of nature is the moſt important concern. Men come into the world with a genius determined not only to a certain art, but to certain parts of that art, in which alone they are capable of ſucceſs. If they quit their ſphere, they fall even below mediocrity in their profeſſion. Art and induſtry add much to natural endowments, but cannot ſupply them where they are wanting. Every thing depends on genius. A painter often pleaſes without obſerving rules; whilſt another diſpleaſes though he obſerves them, becauſe he has not the happineſs of being born with a genius for painting.

A man born with a genius for commanding an army, and capable of becoming a great general by the help of experience, is one whoſe organical conformation is ſuch, that his valour is no obſtruction to his preſence of mind, and his preſence of mind makes no abatement of his valour. Such a diſpoſition of mind cannot be acquired by art: it can be poſſeſſed only by a perſon who has brought it with him into the world.—What has been ſaid of theſe two arts may be equally applied to all other profeſſions. The adminiſtration of great concerns, the art of putting people to thoſe employments for which they are naturally formed, the ſtudy of phyſic, and even gaming itſelf, all require a genius. Nature has thought fit to make a diſtribution of her talents among men, in order to render them neceſſary to one another; the wants of men being the very firſt link of ſociety: ſhe has therefore pitched upon particular perſons, to give them aptitude to perform rightly ſome things which ſhe has rendered impoſſible to others; and the latter have a greater facility granted them for other things, which facility has been refuſed to the former. Nature, indeed, has made an unequal diſtribution of her bleſſings among her children; yet ſhe has diſinherited none; and a man diveſted of all kinds of abilities, is as great a phenomenon as an univerſal genius.

From the diverſity of genius, the difference of inclination ariſes in man, whom nature has had the precaution of leading to the employments for which ſhe deſigns them, with more or leſs impetuoſity in proportion to the greater or leſſer number of obſtacles they have to ſurmount, in order to render themſelves capable of anſwering this vocation. Thus the inclinations of men are ſo very different, becauſe they follow the ſame mover, that is, the impulſe of their genius. This, as with the painter, is what renders one poet pleaſing, even when he treſpaſſes againſt rules; while others are diſagreeable, notwithſtanding their ſtrict regularity.

The genius of theſe arts, according to the abbe du Bos, conſiſts in a happy arrangement of the organs of the brain; in a juſt conformation of each of theſe organs; as alſo in the quality of the blood, which diſpoſes it to ferment, during exerciſe, ſo as to furniſh plenty of ſpirits to the ſprings employed in the functions of the imagination. Here he ſuppoſes that the compoſer's blood is heated; for that painters and poets cannot invent in cool blood; nay, that it is evident they muſt be wrapt into a kind of enthuſiaſm when thy produce their ideas. Ariſtotle mentions a poet who never wrote ſo well as when his poetic fury hurried him into a kind of frenzy. The admirable pictures we have in Taſſo of Armida and Clorinda, were drawn at the expence of a diſpoſition he had to real madneſs, into which he fell before he died. "Do you imagine, (ſays Cicero,) that Pacuvius wrote in cold blood? No, it was impoſſible. He muſt have been inſpired with a kind of fury, to be able to write ſuch admirable verſes."

GENOA, a city of Italy, and capital of a republic of the ſame name, ſituated in E. Long. 9. 30. N. Lat. 44. 30.—By the Latin authors it is very frequently, though corruptly, called *Janua*; and its preſent territories made part of the ancient Liguria. The æra of its foundation is not known. In the time of the ſecond Punic war it was a celebrated emporium; and having declared for the Romans, was plundered and burnt by Mago the Carthaginian. It was afterwards rebuilt by the Romans; and with the reſt of Italy continued under their dominion till the decline of the weſtern empire in 476. Soon after, it fell under the power of Theodoric the Oſtrogoth; who having defeated the uſurper Odoacer, became king of Italy. This happened in the year 498; and in a ſhort time, the Goths being almoſt entirely ſubdued by Beliſarius the emperor Juſtinian's general, Genoa was reannexed to the Roman empire. In 1638, it was plundered and burnt by the Lombards, whoſe king Protharis erected it into a provincial dukedom.

The Lombards continued maſters of Genoa till the year 774, when they were conquered by Charles the Great, ſon to Pepin, king of France. He reduced Liguria to the ancient bounds ſettled by Auguſtus, and erected it into a marquiſate; appointing his relation *Audemarus* the firſt count or margrave. Genoa at this time being diſtinguiſhed for its wealth and populouſneſs, began to give its name to the whole coaſt; and continued under the dominion of theſe counts for about 100 years, till the race of the Pepins became entirely extinct in Italy, and the empire was tranſferred to the German princes—In the year 935 or 936, while the Genoeſe forces were abſent on ſome expedition, the Saracens ſurpriſed the city, which they plundered and burnt, putting to death a great number of the inhabitants, and carrying others into captivity. Having embarked their captives, together with an immenſe booty, they ſet ſail for Africa: but the Genoeſe immediately returning, purſued the invaders; and having entirely defeated them, recovered all the captives and booty, and took a great many of the enemy's ſhips.

About the year 950, the Franks having loſt all authority in Italy, the Genoeſe began to form themſelves into a republic, and to be governed by their own magiſtrates, who were freely elected, and took the name of *Conſuls*. In order to ſupport their independence, they applied themſelves with great aſſiduity to commerce and navigation; and being apprehenſive that ſome of the German emperors, who frequently entered Italy as invaders, might renew their pretenſions to their ſtate, they conſented to acknowledge Berengarius III. duke of Friuli, who had been elected emperor by a party of Italian nobles. Berengarius, who had much ado to maintain himſelf in his new dignity, endeavoured by his conceſſions to enlarge the number of his friends and adherents; and accordingly made no difficulty to confirm the new republic in all its rights and privileges. After this the Genoeſe began to extend their commerce from Spain to Syria, and from Egypt to Conſtantinople; their veſſels, according to the cuſtom of theſe times, being fitted for fighting as well as merchandiſe. Having thus acquired great reputation, they were invited, in 1017, by the Piſans, who had likewiſe formed themſelves into a republic, to join with them in an expedition againſt Sardinia, which had been conquered by the Moors. In this expedition they were ſucceſsful; the iſland was reduced; but from this time an enmity commenced between the two republics, which did not end but with the ruin of the Piſans.

The firſt war with Piſa commenced about 30 years after the Sardinian expedition, and laſted 18 years; when the two contending parties having concluded a treaty of peace, jointly ſent their forces againſt the Moors in Africa, of whom they are ſaid to have killed 100,000. The Genoeſe were very active in the time of the cruſades, and had a principal ſhare in the taking of Jeruſalem. They alſo waged conſiderable wars with the Moors in Spain, of whom they generally got the better. They alſo prevailed againſt the neighbouring ſtates; and, in 1220, had enlarged their territories beyond the ſkirts of the Appennines, ſo that the reſt of Italy looked upon them with a jealous eye: but in 1311 the factions which had for a long time reigned in the city, notwithſtanding all its wealth and power, induced the inhabitants to ſubmit themſelves for 20 years to the dominion of Henry VII. emperor of Germany. That emperor, however, died in Auguſt 1312; and the vicar he had left, ſoon after went to Piſa, upon which the diſſentions in Genoa revived with greater fury than ever. In 1317, a quarrel happened between the families of Spinola and Doria; which came to ſuch an height, that both parties fought in the ſtreets for 24 days without intermiſſion, raiſed battering engines againſt each others houſes, and filled the city with blood. At laſt the Spinolæ quitted the city, and retired to their territories in the Apennine mountains. The civil war continued till the year 1331; when, by the mediation of the king of Naples, it was concluded, that all exiles ſhould return to the city; that the republic ſhould be governed by the king's vicar; and all the offices of the ſtate be equally divided between the Guelfs and the Gibellines, the two contending parties.

By this ruinous war, the coaſt of Genoa, formerly adorned with palaces and vineyards, was now reduced to the appearance of a barren waſte. So great was the general deſolation, that, according to Petrarch, the ſpectators who ſailed along were ſtruck with aſtoniſhment and horror. Villani, a cotemporary author, relates, that it was ſuppoſed by the learned, that greater exploits had not been performed at the ſiege of Troy; and that the loſſes each party had ſuſtained would have been ſufficient to have purchaſed a kingdom, the Genoeſe republic being in his time the richeſt and moſt powerful ſtate in Chriſtendom. The annaliſt Stella informs us, that, before the war, the moſt extravagant profuſion and luxury prevailed among the Genoeſe; but that, towards the end, many noble families were reduced to indigence and poverty; ſo that, about 100 years after, it became faſhionable for the nobles to live in a plain manner, without any ſhew or magnificence.

In 1336, both parties, ſuſpending their mutual animoſities, ſent two fleets of 20 galleys each into the German ocean, to the aſſiſtance of the king of France, who was engaged in a war with Edward III. king of England. This naval expedition proved the cauſe of a moſt remarkable revolution in the Genoeſe government. The ſailors of the fleet, thinking themſelves injured by their officers, whom they accuſed of defrauding them of their pay, proceeded to an open mutiny; and, having expelled the admiral and other commanders, ſeized the galleys. The king of France being choſen arbitrator, decided in favour of the officers, and impriſoned 16 of the chiefs of the mutineers. Upon this ſeveral of the ſailors left the fleet, and returned to Genoa; where they went round the coaſts, repeating their mutinous complaints, which were greatly hearkened to, upon a falſe report that the mutineers who had been impriſoned were broke upon the wheel. The factious ſpirit increaſed; and at laſt the Genoeſe inſiſted in a tumultuous manner for having an abbot of their own chooſing, and 20 of the people with the conſent of the captains of the republic aſſembled for that purpoſe. While the mob were impatiently expecting their deciſion, a mechanic, generally accounted a fool, mounted a wooden bench, and called out that one Simon Bucanigree ſhould be choſen abbot. This being inſtantly echoed by the populace, he was firſt declared *abbot*, then *lord*, and at laſt *duke* of Genoa.

This new expedient did not at all anſwer the purpoſe. The diſſentions continued as violent as ever, notwithſtanding the power of the new magiſtrates; and by theſe perpetual diviſions the republic was at laſt ſo much weakened, that in 1390 the king of France was declared lord of Genoa. Under the French government, however, they ſoon became exceedingly impatient; and, in 1422, the duke of Milan obtained the ſovereignty. With this ſituation they were equally diſpleaſed, and therefore revolted in 1436. Twenty-two years after, finding themſelves preſſed by a powerful fleet and army ſent by Alphonſo king of Naples, they again conferred the ſovereignty of their ſtate upon the king of France. In 1460, they revolted from the French; and, four years after, put themſelves again under the protection of the duke of Milan; from whom they revolted in 1478. He was again declared ſovereign of the republic in 1488; and, 11 years after, the city and territories of Genoa were conquered by Lewis XII. of France.

The almoſt unparalleled fickleneſs of the Genoeſe diſpoſition was not to be corrected by this misfortune. They revolted in 1506; but next year were again ſubdued by Lewis. Six years after, they again revolted; and in 1516, the city was taken and plundered by the Spaniards. In 1528, Andrew Doria, a Genoeſe admiral in the ſervice of the French, undertook to reſcue his country from the dominion of foreign princes, and reſtore it to its liberty. Knowing well the fickle diſpoſition of his countrymen, he took all occaſions of exciting diſcontents among them againſt the government. He perſuaded them, that the French (who had again obtained the ſovereignty) had left them only a ſhadow of liberty, while they pretended to protect them from their enemies. To the nobility he repreſented the diſgrace of ſuffering the government to be veſted in the hands of foreigners leſs worthy of authority than themſelves. Thus he ſoon formed a ſtrong faction, and formed his plan; for the execution of which he took the moſt proper time, namely, when almoſt three-fourths of the French garriſon had been carried off by the plague.—He advanced with 500 men; and his friends having opened the gates of the city to him, he ſeized the principal poſts, and thus became maſter of it without drawing his ſword. The garriſon retired to the forts, where they ſoon after capitulated, and being driven out of the city, Doria re-eſtabliſhed the ancient form of government *.

The republic hath ſince continued to preſerve her liberty, though greatly fallen from her ancient ſplendor, and now become a very inconſiderable ſtate. In 1684, the Genoeſe had the misfortune to fall under the reſentment of Lewis XIV. at which time the city was almoſt deſtroyed by a formidable bombardment. In the year 1688, it was bombarded by admiral Byng, and forced to capitulate; but there were at that time no views of making a permanent conqueſt of the city. In 1730, the iſland of Corſica revolted from the Genoeſe, and could never afterwards be reduced by them; for which reaſon it was ſold to the French, who in the year 1770 totally reduced it.

The Genoeſe territories extend along that part of the Mediterranean ſea, commonly called the *gulph of Genoa*,

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Genoa, about 152 miles; but their breadth is very unequal, being from eight to about 20 miles. Where they are not bounded by the ſea, the following ſtates and countries, taking them from weſt to eaſt, are their boundaries, *viz.* Piedmont, Montferat, Milan, Placentia, Parma, the dukedom of Tuſcany, and the republic of Lucca. This tract, though a great part of it is mountainous, and ſome of that barren enough, yet produces plenty of excellent fruit, good paſture, wood, garden-ſtuff, and mulberry-trees, with ſome wine and oil, but little corn. What they want of the laſt, they have either from Lombardy, Sicily, or Naples.

Genoa ſtands on the coaſt of the Mediterranean ſea, at the bottom of a little gulph, partly on the flat, and partly on the declivity, of a pleaſant hill; in conſequence of which, it appears to great advantage from the ſea. It is defended on the land-ſide a by double wall, which in circumference is about ten Italian miles. Two of the ſtreets conſiſt entirely of a double ſtraight row of magnificent palaces. The others, though clean and well paved, are crooked and narrow. The palaces of the nobility are almoſt all of marble, and many of them are painted on the outſide. That there ſhould be ſuch a profuſion of marble here, is not to be wondered at, as the neighbouring hills abound with it. The city contains a vaſt number of palaces, churches, and convents, and ſeveral hoſpitals. The palace where the doge reſides, and where the great and little council, and the two colleges of the procuratori and governatori aſſemble, is a large ſtone building in the centre of the city: but it contains ſome fine paintings in freſco; two ſtatues of Andrew and John Doria in white marble; and an arſenal, in which are ſaid to be arms for thirty-four thouſand men, with a ſhield, containing one hundred and twenty piſtol-barrels, and thirty-three coats of mail, which, it is pretended, were worn by as many Genoeſe heroines in a croiſade. Of the churches, the fineſt are thoſe of the annunciation, St Mary Carignan, St Dominic, and St Martha. In the cathedral is a diſh made of a ſingle emerald. All the inhabitants here, except the principal ladies, who are carried in chairs, walk on foot, on account of the narrowneſs or ſteepneſs of the ſtreets. The fortifications of the city, towards the ſea, are remarkably ſtrong. There are two fine ſtone-bridges over the rivers Bonzevera and Biſagno, the firſt whereof waſhes the weſt, and the other the eaſt ſide of the city, within which there is alſo a ſurpriſing ſtone-bridge joining two hills. The harbour, though large, is far from being ſafe; but no care or expence have been ſpared, to render it as ſafe and commodious as poſſible. The wind to which it is moſt expoſed, is that called *Labeccio*, or the ſouth-weſt. The place where the republic's galleys lie, is called the Darſena, where are a great number of Turkiſh ſlaves. On a rock, on the weſt ſide of the harbour, is the fanal or light-houſe, a high tower, on the top of which is a lanthorn, containing thirty-ſix lamps. The trade of Genoa is chiefly in velvets, damaſks, pluſh, and other ſilks, brocades, lace, gloves, ſweetmeats, fruits, oil, Parmeſan cheeſe, anchovies, and medicinal drugs from the Levant; but the badneſs of the harbour, and the high price of commodities, greatly check its commerce. In 1751, Genoa was declared a free port for ten years, under certain reſtrictions: in that called *Porto Franco*, any merchant may have a ware-houſe, and import or export goods duty free; but ſuch as are diſpoſed of in the city, or on the continent, are taxed pretty high. The nobility are allowed to trade in the wholeſale way; to carry on velvet, ſilk, and cloth manufactures; and to have ſhares in merchant-ſhips: and ſome of them, as the Palavacini, are actually the greateſt merchants in Genoa. Another very profitable article of trade carried on by them is banking, and dealing in bills of exchange. A new academy of painting, ſculpture, civil and military architecture, was inſtituted here in 1751. One may walk the ſtreets of Genoa in the night with the greateſt ſafety, which is more than can be ſaid of many cities in Italy. Exceſſive ſplendor and luxury are, in ſeveral reſpects, reſtrained by ſalutary laws. No beggars are permitted to aſk alms in Genoa, and the inns are better than thoſe at Turin. When a ſingle perſon is buried, a kind of garland of all ſorts of artificial flowers is placed on the coffin. The Genoeſe in general are eſteemed crafty, induſtrious, and inured to labour above the other Italians.

GENSING. See Panax.

GENTIANA, Gentian, in botany, a genus of the digynia order, belonging to the pentandria claſs of plants. The moſt remarkable ſpecies are the following:

1. The lutea, or common gentian of the ſhops. It is a native of the mountainous parts of Germany; from whence the roots, the only part uſed in medicine, are brought to this country. Theſe have a yellowiſh-brown colour, and a very bitter taſte. The lower leaves are of an oblong oval ſhape, a little pointed at the end, ſtiff, of a yellowiſh green, and have five large veins on the back of each. The ſtalk riſes four or five feet high, garniſhed with leaves growing by pairs at each joint, almoſt embracing the ſtalk at their baſe. They are of the ſame form with the lower, but diminiſh gradually in their ſize to the top. The flowers come out in whorls at the joints on the upper part of the ſtalks, ſtanding on ſhort foot-ſtalks, whoſe origin is in the wings of the leaves. They are of a pale yellow colour.—The roots of this plant are very frequently uſed in medicine as ſtomachic bitters. In taſte they are leſs exceptionable than moſt of the ſubſtances of this claſs. Infuſions of gentian-root flavoured with orange-peel, are ſufficiently grateful. Some years ago a poiſonous root was diſcovered among the gentian brought to London; the uſe of which occaſioned violent diſorders, and in ſome caſes death. This root is eaſily diſtinguiſhed from the gentian, by its being internally of a white colour, and void of bitterneſs.

2. The centaureum, or leſſer centaury of the ſhops, is a native of many parts of Britain. It grows on dry paſtures; and its height is commonly proportioned to the goodneſs of the ſoil, as in rich ſoils it will grow to the height of a foot, but in poor ones not above three or four inches. It is an annual plant, with upright branching ſtalks, garniſhed with ſmall leaves, placed by pairs. The flowers grow in form of an umbel at the top of the ſtalk, and are of a bright purple colour. They come out in July, and the ſeed ripens in autumn. The plant cannot be cultivated in gardens. The tops are an uſeful aperient bitter, in

which view they are often uſed in the preſent practice of medicine.

GENTILE, in matters of religion, a Pagan, or worſhipper of falſe gods.

The origin of this word is deduced from the Jews, who called all thoſe who were not of their name גוים gojim, i. e. *gentes*, which in the Greek tranſlations of the Old Teſtament is rendered τα εθνα; in which ſenſe it frequently occurs in the New Teſtament; as in Matth. vi. 32. "All theſe things the nations or Gentiles ſeek." Whence the Latin church alſo uſed *gentes* in the ſame ſenſe as our *Gentiles*, eſpecially in the New Teſtament. But the word *gertes* ſoon got another ſignification, and no longer meant all ſuch as were not Jews; but thoſe only who were neither Jews nor Chriſtians, but followed the ſuperſtitions of the Greeks and Romans, &c. In this ſenſe it continued among the chriſtian writers, till their manner of ſpeech, together with their religion, was publicly and by authority received in the empire; when *gentiles*, from *gentes*, came into uſe: and then both words had two ſignifications, viz. in treatiſes or laws concerning religion, they ſignified Pagans, neither Jews nor Chriſtians; and in civil affairs, they were uſed for all ſuch as were not Romans.

Gentile, in the Roman law and hiſtory, a name which ſometimes expreſſes what the Romans otherwiſe called *barbarians*, whether they were allies of Rome or not: but this word was uſed in a more particular ſenſe for all ſtrangers and foreigners not ſubject to the Roman empire.

Gentilis (Albericus), profeſſor of civil law at Oxford; an Italian by birth. He had quitted Italy with his father, on account of religion. He wrote ſeveral works; three books, in particular, *De jure belli*, which have not been unſerviceable to Grotius. He died at London in 1608.

Gentilis (Scipio), brother to the former, and as celebrated a civilian as he, forſook his native country that he might openly profeſs the Proteſtant religion. He was counſellor of the city of Nuremberg, and profeſſor of law with uncommon reputation. He was a great humaniſt; and in his lectures, as well as books, mixed the flowers of polite learning with the thorns of the law. He died in 1616.

GENTLEMAN. Under this denomination are comprehended all above the rank of yeomen *, whereby noblemen are truly called *gentlemen*.

* See *Commonalty*

A gentleman is uſually defined to be one who, without any title, bears a coat of arms, or whoſe anceſtors have been freemen; and by the coat that a gentleman giveth, he is known to be, or not to be, deſcended from thoſe of his name that lived many hundred years ſince.

The word is formed of the French *gentilhomme*; or rather of *gentil*, "fine, faſhionable, or becoming;" and the Saxon *man*, q. d. *honeſtus*, or *honeſto loco natus*.—The ſame ſignification has the Italian *gentilhuomo*, and the Spaniſh *hidalgo*, or *hijo dalgo*, that is, the ſon of ſomebody, or of a perſon of note.—If we go farther back, we ſhall find *gentleman* originally derived from the Latin *gentilis homo*; which was uſed among the Romans for a race of noble perſons of the ſame name, born of free or ingenuous parents, and whoſe anceſtors had never been ſlaves or put to death by law. Thus Cicero, in his *Topics*, "*Gentiles ſunt, qui inter ſe eodem ſunt nomine, ab ingenuis oriundi, quorum majorum nemo ſervitutem ſervivit, qui capite non ſunt diminuti*, &c.—Some hold that it was formed from *gentile*, i. e. pagan; and that the ancient Franks, who conquered Gaul, which was then converted to Chriſtianity, were called *gentiles* by the natives, as being yet heathens.—Others relate, that towards the declenſion of the Roman empire, as recorded by Ammianus Marcellinus, there were two companies of brave ſoldiers, the one called *gentilium*, and the other *ſcutariorum*; and that it was hence we derive the names *gentleman* and *eſquire*. See Esquire.—This ſentiment is confirmed by Paſquier, who ſuppoſes the appellation *gentiles* and *ecuyers* to have been tranſmitted to us from the Roman ſoldiery; it being to the *gentiles* and *ſcutarii*, who were the braveſt of the ſoldiery, that the principal benefices and portions of lands were aſſigned. See Benefice.—The Gauls obſerving, that, during the empire of the Romans, the *ſcutarii* and *gentiles* had the beſt tenements or appointments of all the ſoldiers on the frontiers of the provinces, became inſenſibly accuſtomed to apply the ſame names, *gentilhommes* and *ecuyers*, to ſuch as they found their kings gave the beſt proviſions or appointments to.

Gentleman-*Uſher of the Black Rod*. See Rod.

Gentlemen *of the Chapel*; officers whoſe duty and attendance is in the royal chapel, being in number thirty-two. Twelve of them are prieſts; the other twenty, commonly called *clerks of the chapel*, aſſiſt in the performance of divine ſervice. One of the firſt twelve is choſen for confeſſor of the houſehold; whoſe office it is to read prayers every morning to the houſehold ſervants, to viſit the ſick, examine and prepare communicants, and adminiſter the ſacrament. One of twenty clerks, well verſed in muſic, is choſen firſt organiſt, who is maſter of the children, to inſtruct them in muſic, and whatever elſe is neceſſary for the ſervice of the chapel; a ſecond is likewiſe an organiſt; a third, a lutaniſt; and a fourth, a violiſt. There are likewiſe three vergers, ſo called from the ſilver rods they carry in their hands; being a ſerjeant, a yeoman, and groom of the veſtry: the firſt attends the dean and ſub-dean, and finds ſurplices and other neceſſaries for the chapel; the ſecond has the whole care of the chapel, keeps the pews, and ſeats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

GENUS, among metaphyſicians and logicians, denotes a number of beings which agree in certain general properties common to them all: ſo that a genus is nothing elſe but an abſtract idea, expreſſed by ſome general name or term. See Logic, n° 18, &c.

It is plain, therefore, that by a genus we do not barely ſignify one particular thing, nor yet a plurality of things; but a ſort or kind of things, all agreeing in certain general properties.

Thus animal is ſaid to be a genus in reſpect of man and brute, in regard man and brute agree in the common nature and character of animal: ſo a right-lined figure of four ſides, is a genus in reſpect of a parallelogram and a trapezium; and ſo likewiſe is ſubſtance, in reſpect of ſubſtance extended, which is body, and thinking ſubſtance, which is mind.

The method by which the mind advances to form genera is, according to Mr Locke, as follows.—Obſerving ſeveral things, that differ from the mind's idea of man, for inſtance, and therefore cannot be comprehended under that name, to agree with man in ſome certain qualities; by retaining only thoſe qualities, and uniting them into one idea, it gets another more general idea, to which giving a name, it makes a new genus, or a term of a more comprehenſive extenſion. Thus, by leaving out the ſhape, and other properties ſignified by the word *man*, and retaining only a body with life, ſenſe, and ſpontaneous motion, we form the idea ſignified by the name *animal*. By the ſame way the mind proceeds to body, ſubſtance, and at laſt to being, thing, and ſuch univerſal terms as ſtand for any ideas whatever.

This ſhews the reaſon why, in defining things, we make uſe of the genus, namely, to ſave the labour of enumerating the ſeveral ſimple ideas which the next term ſtands for: from whence it appears, that genus is no more than an abſtract idea, comprehending a greater or leſs number of ſpecies, or more particular claſſes. See SPECIES.

GENUS is alſo uſed for a character or manner applicable to every thing of a certain nature or condition: in which ſenſe it ſerves to make capital diviſions in divers ſciences, as rhetoric, anatomy, and natural hiſtory.

GENUS, in rhetoric. Authors diſtinguiſh the art of rhetoric, as alſo orations or diſcourſes produced thereby, into three genera or kinds, demonſtrative, deliberative, and judiciary. To the demonſtrative kind belong panegyrics, genethliacons, epithalamiums, funeral harangues, &c. To the deliberative kind belong perſuaſions, diſſuaſions, commendations, &c. To the judiciary kind belong defences and accuſations.

GENUS, in natural hiſtory, a ſubdiviſion of any claſs or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters. See BOTANY and ZOOLOGY.

GENUS, in muſic, by the ancients called *genus melodiæ*, is a certain manner of dividing and ſubdividing the principles of melody; that is, the conſonant and diſſonant intervals, into their concinnous parts.

The moderns conſidering the octave as the moſt perfect of intervals, and that whereon all the concords depend, in the preſent theory of muſic, the diviſion of that interval is conſidered as containing the true diviſion of the whole ſcale.

But the ancients went to work ſomewhat differently: the diateſſaron, or fourth, was the leaſt interval which they admitted as concord; and therefore they ſought firſt how that might be moſt conveniently divided; from whence they conſtituted the diapente and diapaſon.

The diateſſaron being thus, as it were, the root and foundation of the ſcale, what they called the genera, or kinds, aroſe from its various diviſions; and hence they defined the *genus modulandi* to be the manner of dividing the tetrachord and diſpoſing its four ſounds as to ſucceſſion.

The genera of muſic were three, the enharmonic, chromatic, and diatonic. The two firſt were variouſly ſubdivided: and even the laſt, tho' that is commonly reckoned to be without any ſpecies; yet different authors have propoſed different diviſions under that name, without giving any particular names to the ſpecies, as was done to the other two.

For the characters, &c. of theſe ſeveral genera, ſee ENHARMONIC, CHROMATIC, and DIATONIC.

GEOCENTRIC, in aſtronomy, is applied to a planet, or its orbit, to denote it concentric with the earth, or as having the earth for its centre, or the ſame centre with the earth.

GEOFFREY *of* MONMOUTH, biſhop of St Aſaph, called by our ancient biographers *Galloſridus Monumetenſis*. Leland conjectures that he was educated in a Benedictine convent at Monmouth, where he was born; and that he became a monk of that order. Bale, and after him Pits, call him archdeacon of Monmouth; and it is generally aſſerted that he was made biſhop of St Aſaph in the year 1151 or 1152, in the reign of king Stephen. His hiſtory was probably finiſhed after the year 1138. It contains a fabulous account of Britiſh kings, from the Trojan Brutus, to the reign of Cadwallader in the year 690. But Geoffrey, whatſoever cenſure he may deſerve for his credulity, was not the inventor of the ſtories he relates. It is a tranſlation from a manuſcript written in the Britiſh language, and brought to England from Armorica by his friend Gualter, archdeacon of Oxford. But the atchievements of king Arthur, Merlin's prophecies, many ſpeeches and letters, were chiefly his own addition. In excuſe for this hiſtorian, Mr Wharton judiciouſly obſerves, that fabulous hiſtories were then the faſhion, and popular traditions a recommendation to his book.

GEOFFROY (STEPHEN FRANCIS), a celebrated phyſician, botaniſt, and chemiſt, born at Paris in 1672. After having finiſhed his ſtudies, he travelled into England, Holland, and Italy. In 1704, he received the degree of doctor of phyſic at Paris; and at length became profeſſor of chemiſtry, and phyſician of the Royal College. He was a member of the Royal Society of London, and of the Academy of Sciences. He wrote, 1. Several very curious Theſes in Latin, which were afterwards tranſlated into French. 2. An excellent treatiſe, intitled *Tractatus de Materia Medica, ſive de Medicamentorum ſimplicium, hiſtoria, virtute, delectu, & uſu*. He died at Paris, in 1731.

GEOGRAPHICAL MILE, the ſame with the ſea-mile; being one minute, or the 60th part of a degree of a great circle on the earth's ſurface.

GEOGRAPHY.

GEOGRAPHY (γεωγραφια, from γη *terra*, and γραφω *ſcribo*); the doctrine or knowledge of the earth, both as in itſelf, and as to its affections; or a deſcription of the terreſtrial globe, and particularly of the known and inhabitable parts thereof, with all its different diviſions.

Sect. I. *Hiſtory of the Science.*

At what time the ſcience of geography began firſt to be ſtudied among mankind is entirely uncertain. It is generally agreed, that the knowledge of it was derived to the Greeks, who firſt of the European nations cultivated this ſcience, from the Egyptians or Babylonians; but it is impoſſible to determine which of theſe two nations had the honour of the invention. Herodotus tells us, that the Greeks firſt learned the pole, the gnomon, and the twelve diviſions of the day, from the Babylonians. By Pliny, and Diogenes Laertius, however, we are told, that Thales of Miletus firſt found out the paſſage of the ſun from tropic to tropic; which he could not have done without the aſſiſtance of a gnomon. He is ſaid to have been the author of two books, the one on the tropic, and the other on the equinox; both of which he probably determined by the gnomon; and by this he was led to the diſcovery of the four ſeaſons of the year, which are determined by the ſolſtices and equinoxes.

1 Seaſons of the year diſcovered by Thales.

Thales divided the year into 365 days; which was undoubtedly a method diſcovered by the Egyptians, and communicated by them to him. It is ſaid to have been invented by the ſecond Mercury, ſurnamed Triſmegiſtus, who, according to Euſebius, lived about 50 years after the *Exodus*. Pliny tells us expreſsly, that this diſcovery was made by obſerving when the *ſhadow returned to its marks*; a clear proof that it was done by the gnomon. Thales alſo knew the method of determining the height of bodies by the length of their ſhadows, as appears by his propoſing this method for meaſuring the height of the Egyptian pyramids. Hence many learned men have been of opinion, that as the uſe of the gnomon was known in Egypt long before the dawn of learning in Greece, the pyramids and obeliſks, which to common travellers appeared only to be buildings of magnificence, were in reality as many ſun-dials on a very large ſcale, and built with a deſign to aſcertain the ſeaſon of the year, by the variation of the length of their ſhadows: and, in confirmation of this opinion, it was found by M. Chazelles in 1694, that the two ſides, both of the larger and ſmaller pyramids, ſtood exactly north and ſouth; ſo that, even at this day, they form true meridian lines.

2 Conjecture concerning the uſe of the Egyptian pyramids and obeliſks.

From the days of Thales, who flouriſhed in the ſixth century before Chriſt, very little ſeems to have been done towards the eſtabliſhment of geography for 200 years. During this period, there is only one aſtronomical obſervation recorded; namely, that of Meton and Euctemon, who obſerved the ſummer ſolſtice at Athens, during the archonſhip of Apſeudes, on the 21ſt of the Egyptian month Phamenoth, in the morning, being the 27th of June, 432. B. C. This obſervation was made by watching narrowly the ſhadow of the gnomon, and was done with a deſign to fix the beginning of their cycle of 19 years.

3 Longitudes and latitudes determined.

Timocharis and Ariſtillus, who began to obſerve about 295 B. C. ſeem to have been the firſt who attempted to fix the longitudes and latitudes of the fixed ſtars, by conſidering their diſtances from the equator. One of their obſervations gave riſe to the diſcovery of the preceſſion of the equinoxes, which was firſt obſerved by Hipparchus about 150 years after; and he made uſe of Timocharis and Ariſtillus's method, in order to delineate the parallels of latitude, and the meridians on the ſurface of the earth; thus laying the foundation of the ſcience of geography as we have it at preſent.

But though the latitudes and longitudes were thus introduced by Hipparchus, they were not attended to by any of the intermediate aſtronomers, till the days of Ptolemy. Strabo, Vitruvius, and Pliny, have all of them entered into a minute geographical deſcription of the ſituation of places, according to the length of the ſhadows of the gnomon, without taking the leaſt notice of the degrees and minutes of longitude and latitude.

4 Account of the an ent maps

The diſcovery of the longitudes and latitudes immediately laid a foundation for making maps, or delineations of the ſurface of the earth *in plano*, on a very different plan from what had been attempted before. Formerly the maps were little more than rude outlines and topographical ſketches of different countries. The earlieſt were thoſe of Seſoſtris, mentioned by Euſtathius; who ſays, that "this Egyptian king, having traverſed great part of the earth, recorded his march in maps, and gave copies of his maps not only to the Egyptians, but to the Scythians, to their great aſtoniſhment.—Some have imagined, that the Jews made a map of the Holy Land, when they gave the different portions to the nine tribes at Shiloh: for Joſhua tells us, that they were ſent to walk through the land, and that they *deſcribed it in ſeven parts in a book*; and Joſephus tells us, that when Joſhua ſent out people from the different tribes to meaſure the land, he gave them, as companions, perſons well ſkilled in geometry, who could not be miſtaken in the truth.

The firſt Grecian map on record is that of Anaximander, mentioned by Strabo, lib. i. p. 7. It has been conjectured by ſome, that this was a general map of the then known world, and is imagined to be the one referred to by Hipparchus under the deſignation of the *ancient map*. Herodotus minutely deſcribes a map made by Ariſtagoras tyrant of Miletus, which will ſerve to give us ſome idea of the maps of thoſe ages. He tells us, that Ariſtagoras ſhewed it to Cleomenes king of Sparta, with a view of inducing him to attack the king of Perſia, even in his palace at Suſa, in order to reſtore the Ionians to their ancient liberty. It was traced upon braſs or copper, and contained the intermediate countries which were to be traverſed in that march. Herodotus tells us, that it contained "the whole circumference of the earth, the whole ſea, or ocean, and all the rivers:" but theſe words muſt not be underſtood literally. From the ſtate of geography at that time, it may be fairly concluded that by the *ſea* was meant no more than the Mediterranean; and therefore, the earth or land ſignified the coaſts of that ſea, and more particularly the Leſſer Aſia, extending towards the middle of Perſia. The rivers were the Halys, the Euphrates, and Tigris, which Herodotus mentions as neceſſary to be croſſed in that expedition. It contained one ſtraight line, called the *Royal Highway*, which took in all the ſtations or places of encampment from Sardis to Suſa. Of theſe there were 111 in the whole journey, containing 13,500 ſtadia, or 1687 ½ Roman miles of 5000 feet each.

Theſe itinerary maps of the places of encampment were indiſpenſably neceſſary in all armies. Athenæus quotes Bæton as author of a work intitled, *The encampments of Alexander's march*; and likewiſe Amyntas to the ſame purpoſe. Pliny tells us, that Diognetus and Bæton were the ſurveyors of Alexander's marches, and then quotes the exact number of miles according to their menſuration; which he afterwards confirms by the letters of Alexander himſelf. It likewiſe appears, that Alexander was very careful in examining the meaſures of his ſurveyors, and took care to employ the moſt ſkilful in every country for this purpoſe. The ſame author alſo acquaints us, that a copy of this great monarch's ſurveys, was given by Xenocles his treaſurer, to Patrocles the geographer, who, as Pliny informs us, was admiral of the fleets of Seleucus and Antiochus. His book on geography is often quoted both by Strabo and Pliny; and it appears, that this author furniſhed Eratoſthenes with the principal materials for conſtructing his map of the oriental part of the world.

Eratoſthenes was the firſt who attempted to reduce geography to a regular ſyſtem, and introduced a regular parallel of latitude. This was traced over certain places where the longeſt day was of the ſame length. He began it from the ſtraits of Gibraltar; and it thence paſſed through the Sicilian ſea, and near the ſouthern extremities of Peloponneſus. From thence it was continued through the Iſland of Rhodes and the Bay of Iſſus; and there entering Cilicia, and croſſing the rivers Euphrates and Tigris, it was extended to the mountains of India. By means of this line, he endeavoured to rectify the errors of the ancient map, ſuppoſed to be that of Anaximander. In drawing this parallel, he was regulated by obſerving where the longeſt day was fourteen hours and an half, which Hipparchus afterwards determined to be the latitude of 36 degrees.

The firſt parallel through Rhodes was ever afterwards conſidered with a degree of preference, like the foundation-ſtone of all ancient maps; and the longitude of the then known world was often attempted to be meaſured in ſtadia and miles, according to the extent of that line, by many ſucceeding geographers. Eratoſthenes ſoon after attempted, not only to draw other parallels of latitude, but alſo to trace a meridian, at right angles to theſe, paſſing through Rhodes and Alexandria, down to Syene and Meroë; and as the progreſs he thus made tended naturally to enlarge his ideas, he at laſt undertook a ſtill more arduous taſk, namely, to determine the circumference of the globe, by an actual meaſurement of a ſegment of one of its great circles. Here he made his computation by uniting certain accurate obſervations made in the heavens, with a correſponding diſtance carefully ſurveyed and taken upon a meridian of the earth. The ſegment of the meridian which he pitched upon for this purpoſe, was that between Alexandria and Syene, the diſtance betwixt which places was found to be 5000 ſtadia. The angle of the ſhadow on the ſun-dial of Alexandria was equal to the 50th part of the circle; but at Syene there was no ſhadow on the day of the ſummer ſolſtice; and that this might be the more accurately obſerved, they dug a deep well, which being perpendicular, was completely illuminated at the bottom when the ſun was vertical. Even this, however, was not ſufficient to give the exact line of the tropic; becauſe the ſun was found to be vertical, or to caſt no ſhadow at all, for a circular ſpace of 300 ſtadia. The reaſon of this is, that the apparent diameter of the ſun is 32 minutes, and he muſt therefore appear perpendicular to an extent of ground equivalent to that ſpace.

The inveſtigation of this problem of the circumference of the earth was eſſentially neceſſary for determining the radical principles of all maps; and therefore the moſt eminent of the ancient geographers made repeated attempts to diſcover this exactly. Eratoſthenes made the circumference 250,000 or 252,000 ſtadia; thus allowing 700 ſtadia, or 87½ Roman miles, to each degree. Hipparchus added 25,000 ſtadia to this meaſurement of Eratoſthenes, which increaſed the degree to 96 Roman miles. Poſſidonius, however, having obtained a more accurate meaſurement than that of Eratoſthenes, reduced the circumference of the earth to 180,000 ſtadia, and the degree to 62½ Roman miles.

7
Inaccuracy of the ancient maps.

The map of Eratoſthenes, though the beſt of which antiquity can boaſt, was nevertheleſs exceedingly imperfect and inaccurate. It contained little more than the ſtates of Greece, and the dominions of the ſucceſſors of Alexander, digeſted according to the ſurveys above-mentioned. He had ſeen, indeed, and has quoted, the voyages of Pytheas into the great Atlantic ocean, which gave him ſome faint idea of the weſtern parts of Europe; but ſo imperfect, that they could not be realiſed into the outlines of a chart. Strabo tells us, that he was extremely ignorant of Gaul, Spain, Germany, and Britain. He was equally ignorant of Italy, the coaſts of the Adriatic, Pontus, and all the countries towards the north. We are alſo told by the ſame author, that Eratoſthenes made the diſtance between Epidamnus or Dyrrhachium on the Adratic, and the bay of Thermæ on the Ægean ſea, to be only 900 ſtadia, when in reality it was above 2000; and in another inſtance, he had enlarged the diſtance from Carthage to Alexandria to 15,000 ſtadia, when in reality it was no more than 9000.

Such was the ſtate of geography and the nature of the maps prior to the time of Hipparchus; who, as already obſerved, made a cloſer connection between geography and aſtronomy, by determining the longitudes and latitudes from celeſtial obſervations. It muſt be owned, however, that the previous ſteps to this new projection of the ſphere had been in a great meaſure made eaſy by Archimedes, upwards of 50 years before the time of Hipparchus, when he invented his noble theorems for meaſuring the ſurface of a ſphere and its different ſegments.

It appears that war has been generally the occaſion of making the moſt accurate maps of different countries; and therefore geography made great advances from the progreſs of the Roman arms. In all the provinces occupied by that people, we find that camps were every where conſtructed at proper intervals, and roads were raiſed with ſubſtantial materials, for making an eaſier communication between them; and thus civiliſation and ſurveying were carried on according to ſyſtem throughout the extent of that large empire.

Every new war produced a new ſurvey and itinerary of the countries where the ſcenes of action paſſed; ſo that the materials of geography were accumulated by every additional conqueſt. Polybius tells us, that at the beginning of the ſecond Punic war, when Hannibal was preparing his expedition againſt Rome, the countries through which he was to paſs, were carefully meaſured by the Romans. Julius Cæſar cauſed a general ſurvey of the Roman empire to be made, by a decree of the ſenate. Three ſurveyors, Zenodoxus, Theodotus, and Polyclitus, had this taſk aſſigned them, and are ſaid to have completed it in 25 years. The Roman itineraries that are ſtill extant, alſo ſhew what care and pains they had been at in making ſurveys in all the different provinces of their empire; and Pliny has filled the third, fourth, and fifth books of his Natural Hiſtory with the geographical diſtances that were thus meaſured. We have likewiſe another ſet of maps ſtill preſerved to us, known by the name of the *Peutingerian Tables*, publiſhed by Welſer and Bertius, which give a ſufficient ſpecimen of what Vegetius calls the *Itinera Picta*, for the clearer direction of their armies in their march.

The Roman empire had been enlarged to its greateſt extent, and all its provinces well known and ſurveyed, when Ptolemy, in the reign of Antoninus Pius, about 150 years after Chriſt, compoſed his ſyſtem of geography. The principal materials he made uſe of for compoſing this work, were *the proportions of the gnomon to its ſhadow*, taken by different aſtronomers at the times of the equinoxes and ſolſtices; calculations founded upon the length of the longeſt days; the meaſures or computed diſtances of the principal roads contained in their ſurveys and itineraries; and the various reports of travellers and navigators, who often determined the diſtances of places by hearſay and conjecture. All theſe were compared together, and digeſted into one uniform body or ſyſtem; and afwards were tranſlated by him into a new mathematical language, expreſſing the different degrees of longitude and latitude, according to the invention of Hipparchus, but which Ptolemy had the merit of carrying into full practice and execution, after it had been neglected for upwards of 250 years. With ſuch imperfect and inaccurate materials, it is no wonder to find many errors in Ptolemy's ſyſtem. Neither were theſe errors ſuch as had been introduced in the more diſtant extremities of his maps, but even in the very centre of that part of the world which was the beſt known to the ancient Greeks and Romans, and where all the famed ancient aſtronomers had made their obſervations.—Yet this ſyſtem, with all its imperfections, continued in vogue till the beginning of the preſent century. The improvements in geography which at that time, and ſince have taken place, were owing to the great progreſs made in aſtronomy by ſeveral eminent men who lived during that period. More correct methods and inſtruments for obſerving the latitude were found out, and the diſcovery of Jupiter's ſatellites afforded a much eaſier method of finding the longitudes than was formerly known. The voyages made by different nations alſo, which were now become much more frequent than formerly, brought to the knowledge of the Europeans a vaſt number of countries utterly unknown to them before. The late voyages of Captain Cooke, made by order of his Britannic Majeſty, have contributed more to the improvement of geography than any thing that has been done during the preſent century; ſo that now the geography of the utmoſt extremities of the earth is in a fair way of being much better known to the moderns, than that of the moſt adjacent countries was to the ancients. This, however, muſt be underſtood only of the ſea-coaſts of theſe countries; for, as to their internal geography, it is leſs known now than before, except in a very few places.

8 Geograph ſtill imp fect.

On the whole, it may be obſerved, that geography is a ſcience even yet far from perfection. The maps of America and the eaſtern parts of Aſia are, perhaps, more unfiniſhed than any of the reſt. Even the maps of Great Britain and Ireland are very imperfect and unſatiſfactory; and the numbers we have of them, varied, and republiſhed, without any real improvement, juſtly confirm an obſervation made by Lord Bacon, namely, that an opinion of plenty is one of the cauſes of want. The late Dr Bradley was of opinion, that there were but two places in England whoſe longitude might be depended upon as accurately taken; and that theſe were the obſervatory at Greenwich, and Serburncaſtle the ſeat of the Earl of Macclesfield in Oxfordſhire; and that their diſtance was one degree in ſpace, or four minutes in time. Even this was found to be inaccurate, the diſtance in time being obſerved by the late tranſit of Venus to be only three minutes and forty-ſeven ſeconds. It were well, however, if there were no greater errors with regard to other places: but if we examine the longitude of the Lizard, we ſhall find ſcarce any two geographers that agree concerning it; ſome making it 4° 40′ from London; others 5°, and 5° 14′; while ſome enlarge it to 6°. Our beſt maps are therefore ſtill to be conſidered as unfiniſhed works, where there will always be many things to be added and corrected, as different people have an opportunity.

SECT. II. *Principles and Practice of Geography.*

THE practical part of geography conſiſts in meaſuring the diſtances between different places on the ſurface of the earth, and laying them down upon paper according to their different longitudes and latitudes. For this purpoſe, an exact obſervation of the longitudes and latitudes of the different places is ſufficient; for when once theſe are known, the diſtance between the places themſelves is eaſily found, that is to ſay, provided the extent of the circumference of the earth is known; for without this, it is impoſſible to aſcertain the diſtance between any two places except by actual menſuration. For the ſolution of this problem, it is only neceſſary to meaſure one degree of the earth's ſurface; which may be done in the following manner. Having found exactly the latitude of the place from whence your menſuration is to commence, by the directions given under ASTRONOMY, n°209. proceed exactly northward or ſouthward, carefully meaſuring the diſtance as you go along, till you find by another celeſtial obſervation that you are got to one degree of latitude either farther north or farther ſouth than the place from whence you ſet out. The diſtance between the two places is the length of a degree on the earth's ſurface; and conſequently, if multiplied by 360, will give the meaſure of the whole circumference of the earth.

9 How meaſ degre the e ſurfa

This method, however, though in theory it ſeems to be ſo eaſy and ſimple, is nevertheleſs attended with very great, nay, almoſt inſurmountable, difficulties in practice. It is impoſſible to find a perfect plane on the ſurface of the earth, which extends for ſo great a length. In the menſuration of a degree, therefore, the inequalities with which the earth every where abounds are found to be exceeding great obſtacles. For this reaſon, we are obliged to have recourſe to trigonometrical calculations of the diſtances between different places, till we arrive at one diſtant from that whence we ſet out by a degree of latitude. But it is impoſſible to make any calculation in the trigonometrical way without ſome ſmall error; nay, often not without a very great one; for the different ſtates of the atmoſphere are found greatly to affect trigonometrical menſurations. Hence there hath ariſen a prodigious diſagreement among thoſe who have attempted to meaſure the circumference of the terraqueous globe; for as a degree of the earth's ſurface cannot be meaſured but by many calculations, the error in one being repeated in all the reſt muſt neceſſarily become very conſiderable at laſt. Thoſe who firſt attempted this menſuration, computed the circumference of the earth to be 50,000 Italian miles; by Ptolemy it was reckoned only 21,600 of the ſame miles; and the more modern geometricians have computed the circumference of the earth at about 25,000 miles.

A method more eaſily practicable would ſeem to be by attempting to meaſure the degrees of longitude. We know, that at the equator a degree of longitude is equal to a degree of latitude; but as we advance towards either of the poles, the degrees of longitude continually decreaſe by reaſon of the approximation of the meridians to each other, till at the pole itſelf they totally vaniſh. If we know the length of a degree of longitude at the equator, therefore, we can eaſily, by a geometrical calculation liable to no unavoidable error, find the length of a degree of longitude at any diſtance either north or ſouth from the equator. Again, if we know the meaſure of a degree of longitude at any diſtance from the equator, we may eaſily, by a like calculation, find the length of a degree of longitude at the equator itſelf. If, therefore, attempts are made to meaſure the degrees of longitude at the equator itſelf, and in many different places north and ſouth from it, making at the ſame time proper geometrical calculations, it is plain that all theſe different operations will tend to confirm or correct one another, and by their mutual agreement or diſagreement among themſelves we will know which of them comes neareſt the truth.

As a difference in longitude makes alſo a difference in the hour of the day, we have from thence a much eaſier method of meaſuring a degree of longitude than of meaſuring one of latitude. We know, that if two places are diſtant from each other by 15 degrees of longitude, it will be one o'clock in the afternoon in the one, when it is only twelve o'clock in the other. If they are diſtant from each other by a ſingle degree of longitude, it will be four minutes after twelve at the one, when it is exactly twelve at the other. If they are diſtant half a degree, the difference will be two minutes; or if a quarter of a degree, the difference in time will be one minute. Inſtruments for computing time, are now brought to ſuch a degree of perfection, that if two of them are exactly ſet with each other, they may be ſafely truſted for a much longer time than what is neceſſary for the operation we now ſpeak of. Having therefore choſen our firſt ſtation, and drawn there a meridian line as directed at ASTRONOMY, n°174, 175. we muſt obſerve exactly when the ſun is in the meridian, and then ſet our time-piece to twelve o'clock. We muſt then proceed directly eaſtward or weſtward a conſiderable way, till we arrive at ſome other convenient ſtation; and having there alſo drawn a meridian line, we are to obſerve exactly by it when the ſun comes to the meridian, and looking upon our time-piece at the ſame time, we will know how much the one place differs from the other in longitude by the diſtance of time ſhewn by the time-piece either before or after twelve, when the ſun is exactly in the meridian of the ſecond ſtation.

The advantages which this method hath over the other, ariſe from the exactneſs with which the inſtrument is ſuppoſed to meaſure time, and from there being a leſs ſpace on the ſurface of the earth to be meaſured than in the other. A minute, or even half a minute of time, may be obſerved by a proper inſtrument very exactly; and one of Mr Harriſon's time-pieces may undoubtedly be truſted as perfectly exact for two or three days. If we attempt the menſuration of a degree of longitude at the equator, we muſt chooſe our ſecond ſtation at a conſiderable diſtance before we can expect a variation in time great enough to be obſerved with any tolerable accuracy: thus before a difference of one minute at the equator could be perceived, we muſt travel more than 17 Engliſh miles eaſtward or weſtward; but in the latitude of 60 degrees we would only have half that ſpace to travel, and therefore could meaſure it with more exactneſs; at the latitude of 70 degrees, little more than a third of that ſpace would require to be meaſured; and at 80 degrees, ſcarce an eighth part. The extreme cold in theſe high latitudes, however, renders it almoſt impoſſible to penetrate ſo far; though the voyage of the Hon. Conſtantine Phipps afforded a very favourable opportunity for a menſuration of this kind, and ſeveral as favourable opportunities as could be wiſhed occurred in the voyages of captain Cook, had ſuch a thing been thought of. Yet it is not to be expected that the extent of the earth's circumference will ever be known with great accuracy, though we are certainly not yet arrived at the neareſt approximation to truth which is attainable on this ſubject.

10
Earth not an exact ſphere.

Hitherto we have ſuppoſed the circumference of the earth to be exactly circular, or the globe itſelf to be a perfect ſphere; but, from ſome obſervations, this appears not to be the caſe. Some time ago, the French made an obſervation, ſhewing that a pendulum vibrates ſlower in proportion as it is brought nearer to the equator: that is, the gravity or celerity of deſcent of the pendulum, and of all other bodies, is leſs in countries approaching to the equator than in places near either pole. This excited the curioſity of the celebrated philoſophers Huygens and Newton, who thence conjectured that the earth muſt have ſome other figure than what was commonly ſuppoſed. Sir Iſaac Newton afterwards demonſtrated that this diminution of weight naturally ariſes from the earth's rotation round its axis; which, according to the laws of circular motion, repels all heavy bodies from the axis of motion: ſo that this motion, being ſwifter at the equator than in parts more remote, the weight of bodies muſt alſo be much leſs there than nearer the poles *. —To determine this matter, ſeveral mathematicians were by the French king employed to meaſure a degree on the earth's ſurface in different parts of the world; and, according to their menſurations, the diameter of the earth from north to ſouth is ſhorter than that from eaſt to weſt, by 36 miles.

* See Earth, nº 28.

11 Of finding the longitudes and latitudes.

With regard to the method of finding the longitudes and latitudes of particular places, rules have been already laid down under ASTRONOMY, nº 209. and 282, 283. The ſame thing, however, may be done by other methods. Thus, the latitude may be found by obſerving exactly the meridian altitude of the ſun, and knowing his declination for that day, the declination ſubtracted from the meridian altitude gives the complement of the latitude, and this laſt ſubtracted from 90° leaves the latitude required. As to the longitude, Mr Harriſon, by his invention of time-pieces which go much more exactly than either clocks or watches could be made to do formerly, hath in a great meaſure facilitated that. For, ſuppoſing any perſon, poſſeſſed of one of theſe time-pieces, to ſet out on a journey, *e. g.* from London. If he adjuſts his time-piece properly before he goes away, he will know the hour at London exactly, let him go where he pleaſes; and when he hath proceeded ſo far either eaſtward or weſtward, that a difference is perceived betwixt the hours ſhown by his time-piece, and thoſe on the clocks or watches at the place to which he goes, the diſtance of that place from London in degrees and minutes of longitude will be known; and if the length of a degree of longitude is known, the real diſtance between the two places may alſo be eaſily found. It is not to be expected, however, that any inſtrument, with whatever care it may be conſtructed, can always be depended upon as an exact meaſurer of time; and therefore frequent corrections of longitudes taken in this manner will be neceſſary. The method of finding the longitude from the eclipſes of Jupiter's ſatellites appears to be the beſt of any. Eclipſes of the ſun, and occultations of the ſtars by the moon, are alſo very proper, though they happen but ſeldom. Eclipſes of the moon have alſo been made uſe of for this purpoſe; but it is found impoſſible to obſerve either the beginning or end of a lunar eclipſe with the accuracy neceſſary for determining the longitude of any place. —All theſe different methods agree in this, that they determine the longitude by the difference of time between the obſervation of the phenomenon in two different places; and of this time, four minutes are to be allowed for every degree of longitude either eaſt or weſt.

12 Of the different kinds of maps.

After the geographer is thus become acquainted with the longitudes and latitudes of a great number of different places, he may delineate them upon paper, or make a *map*, either of the whole world, or of any particular country with which he is beſt acquainted. General maps of the world, or of very large tracts, anſwer the purpoſe of ſhewing in what manner the different countries of the world lie with reſpect to each other. They cannot be made of ſuch a ſize as to admit the delineation of many particular towns or cities, neither indeed is it at all required. Where the whole world is delineated at once, the mind can hardly take in more than the idea of the ſituations of different kingdoms from one another; the ſituations of the different cities of each particular kingdom being almoſt wholly overlooked, and not attended to: and this happens likewiſe where a very large portion of the globe, as one of the four quarters, is repreſented on a ſingle map. Beſides theſe, therefore, it is neceſſary to have particular maps of all the different countries done upon a larger ſcale, that thus the mind may not be fatigued by endeavouring to comprehend too much at once. The qualifications which maps ought to have, in order to render them complete, are, 1. That they repreſent the countries exactly of the ſame ſhape, and in the ſame proportions to the eye, that they really have on the earth itſelf. 2. That the diviſions of one country from another be diſtinctly marked, and readily perceptible, without a diſagreeable and tedious ſearch. 3. That the longitudes and latitudes of different places be found exactly on the map, and with little or no trouble.

The foundation of all maps is what is called *the projection of the ſphere*, i. e. the delineation of thoſe circles apparently traced out by the ſun in the heavens, upon ſome ſubſtance, either plane or ſpherical, deſigned to repreſent the ſurface of the earth; upon which alſo are delineated the parallels of latitude, and the meridians, in as great numbers as the ſize of the map will admit of without confuſion.

Theſe delineations upon a ſpherical ſurface are very eaſy: and under the article GLOBE, full directions are given for the conſtruction of the ſpherical ſubſtances upon which maps of the earth and the heavens are uſually delineated; and which, when furniſhed with the reſt of their apparatus, are called *terreſtrial* and *celeſtial globes*. The method of drawing the maps for theſe globes, is never followed in any other caſe; for which reaſon it is alſo referred to the article GLOBE. The ordinary kinds of maps are conſtructed by delineating the circles of the ſphere upon a plane ſurface, according to the rules of perſpective. This is properly the projection of the ſphere; and is deſigned to give a view of the terraqueous globe, as it would appear, at ſome diſtance, to an eye that could take in the whole extent of it at once.

§. 1. *Of Projections of the Sphere, and Maps.*

OF projections there are two kinds, the *orthographic* and *ſtereographic*; both of which repreſent the ſurface of the earth projected upon the plane of one of its great circles.

Ortho phic jectio

I. The *orthographic* ſuppoſes the eye to be placed at an infinite diſtance in the axis of the circle of projection, while the ſecond ſuppoſes it to be only in the pole of that circle. The circles on which the projections are uſually made, are, the equator, ſome of the meridians, or the rational horizon of ſome particular place. For maps of the world, a meridian is generally choſen; and moſt commonly that one which paſſes through Ferro, one of the Canary Iſlands, becauſe thus the continents of Europe, Aſia, and Africa, are conveniently delineated in one circle, and America in the other.

3 MA 53

Fig. 1.

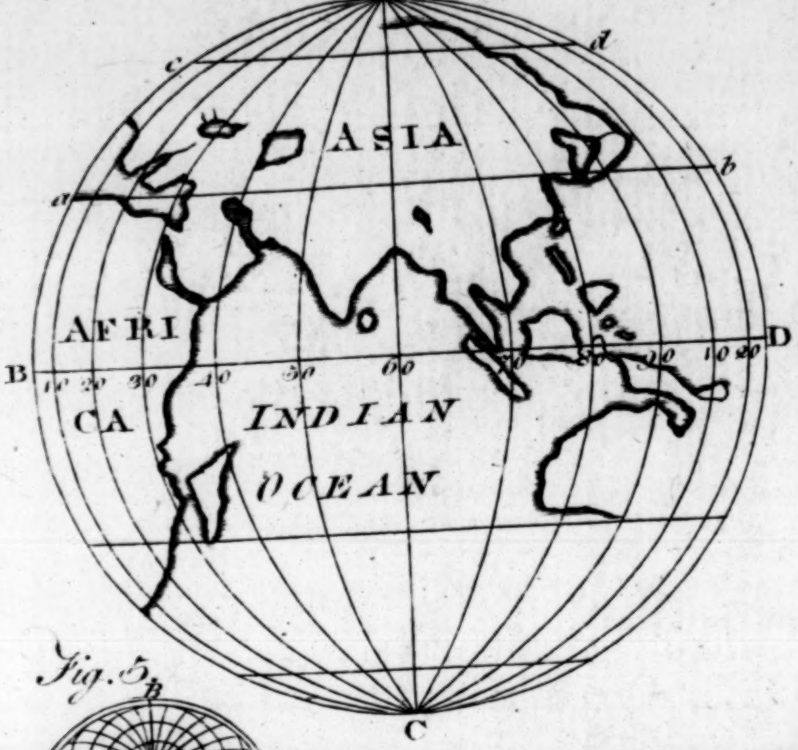

A
c
d
ASIA
a
b
AFRI
CA
B
10 20 30 40 50 60 70 80 90 100 120
D
INDIAN
OCEAN
C

Fig. 2.

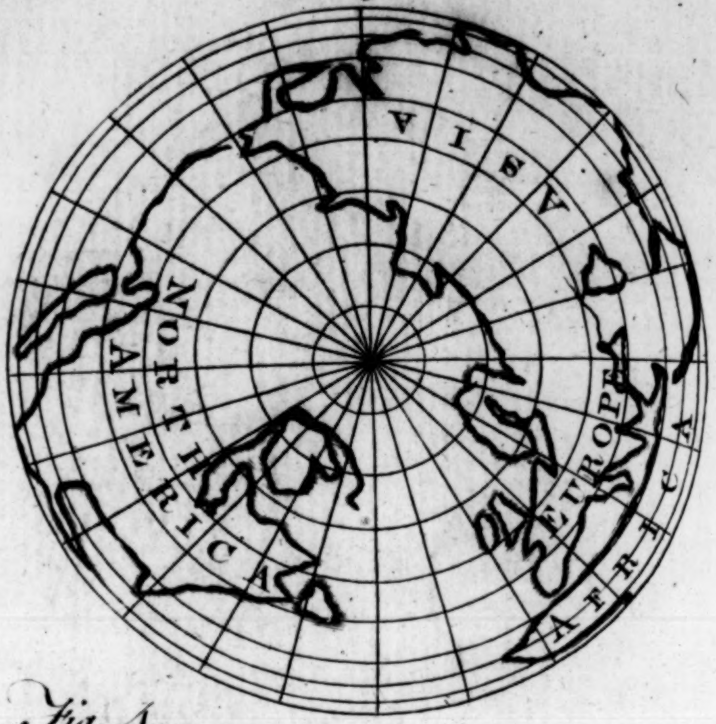

ASIA
NORTH
AMERICA
EUROPE
AFRICA

Fig. 5.

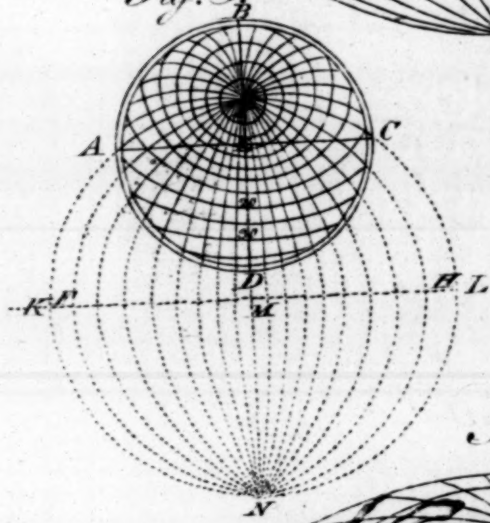

B
A
C
D
K F
M
H L
N

Fig. 4.

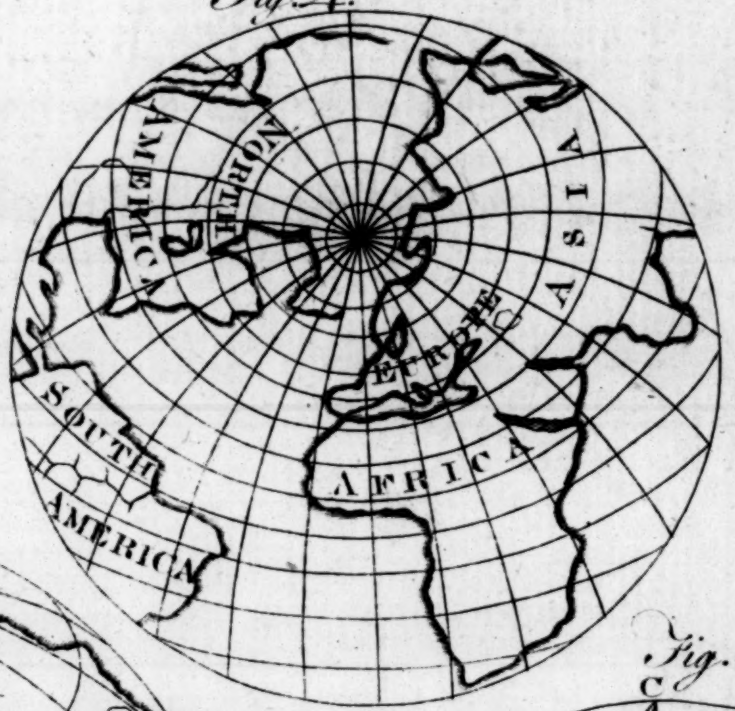

NORTH
AMERICA
ASIA
EUROPE
SOUTH
AMERICA
AFRICA

Fig. 3.

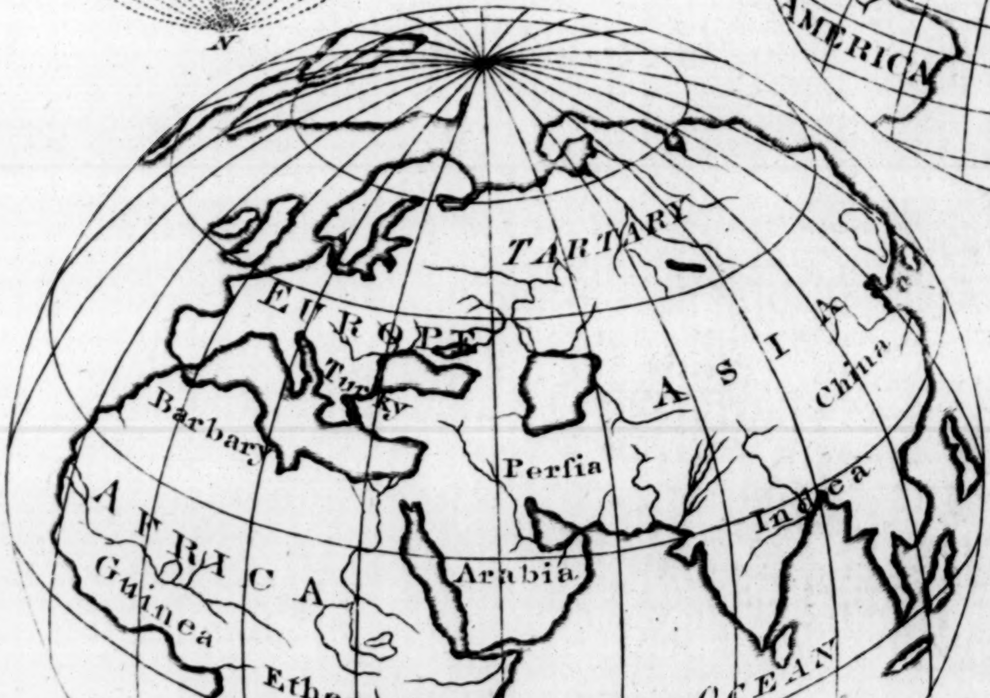
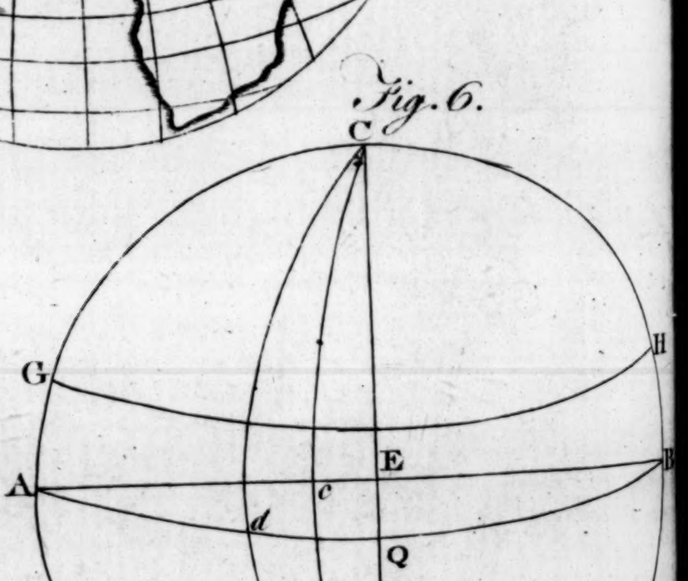

TARTARY
EUROPE
Turky
ASIA
China
Barbary
Persia
AFRICA
Arabia
Indea
Guinea
Etheopia
INDIAN OCEAN
Madagascar

Fig. 6.


C
G
H
E
A
B
c
d
Q
D

A. Bell Sculpt.

14 the ne of a ridian. Plate V.

1. To project the ſphere orthographically on the plane of any meridian, we have only to conſider, that as the eye is ſuppoſed to be at an infinite diſtance, all the rays which come from the diſk of the earth are parallel; and conſequently all lines drawn from the eye to the diſk muſt be perpendicular to the latter. Let, therefore, ABCD, (fig. 1.) repreſent the plane of one of the meridians. The equator, which cuts all the meridians in the middle, muſt be repreſented by an infinite number of points let fall upon the plane of projection, and dividing it exactly in the middle; that is, by the right line BD. The parallels of latitude, being alſo perpendicular to the plane of the meridian, will be marked out by an infinite number of right lines let fall from their peripheries upon that plane, thus forming the right lines *ab*, *cd*, &c. The meridians will likewiſe be repreſented on the diſk by an infinite number of right lines let fall perpendicularly from their peripheries upon the plane of projection, and thus will form the elliptic curves A10C A20C, &c. From an inſpection of the figure, therefore, it appears, that in this projection both longitudes and latitudes are meaſured by a line of ſines, and both of them decreaſe prodigiouſly as we approach the edges of the diſk; and hence the countries which lie at a diſtance from the equator are exceedingly diſtorted, and it is even impoſſible to draw them with any degree of accuracy. The orthographic projection on the plane of a meridian, therefore, is never uſed for a map of the world.

15 the e- tor, 2.

2. On the plane of the equator, the orthographic projection repreſents the meridians as ſtraight lines diverging from a centre, and the parallels of latitude as concentric circles. The latter, however, are by no means to be placed at equal diſtances from each other; for the meridians are to be divided by the line of ſines, as in the laſt; and thus the equatorial parts of the globe are as much diſtorted and confuſed as the polar ones were in the foregoing. This projection, therefore, is ſeldom uſed for a map of the whole world, though it anſwers very well for a repreſentation of the polar regions.

16 ny cular on,

3. On the horizon of any particular place, except either of the poles, or any point lying directly under the equator, the orthographic projection repreſents both parallels and meridians by ſegments of ellipſes. The figure ſhews a map done on the horizon of Ur of the Chaldees: it is obvious, however, that a conſiderable degree of diſtortion takes place here alſo; though leſs than in the former caſes. Projections of this kind, therefore, are uſed only for the conſtruction of ſolar eclipſes. See Astronomy, n° 269.

7 ogra- pro- n.

II. The *ſtereographic* projection of the ſphere ſuppoſes the eye to be in the pole of the circle of projection. The laws of this projection are,

1. A right circle is projected into a line of half tangents.

2. The repreſentation of a right circle, perpendicularly oppoſed to the eye, will be a circle in the plane of the projection.

3. The repreſentation of a circle placed oblique to the eye, will be a circle in the plane of the projection.

4. If a great circle is to be projected upon the plane of another great circle, its centre will lie in the line of meaſures, diſtant from the centre of the primitive by the tangent of its elevation above the plane of the primitive.

5. If a leſſer circle, whoſe poles lie in the plane of the projection, were to be projected; the centre of its repreſentation would be in the line of meaſures, diſtant from the centre of the primitive, by the ſecant of the leſſer circles diſtance from its pole, and its ſemidiameter or radius be equal to the tangent of that diſtance.

6. If a leſſer circle were to be projected, whoſe poles lie not in the plane of the projection, its diameter in the projection, if it falls on each ſide of the pole of the primitive, will be equal to the ſum of the half tangents of its greateſt and neareſt diſtance from the pole of the primitive, ſet each way from the centre of the primitive in the line of meaſures.

7. If the leſſer circle to be projected fall entirely on one ſide of the pole of the projection, and do not encompaſs it; then will its diameter be equal to the difference of the half tangents of its greateſt and neareſt diſtance from the pole of the primitive, ſet off from the centre of the primitive one; and the ſame way in the line of meaſures.

8. In the ſtereographic projection, the angles made by the circles of the ſurface of the ſphere, are equal to the angles made by their repreſentatives in the plane of their projection.

For a demonſtration of theſe laws, ſee the articles Perspective and Projection. The method of delineating general maps of the world will, however, be eaſily underſtood by the following directions.

18 On the plane of a meridian, fig. 6.

1. To delineate a map of the earth upon the plane of a meridian. Draw a circle of any convenient magnitude, as ABCD, to repreſent one half of the earth's diſc; draw two diameters AB, CD, interſecting each other at right angles; AB will then repreſent the equator, and CD that meridian which is directly perpendicular to the plane of projection, C will be the north pole, and D the ſouth pole. Divide the circle into 360 equal parts, repreſenting the degrees of latitude; or into ſmaller parts, if it can admit of ſuch a diviſion, to repreſent minutes. Then, by means of a ſector, divide the equator AB into two lines of ſemitangents EA and EB, which will repreſent the degrees of longitude. Then with the ſecant of 80°, as a radius deſcribe the arch of the circle C*c*D, which repreſents a meridian cutting the plane of projection at an angle of 80°; with the ſecant of 70°, deſcribe the arch C*d*D, which repreſents a meridian cutting the plane of projection at 70°; and thus proceed with the reſt of the meridians, which are uſually drawn at every ten degrees longitude, as the parallels are at every ten degrees latitude. Theſe laſt are to be drawn with the tangents for radii as the meridians are with the ſecants; GH, repreſenting the parallel of ten degrees, with the tangent of 80°, that of 20 with the tangent of 70, &c. The ecliptic AQB is drawn with the tangent of 66. 31 for a radius, its greateſt diſtance from the equator being 23. 29. This is the moſt common projection for maps of the world, and is that on which the map Plate CXVI. is delineated. It hath this diſadvantage, however, that neither the degrees of longitude nor latitude continue of the ſame length, even under the ſame parallel; and conſequently the ſhape of the countries

tries is ſomewhat diſtorted: it is alſo exceedingly difficult to find the preciſe degree of longitude or latitude belonging to any place, upon maps of this kind, as muſt be evident from an inſpection of the figures.

19 On a particular horizon.

Plate CXV.

2. On the plane of the horizon. Suppoſe, for inſtance, it is deſired to have London the centre of the map: its latitude we will ſuppoſe to be 51 degrees 32 minutes. Take then the point E (fig. 5.) for London; and from this, as a centre, deſcribe the circle ABCD to repreſent the horizon; which you are then to divide into four quadrants, and each of theſe into 90 degrees. Let the diameter BD be the meridian, B the northern quarter, D the ſouthern; the line of equinoctial eaſt and weſt ſhews the firſt vertical, A the weſt, C the eaſt, or a place of 90 degrees from the zenith in the firſt vertical. All the verticals are repreſented by right lines drawn from the centre E to the ſeveral degrees of the horizon. Divide BD into 180 degrees, as in the former method; the point in EB, repreſenting 51 deg. 32 min. of the arch BC, will be the projection of the north pole, which note with the letter P. The point in ED repreſenting 51 deg. 32 min. of the arch DC, (reckoning from C towards D), will be the projection of the interſection of the equator and meridian of London; and from this, towards P, write the numbers of the degrees, 1, 2, 3, &c. As alſo towards D, and from B towards P, viz. 51, 52, 53, &c.

Then taking the correſponding points of equal degrees, 88, 89, &c. about thoſe, as diameters, deſcribe circles, which will repreſent parallels, or circles of latitude, with the equator, tropics, and polar circles. For the meridians, firſt deſcribe a circle through the three points A, P, C. This will repreſent the meridian 90 degrees from London. Let its centre be M in BD, (continued to the point N, which repreſents the ſouth pole), PN being the diameter, through M draw a parallel to AC, viz. FH, continued each way to K and L. Divide the circle PHNF into 360 degrees; and from the point P draw right lines to the ſeveral degrees, cutting KFHL; through the ſeveral points of interſection, and the two poles P, N, as through three given points, deſcribe circles repreſenting all the meridians. The centres for deſcribing the arches will be in the ſame KL, as being the ſame that are found by the former interſection; but are to be taken with this caution, that for the meridian next BDN towards A, the moſt remote centre towards L be taken for the ſecond, the ſecond from this, &c.—The circles of longitude and latitude thus drawn, inſert the places from a table.

Maps of this kind may be uſeful for particular purpoſes: but the irregular length of the degrees, both of longitude and latitude, render them very unfit for repreſenting the countries in their proper ſhape: and the difficulties in finding the particular degrees of longitude and latitude are even greater in this than any other projection, as is evident from the inſpection of fig. 4.

III. Beſides theſe, there may be a variety of other projections, though few of them are applicable to any particular purpoſe. The three following are thoſe moſt generally uſeful, as having each ſome peculiar property which cannot be found in any other but themſelves.

20 Projectio in which the earth ſuppoſed become.

1. If, inſtead of its globular figure, we ſuppoſe the earth to have a conical one, it is plain, that the meridians would be repreſented by ſtraight lines diverging from the apex of the cone, while the parallels are ſhewn by concentric circles, placed at equal diſtances. This kind of projection is ſhewn in the map of the world, Plate CXVII. It hath this great advantage, that the longitudes and latitudes may be found with the greateſt eaſe, by means of a moveable index placed on the centre. The whole earth may alſo be thus repreſented on a ſingle circle: but thus the countries towards the ſouth pole are prodigiouſly augmented in breadth in proportion to their length; for the degrees of longitude conſtantly increaſe the farther we are removed from the pole, while thoſe of latitude ſtill remain the ſame. This apparent error, however, doth not in the leaſt affect the real proportion of the map, or render it more difficult to find the longitudes or latitudes upon it.

21 Mercato projectio ſuppoſin it a cyli der.

2. Mercator's projection ſuppoſes the earth, inſtead of a globular, to have a cylindrical figure; in conſequence of which, the degrees of longitude become of an equal length throughout the whole ſurface, and are marked out on the map by parallel lines. The circles of latitude alſo are repreſented by lines croſſing the former at right angles, but at unequal diſtances. The farther we remove from the equator, the longer the degrees of latitude become in proportion to thoſe of longitude, and that in no leſs a degree than as the ſecant of an arch to the radius of the circle: that is, if we make one degree of longitude at the equator the radius of a circle; at one degree diſtant from the equator, a degree of latitude will be expreſſed by the ſecant of one degree; at ten degrees diſtance, by the ſecant of ten degrees; and ſo on *. A map of the world, therefore, cannot be delineated upon this projection, without diſtorting the ſhape of the countries in an extraordinary manner. The projection itſelf is, however, very uſeful in navigation, as it ſhews the different bearings with perfect accuracy, which cannot be done upon any other map. See the map of the New Diſcoveries, Plate CXVII.

22 Globula projecti

3. The globular projection, is an invention of M. de la Hire, and is more uſeful than any of the former for exhibiting the true ſhape of the countries. It may be made in the following manner: Having drawn a circle, repreſenting one half of the earth's diſc, draw two diameters as before, which repreſent the equator and vertical meridian. Divide each of theſe into 180 equal parts, for the meaſures of the degrees of longitude and latitude. Then, through the two poles, and every tenth diviſion on the equator, draw arches of circles for the meridians; and in like manner, through every tenth degree on each ſemicircle, draw an arch, which ſhall likewiſe paſs through every tenth diviſion on the meridian, for the parallels of latitude.

23 Conſtr tion of ticular maps.

IV. The conſtruction of maps of particular parts of the earth requires a different operation. Large portions of its ſurface may indeed be drawn on the plane of the meridian, as before directed; but when a ſmall part, as the iſland of Britain for inſtance, is to be repreſented on a large ſcale, it would be found diffi-

* See 2d Plate CXVI.

difficult to draw the arches of ſuch large circles as are neceſſary, and therefore the following method may be adopted. In this caſe, the degrees of longitude and latitude may be both repreſented by ſtraight lines. It is to be remembered, however, that though the degrees of latitude always continue of an equal length, it is not ſo with thoſe of longitude. They muſt neceſſarily decreaſe as we approach the pole. The proportion in which they decreaſe, may be found by the line of longitudes on the plain ſcale; or by the following

TABLE, ſhewing the Number of Miles contained in a Degree of Longitude, in each Parallel of Latitude from the Equator.

Degrees of Latitude.	Miles.	100th parts of a mile.	Degrees of Latitude.	Miles.	100th parts of a mile.	Degrees of Latitude.	Miles.	100th parts of a mile.
1	59	96	31	51	43	61	29	04
2	59	94	32	50	88	62	28	17
3	59	92	33	50	32	63	27	24
4	59	86	34	49	74	64	26	30
5	59	77	35	49	15	65	25	36
6	59	67	36	48	54	66	24	41
7	59	56	37	47	92	67	23	45
8	59	40	38	47	28	68	22	48
9	59	20	39	46	62	69	21	51
10	59	08	40	46	00	70	20	52
11	58	89	41	45	28	71	19	54
12	58	68	42	44	95	72	18	55
13	58	46	43	43	88	73	17	54
14	58	22	44	43	16	74	16	53
15	58	00	45	42	43	75	15	52
16	57	60	46	41	68	76	14	51
17	57	30	47	41	00	77	13	50
18	57	04	48	40	15	78	12	48
19	56	73	49	39	36	79	11	45
20	56	38	50	38	57	80	10	42
21	56	00	51	37	73	81	09	38
22	55	63	52	37	00	82	08	35
23	55	23	53	36	18	83	07	32
24	54	81	54	35	26	84	06	28
25	54	38	55	34	41	85	05	23
26	54	00	56	33	55	86	04	18
27	53	44	57	32	67	87	03	14
28	53	00	58	31	70	88	02	09
29	52	48	59	30	90	89	01	05
30	51	96	60	30	00	90	00	00

Suppoſe, then, it is required to draw the meridians and parallels for a map of Britain. This iſland is known to lie between 50 and 60 degrees of latitude, and two and ſeven of longitude. Having therefore choſen the length of your degrees of latitude, you muſt next proportion your degrees of longitude to it. By the table you find, that in the latitude of 50° the length of a degree of longitude is to one of latitude as 38,57 is to 60; that is, a degree of longitude in lat. 50, is ſomewhat more than half the length of a degree of latitude. The exact proportion may eaſily be taken by a diagonal ſcale; after which you are to mark out ſeven or eight of thoſe degrees upon a right line, for the length of your intended map. On the extremities of this line raiſe two perpendiculars, upon which mark out ten degrees of latitude for the height of it. Then, having completed the parallellogram, conſult the table for the length of a degree of longitude in Lat. 60°, which is found to be very nearly one half a degree of latitude. It will always be proper, however, to draw a vertical meridian exactly in the middle of the parallellogram, to which the meridian on each ſide may converge; and from this you are to ſet off the degrees of longitude on each ſide, Then, having divided the lines bounding your map into as many parts as can conveniently be done, to ſerve for a ſcale, you may by their means ſet off the longitudes and latitudes with much leſs trouble than where curve lines are uſed. This method may always be followed where a particular kingdom is to be delineated, and will repreſent the true figure and ſituation of the places with tolerable exactneſs. The particular points of the compaſs, on which the towns lie with reſpect to one another, or their bearings, cannot be exactly known, except by a globe, or Mercator's projection. Their diſtances, however, may by this means be accurately expreſſed, and this is the only kind of maps to which a ſcale of miles can be truly adapted.

§ 2. *Deſcription and Uſe of the Globes and Armillary Sphere.*

When we have thus diſcovered, by means of maps, or any other way, the true ſituation of the different places of the earth with regard to one another, we may eaſily know every other particular relative to them; as, how far diſtant they are from us, what hour of the day it is, what ſeaſon of the year, &c. at any particular place. As each of theſe problems, however, would require a particular and ſometimes troubleſome calculation, machines have been invented, by which all the calculations may be ſaved, and every problem in geography may be ſolved mechanically, and in the moſt eaſy and expeditious manner. Theſe machines are the celeſtial and terreſtrial globes, and the armillary ſphere; of which, and the method of uſing them, we proceed to give a deſcription.

24 The terreſtrial globe.

If a map of the world be accurately delineated on a ſpherical ball, the ſurface thereof will repreſent the ſurface of the earth: for the higheſt hills are ſo inconſiderable with reſpect to the bulk of the earth, that they take off no more from its roundneſs than grains of ſand do from the roundneſs of a common globe; for the diameter of the earth is 8000 miles in round numbers, and no known hill upon it is much above three miles in perpendicular height.

For the proof of the earth's being ſpherical, ſee Astronomy, n° 123.

With regard to what we call *up* and *down*, ſee the article Gravity.

To an obſerver placed any where in the indefinite ſpace, where there is nothing to limit his view, all remote objects appear equally diſtant from him; and ſeem to be placed in a vaſt concave ſphere, of which his eye is the centre. The moon is much nearer to us than the ſun; ſome of the planets are ſometimes nearer, and ſometimes farther from us, than the ſun; others of them never come ſo near to us as the ſun always is;

the remoteſt planet in our ſyſtem is beyond compariſon nearer to us than any of the fixed ſtars are: and yet all theſe celeſtial objects appear equally diſtant from us. Therefore, if we imagine a large hollow ſphere of glaſs to have as many bright ſtuds fixed to its inſide, as there are ſtars viſible in the heaven, and theſe ſtuds to be of different magnitudes, and placed at the ſame angular diſtances from each other as the ſtars are; the ſphere will be a true repreſentation of the ſtarry heaven, to an eye ſuppoſed to be in its centre, and viewing it all around. And if a ſmall globe, with a map of the earth upon it, be placed on an axis in the centre of this ſtarry ſphere, and the ſphere be made to turn round on this axis, it will repreſent the apparent motion of the heavens round the earth.

25 The face of the heavens and of the earth repreſented in a machine.

If a great circle be ſo drawn upon this ſphere, as to divide it into two equal parts or hemiſpheres, and the plane of the circle be perpendicular to the axis of the ſphere, this circle will repreſent the *equinoctial*, which divides the heaven into two equal parts, called the *northern* and the *ſouthern hemiſpheres;* and every point of that circle will be equally diſtant from the *poles*, or ends of the axis in the ſphere. That pole which is in the middle of the northern hemiſphere, will be called the *north pole of the ſphere;* and that which is in the middle of the ſouthern hemiſphere, the *ſouth pole*.

If another grand circle be drawn upon the ſphere, in ſuch a manner as to cut the equinoctial at an angle of 23½ degrees in two oppoſite points, it will repreſent the *ecliptic*, or circle of the ſun's apparent annual motion; one half of which is on the north ſide of the equinoctial, and the other half on the ſouth.

If a large ſtud be made to move eaſtward in this ecliptic, in ſuch a manner as to go quite round it in the time that the ſphere is turned round weſtward 366 times upon its axis; this ſtud will repreſent the *ſun*, changing his place every day a 365th part of the ecliptic; and going round weſtward, the ſame way as the ſtars do; but with a motion ſo much ſlower than the motion of the ſtars, that they will make 366 revolutions about the axis of the ſphere, in the time that the ſun makes only 365. During one half of theſe revolutions, the ſun will be on the north ſide of the equinoctial; during the other half, on the ſouth; and at the end of each half, in the equinoctial.

If we ſuppoſe the terreſtrial globe in this machine to be about one inch in diameter, and the diameter of the ſtarry ſphere to be about five or ſix feet, a ſmall inſect on the globe would ſee only a very little portion of its ſurface; but it would ſee one half of the ſtarry ſphere, the convexity of the globe hiding the other half from its view. If the ſphere be turned weſtward round the globe, and the inſect could judge of the appearances which ariſe from that motion, it would ſee ſome ſtars riſing to its view in the eaſtern ſide of the ſphere, whilſt others were ſetting on the weſtern: but as all the ſtars are fixed to the ſphere, the ſame ſtars would always riſe in the ſame points of view on the eaſt ſide, and ſet in the ſame points of view on the weſt ſide. With the ſun it would be otherwiſe; becauſe the ſun is not fixed to any point of the ſphere, but moves ſlowly along an oblique circle in it. And if the inſect ſhould look towards the ſouth, and call that point of the globe, where the equinoctial in the ſphere ſeems to cut it on the left ſide, the *eaſt point;* and where it cuts the globe on the right ſide, the *weſt point;* the little animal would ſee the ſun riſe north of the eaſt, and ſet north of the weſt, for 182½ revolutions; after which, for as many more, the ſun would riſe ſouth of the eaſt, and ſet ſouth of the weſt. And in the whole 365 revolutions, the ſun would riſe only twice in the eaſt point, and ſet twice in the weſt. All theſe appearances would be the ſame, if the ſtarry ſphere ſtood ſtill (the ſun only moving in the ecliptic) and the earthly globe were turned round the axis of the ſphere eaſtward. For, as the inſect would be carried round with the globe, he would be quite inſenſible of its motion, and the ſun and ſtars would appear to move weſtward.

We may imagine as many circles deſcribed upon the earth as we pleaſe; and we may imagine the plane of any circle deſcribed upon the earth to be continued, until it marks a circle in the concave ſphere of the heavens.

26 The horizon.

The *horizon* is either *ſenſible* or *rational*. The *ſenſible* horizon is that circle which a man ſtanding upon a large plane obſerves to terminate his view all around, where the heaven and earth ſeem to meet. The plane of our ſenſible horizon continued to the heaven, divides it into two hemiſpheres; one viſible to us, the other hid by the convexity of the earth.

The plane of the *rational horizon*, is ſuppoſed parallel to the plane of the ſenſible; to paſs through the centre of the earth, and to be continued to the heavens. And although the plane of the ſenſible horizon touches the earth in the place of the obſerver, yet *this* plane, and that of the rational horizon, will ſeem to coincide in the heaven, becauſe the whole earth is but a point compared to the ſphere of the heaven.

27 The p

The earth being a ſpherical body, the horizon, or limit of our view, muſt change as we change our place.

The *poles of the earth*, are thoſe two points on its ſurface in which its axis terminates. The one is called the *north pole*, and the other the *ſouth pole*.

The *poles of the heavens*, are thoſe two points in which the earth's axis produced terminates in the heaven; ſo that the *north pole* of the heaven is directly over the north pole of the earth, and the *ſouth pole* of the heaven is directly over the ſouth pole of the earth.

28 Equat

The *equator* is a great circle upon the earth, every part of which is equally diſtant from either of the poles. It divides the earth into two equal parts, called the *northern* and *ſouthern hemiſpheres*. If we ſuppoſe the plane of this circle to be extended to the heaven, it will mark the *equinoctial* therein; and will divide the heaven into two equal parts, called the *northern* and *ſouthern* hemiſpheres of the heaven.

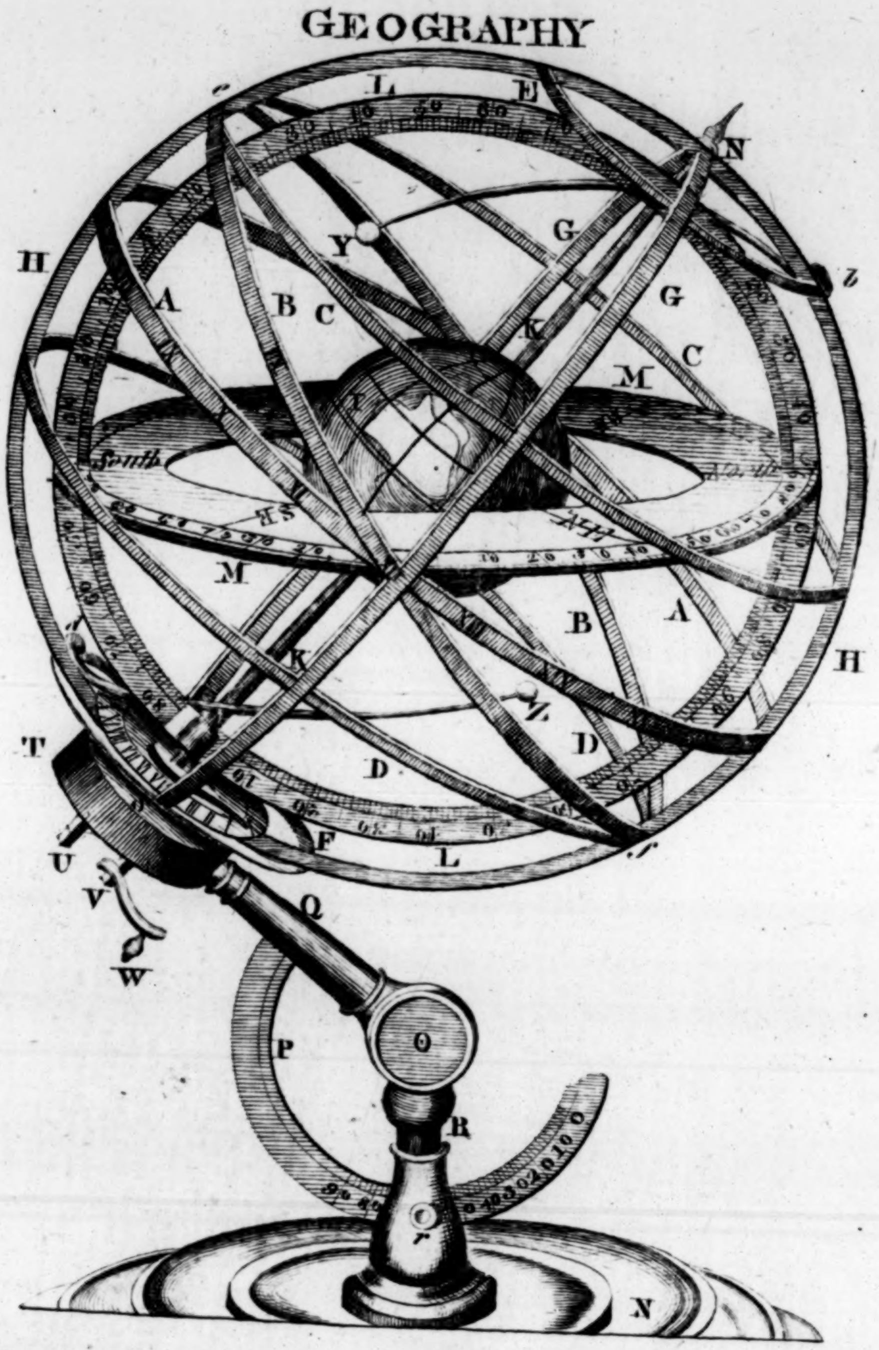
29 Merid

The *meridian* of any place is a great circle paſſing through that place and the poles of the earth. We may imagine as many ſuch meridians as we pleaſe; becauſe any place that is ever ſo little to the eaſt or weſt of any other place, has a different meridian from that place; for no one circle can paſs through any two ſuch places and the poles of the earth.

The *meridian* of any place is divided by the poles into two ſemicircles: that which paſſes thro' the place is called the *geographical*, or *upper*, *meridian;* and that which paſſes through the oppoſite place, is called the *lower meridian*.

When the rotation of the earth brings the plane of the

GEOGRAPHY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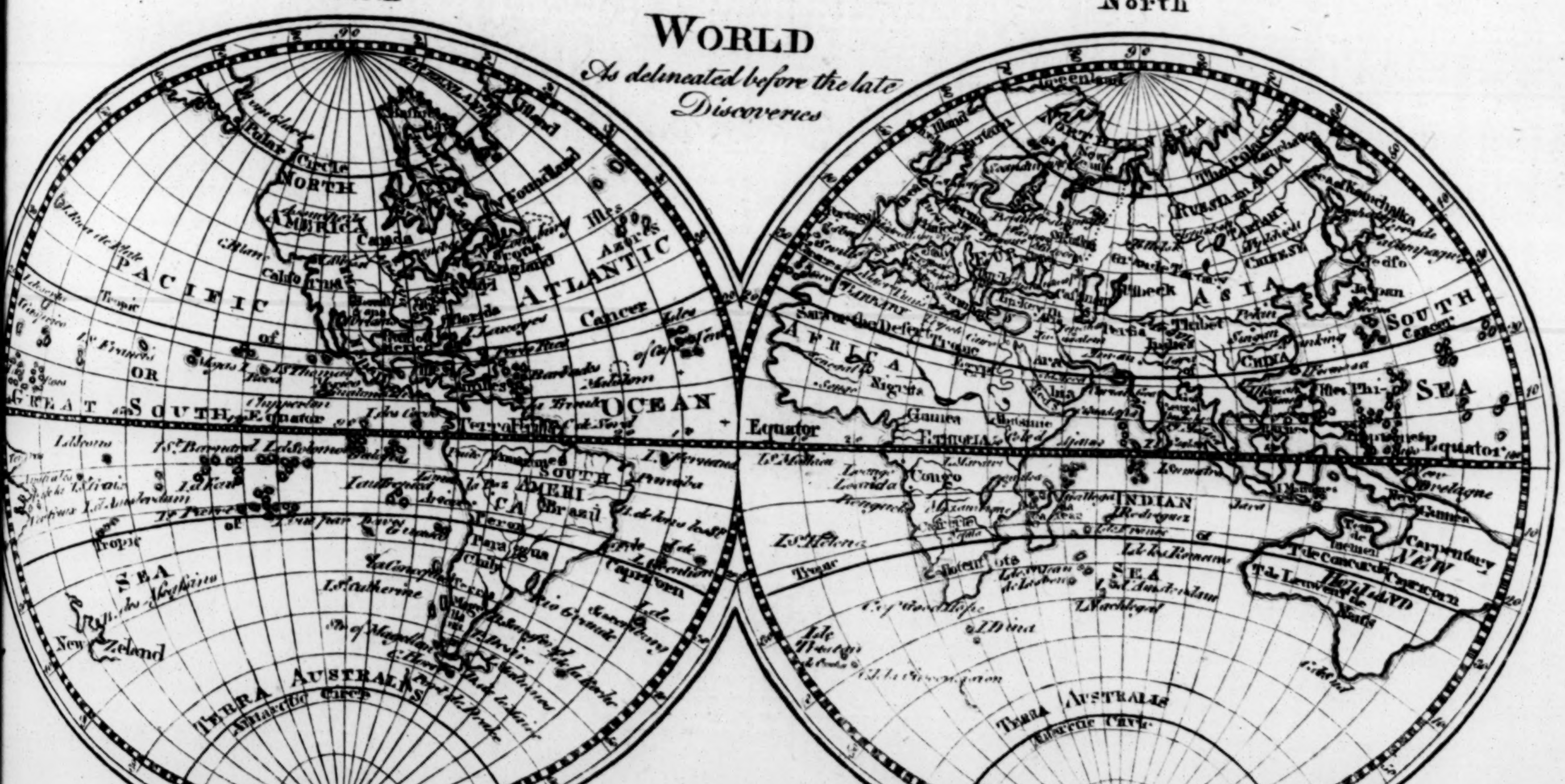
ARMILLARY SPHERE


North
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Chili
New Zeland
TERRA AUSTRALIS
Antarctic Circle
AFRICA
Guinea
Congo
ASIA
CHINA
INDIAN SEA
SOUTH SEA
NEW HOLLAND
Equator
TERRA AUSTRALIS
Antarctic Circle
South
South

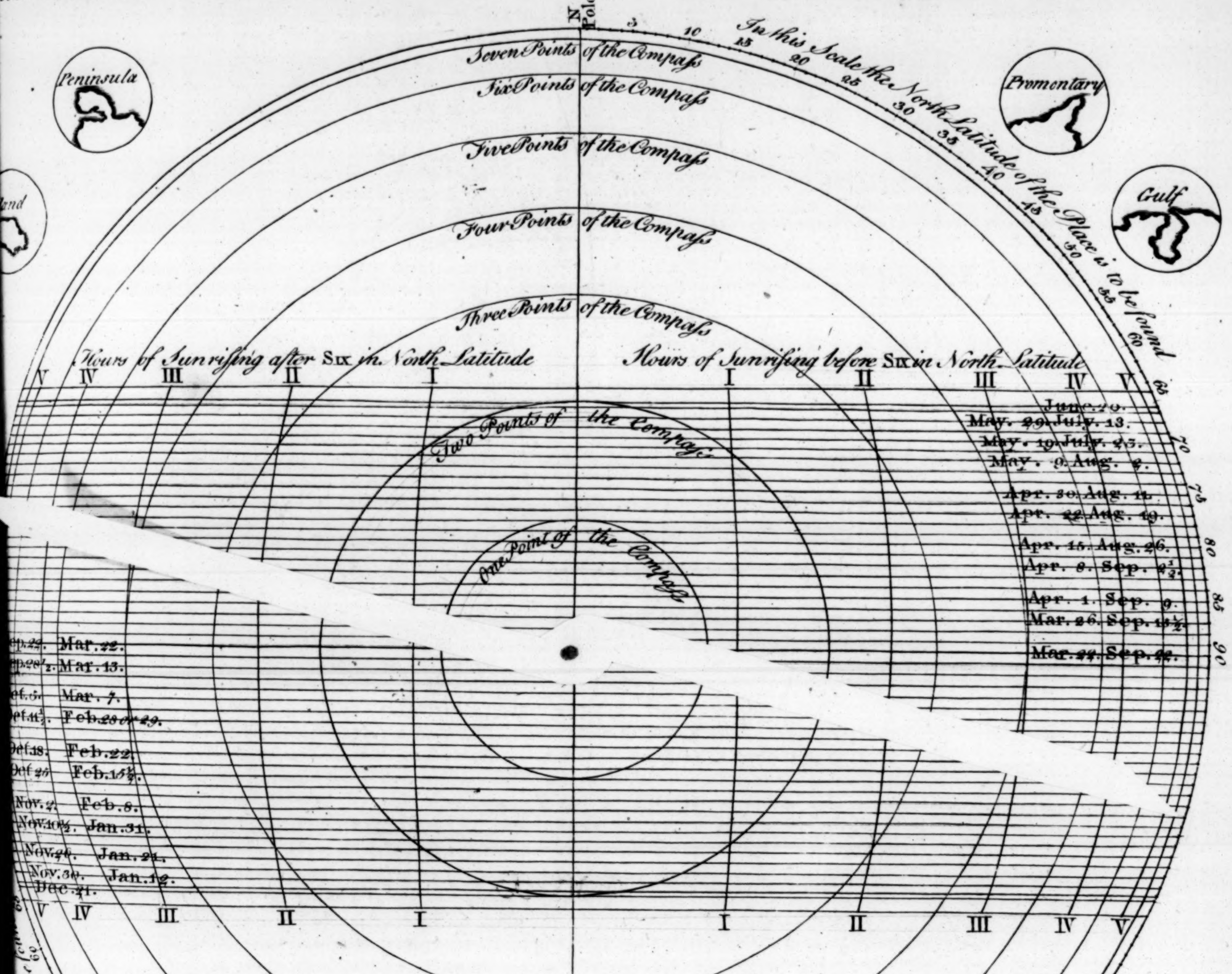
WORLD

As delineated before the late Discoveries

A. Bell Sculpt.

3 MA 55

An Analemma, Shewing the time of Sun rising & Sun setting, the length of the Days & Nights, and the point
the Compaſs on which the Sun rises & sets, for every Degree of Latitude, and for every Degree of the Suns North
South declination.


N Pole
S Pole
In this Scale the North Latitude of the Place is to be found
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
In the Scale the South Latitude of the Place is to be found
5 10 15 20 25 30 35 40 60
Seven Points of the Compaſs
Six Points of the Compaſs
Five Points of the Compaſs
Four Points of the Compaſs
Three Points of the Compaſs
Two Points of the Compaſs
One Point of the Compaſs
Hours of Sunriſing after Six in North Latitude
Hours of Sunriſing before Six in North Latitude
V IV III II I I II III IV V
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Apr. 30. Aug. 11.
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Apr. 15. Aug. 26.
Apr. 8. Sep. 2½.
Apr. 1. Sep. 9.
Mar. 26. Sep. 15½.
Mar. 24. Sep. 22.
p. 22. Mar. 22.
p. 28½. Mar. 13.
et. 5. Mar. 7.
et. 11½. Feb. 28 or 29.
et. 18. Feb. 22.
et 25. Feb. 15½.
Nov. 2. Feb. 8.
Nov. 10½. Jan. 31.
Nov. 26. Jan. 21.
Nov. 30. Jan. 12.
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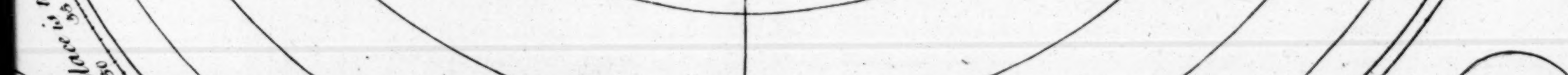
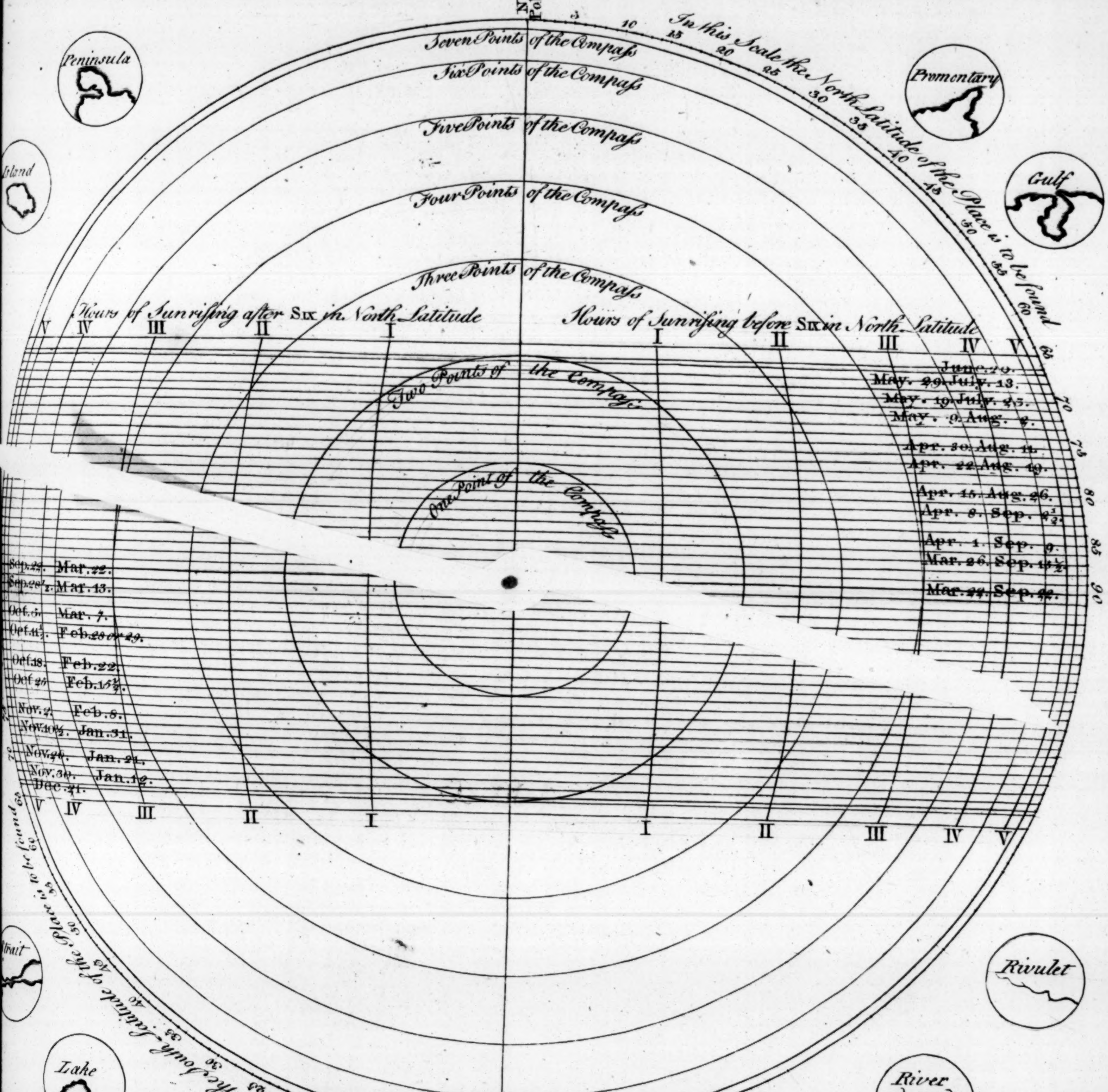
Method of enlarging the Degrees in Mercator's Chart


5 10 15 20 25 30 35 40 45

A Bell Sculp.

3 MA 53

An Analemma, Shewing the time of Sun rising & Sun setting, the length of the Days & Nights, and the point
f the Compaſs on which the Sun rises & sets, for every Degree of Latitude, and for every Degree of the Suns North
South declination.


N Pole
S Pole
In this Scale the North Latitude of the Place is to be found
In this Scale the South Latitude of the Place is to be found
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Seven Points of the Compaſs
Six Points of the Compaſs
Five Points of the Compaſs
Four Points of the Compaſs
Three Points of the Compaſs
Two Points of the Compaſs
One Point of the Compaſs
Hours of Sunriſing after Six in North Latitude
Hours of Sunriſing before Six in North Latitude
V
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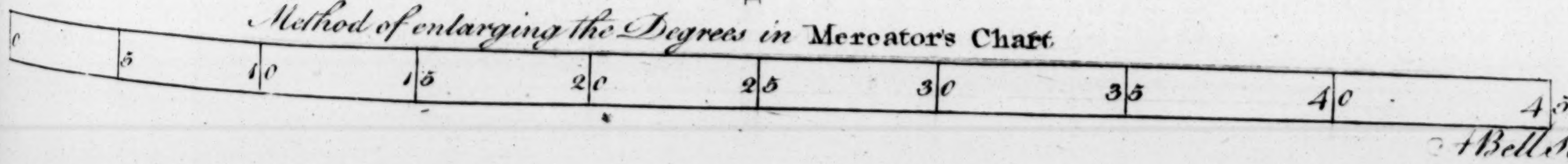
May. 29. July. 13.
May. 19. July. 25.
May. 9. Aug. 2.
Apr. 30. Aug. 11.
Apr. 22. Aug. 19.
Apr. 15. Aug. 26.
Apr. 8. Sep. 2½.
Apr. 1. Sep. 9.
Mar. 26. Sep. 15½.
Mar. 24. Sep. 22.
Sep. 23. Mar. 22.
Sep. 29½. Mar. 13.
Oct. 5. Mar. 7.
Oct. 11½. Feb. 28 or 29.
Oct. 18. Feb. 22.
Oct. 25. Feb. 15½.
Nov. 2. Feb. 8.
Nov. 10½. Jan. 31.
Nov. 20. Jan. 21.
Nov. 30. Jan. 12.
Dec. 21.
Peninsula
Island
Promontory
Gulf
Strait
Lake
Rivulet
River


Method of enlarging the Degrees in Mercator's Chart
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A. Bell Sculp.

3 . MA 53

the geographical meridian to the ſun, it is *noon* or *mid-day* to that place; and when the lower meridian comes to the ſun, it is *mid-night*.

All places lying under the ſame geographical meridian, have their noon at the ſame time, and conſequently all the other hours. All thoſe places are ſaid to have the ſame *longitude*, becauſe no one of them lies either eaſtward or weſtward from any of the reſt.

If we imagine 24 ſemicircles, one of which is the geographical meridian of a given place, to meet at the poles, and to divide the equator into 24 equal parts; each of thoſe meridians will come round to the ſun in 24 hours, by the earth's equable motion round its axis in that time. And, as the equator contains 360 degrees, there will be 15 degrees contained between any two of theſe meridians which are neareſt to one another: for 24 times 15 is 360. And as the earth's motion is eaſtward, the ſun's apparent motion will be weſtward, at the rate of 15 degrees each hour. Therefore,

They whoſe geographical meridian is 15 degrees weſtward from us, have noon, and every other hour, an hour ſooner than we have. They whoſe meridian is fifteen degrees weſtward from us, have noon, and every other hour, an hour later than we have: and ſo on in proportion, reckoning one hour for every fifteen degrees.

For the ecliptic circle, ſigns, and degrees, ſee ASTRONOMY, n° 122,—137.

The *tropics* are leſſer circles in the heaven, parallel to the equinoctial; one on each ſide of it, touching the ecliptic in the points of its greateſt declination; ſo that each tropic is 23½ degrees from the equinoctial, one on the north ſide of it, and the other on the ſouth. The northern tropic touches the ecliptic at the beginning of Cancer, the ſouthern at the beginning of Capricorn; for which reaſon the former is called the *tropic of Cancer*, and the latter the *tropic of Ca-Capricorn*.

The *polar circles* in the heaven, are each 23½ degrees from the poles, all around. That which goes round the north pole, is called the *arctic circle*. The ſouth polar circle, is called the *antarctic circle*, from its being oppoſite to the arctic.

The ecliptic, tropics, and polar circles, are drawn upon the terreſtrial globe, as well as upon the celeſtial. But the ecliptic, being a great fixed circle in the heavens, cannot properly be ſaid to belong to the terreſtrial globe; and is laid down upon it only for the conveniency of ſolving ſome problems. So that, if this circle on the terreſtrial globe was properly divided into the months and days of the year, it would not only ſuit the globe better, but would alſo make the problems thereon much eaſier.

1. *Deſcription of the Terreſtrial Globe.*

THE equator, ecliptic, and tropics, polar circles, and meridians, are laid down upon the globe in the manner already deſcribed. The ecliptic is divided into 12 ſigns, and each ſign into 30 degrees. Each tropic is 23½ degrees from the equator, and each polar circle 23½ degrees from its reſpective pole. Circles are drawn parallel to the equator, at every ten degrees diſtance from it on each ſide to the poles: theſe circles are called *parallels of latitude*. On large globes there are circles drawn perpendicularly through every tenth degree of the equator, interſecting each other at the poles: but on globes of or under a foot diameter, they are only drawn through every fifteenth degree of the equator; theſe circles are generally called *meridians*, ſometimes *circles of longitude*, and at other times *hour-circles*.

The globe is hung in a braſs-ring called the *brazen meridian*; and turns upon a wire in each pole ſunk half its thickneſs into one ſide of the meridian ring; by which means that ſide of the ring divides the globe into two equal parts, called the *eaſtern* and *weſtern hemiſpheres*; as the equator divides it into two equal parts, called the *northern* and *ſouthern hemiſpheres*. The ring is divided into 360 equal parts or degrees, on the ſide wherein the axis of the globe turns. One half of theſe degrees are numbered, and reckoned, from the equator to the poles, where they end at 90: their uſe is to ſhew the latitudes of places. The degrees on the other half of the meridian are numbered from the poles to the equator, where they end at 90; their uſe is to ſhew how to elevate either the north or ſouth pole above the horizon, according to the latitude of any given place, as it is north or ſouth of the equator.

The brazen meridian is let into two notches made in a broad flat ring called the *wooden horizon*; the upper ſurface of which divides the globe into two equal parts, called the *upper* and *lower hemiſpheres*. One notch is in the north point of the horizon, and the other in the ſouth. On this horizon are ſeveral concentric circles, which contain the months and days of the year, the ſigns and degrees anſwering to the ſun's place for each month and day, and the 32 points of the compaſs.—The graduated ſide of the braſs meridian lies towards the eaſt ſide of the horizon, and ſhould be generally kept towards the perſon who works problems by the globes.

There is a ſmall *horary circle*, ſo fixed to the north part of the brazen meridian, that the wire in the north pole of the globe is in the centre of that circle; and on the wire is an *index*, which goes over all the 24 hours of the circle, as the globe is turned round its axis. Sometimes there are two horary circles, one between each pole of the globe and the brazen meridian.

There is a thin ſlip of braſs, called the *quadrant of altitude*, which is divided into 90 equal parts or degrees, anſwering exactly to ſo many degrees of the equator. It is occaſionally fixed to the uppermoſt point of the brazen meridian by a nut and ſcrew. The diviſions end at the nut, and the quadrant is turned round upon it.

2. *Deſcription and Uſe of the Armillary Sphere.*

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Armillary ſphere deſcribed.

Plate CXVI fig. 1.

THE exterior parts of this machine are, a compages of braſs rings, which repreſent the principal circles of the heaven, *viz.* 1. The equinoctial *AA*, which is divided into 360 degrees (beginning at its interſection with the ecliptic in Aries) for ſhewing the ſun's right aſcenſion in degrees; and alſo into 24 hours, for ſhewing his right aſcenſion in time. 2. The ecliptic *BB*, which is divided into 12 ſigns, and each ſign into 30 degrees, and alſo into the months and days of the year; in ſuch a manner, that the degree or point of the ecliptic in which the ſun is, on any given day, ſtands over that day in the circle of months. 3. The tropic of Cancer *CC*, touching the ecliptic at the beginning of Cancer in *e*, and the tropic of Capricorn *DD*, touching the ecliptic at the beginning of Capricorn in *f*; each 23$\frac{1}{2}$ degrees from the equinoctial circle. 4. The arctic circle *E*, and the antarctic circle *F*, each 23$\frac{1}{2}$ degrees from its reſpective pole at *N* and *S*. 5. The equinoctial colure *GG*, paſſing through the north and ſouth poles of the heaven at *N* and *S*, and through the equinoctial points Aries and Libra, in the ecliptic. 6. The ſolſtitial colure *HH*, paſſing through the poles of the heaven, and through the ſolſtitial points Cancer and Capricorn in the ecliptic. Each quarter of the former of theſe colures is divided into 90 degrees, from the equinoctial to the poles of the world, for ſhewing the declination of the ſun, moon, and ſtars; and each quarter of the latter, from the ecliptic at *e* and *f*, to its poles *b* and *d*, for ſhewing the latitude of the ſtars.

In the north pole of the ecliptic is a nut *b*, to which is fixed one end of a quadrantal wire, and to the other end a ſmall ſun *Y*, which is carried round the ecliptic *BB*, by turning the nut: and in the ſouth pole of the ecliptic is a pin *d*, on which is another quadrantal wire, with a ſmall moon *Z* upon it, which may be moved round by the hand: but there is a particular contrivance for cauſing the moon to move in an orbit which croſſes the ecliptic at an angle of 5$\frac{1}{3}$ degrees, in two oppoſite points called the *moon's nodes*; and alſo for ſhifting theſe points backward in the ecliptic, as the *moon's nodes* ſhift in the heaven.

Within theſe circular rings is a ſmall terreſtrial globe *I*, fixt on an axis *KK*, which extends from the north and ſouth poles of the globe at *n* and *s*, to thoſe of the celeſtial ſphere at *N* and *S*. On this axis is fixed the flat celeſtial meridian *LL*, which may be ſet directly over the meridian of any place on the globe, and then turned round with the globe, ſo as to keep over the ſame meridian upon it. This flat meridian is graduated the ſame way as the braſs meridian of a common globe, and its uſe is much the ſame. To this globe is fitted the moveable horizon *MM*, ſo as to turn upon two ſtrong wires proceeding from its eaſt and weſt points to the globe, and entering the globe at the oppoſite points of its equator, which is a moveable braſs ring let into the globe in a groove all around its equator. The globe may be turned by hand within this ring, ſo as to place any given meridian upon it, directly under the celeſtial meridian *LL*. The horizon is divided into 360 degrees all around its outermoſt edge, within which are the points of the compaſs for ſhewing the amplitude of the ſun and moon both in degrees and points. The celeſtial meridian *LL*, paſſes thro' two notches in the north and ſouth points of the horizon, as in a common globe: but here, if the globe be turned round, the horizon and meridian turn with it. At the ſouth pole of the ſphere is a circle of 24 hours, fixed to the rings; and on the axis is an index which goes round that circle, if the globe be turned round its axis.

The whole fabric is ſupported on a pedeſtal *N*, and may be elevated or depreſſed upon the joint *O*, to any number of degrees from 0 to 90, by means of the arc *P*, which is fixed in the ſtrong braſs arm *Q*, and ſlides in the upright piece *R*, in which is a ſcrew at *r*, to fix it at any proper elevation.

In the box *T* are two wheels (as in Dr Long's ſphere), and two pinions, whoſe axes come out at *V* and *U*; either of which may be turned by the ſmall winch *W*. When the winch is put upon the axis *V*, and turned backward, the terreſtrial globe, with its horizon and celeſtial meridian, keep at reſt; and the whole ſphere of circles turns round from eaſt, by ſouth, to weſt, carrying the ſun *Y*, and moon *Z*, round the ſame way, and cauſing them to riſe above and ſet below the horizon. But when the winch is put upon the axis *U*, and turned foreward, the ſphere with the ſun and moon keep at reſt; and the earth, with its horizon and meridian, turn round from weſt, by ſouth, to eaſt; and bring the ſame points of the horizon to the ſun and moon, to which theſe bodies came when the earth kept at reſt and they were carried round it; ſhewing that they riſe and ſet in the ſame points of the horizon, and at the ſame times in the hour-circle, whether the motion be in the earth or in the heaven. If the earthly globe be turned, the hour-index goes round its hour-circle; but if the ſphere be turned, the hour-circle goes round below the index.

And ſo, by this conſtruction, the machine is equally fitted to ſhew either the real motion of the earth, or the apparent motion of the heaven.

To rectify the ſphere for uſe, firſt ſlacken the ſcrew *r* in the upright ſtem *R*, and taking hold of the arm *Q*, move it up or down until the given degree of latitude for any place be at the ſide of the ſtem *R*; and then the axis of the ſphere will be properly elevated ſo as to ſtand parallel to the axis of the world, if the machine be ſet north and ſouth by a ſmall compaſs: this done, count the latitude from the north pole, upon the celeſtial meridian *LL*, down towards the north notch of the horizon, and ſet the horizon to that latitude; then, turn the nut *b* until the ſun *Y* comes to the given day of the year in the ecliptic, and the ſun will be at its proper place for that day: find the place of the moon's aſcending node, and alſo the place of the moon, by an Ephemeris, and ſet them right accordingly: laſtly, turn the winch *W*, until either the ſun comes to the meridian *LL*, or until the meridian comes to the ſun (according as you want the ſphere or earth to move) and ſet the hour-index to the XII, marked noon, and the whole machine will be rectified. ——Then turn the winch, and obſerve when the ſun or moon riſe and ſet in the horizon, and the hour-index will ſhew the times thereof for the given day.

As thoſe who underſtand the uſe of the globes will be at no loſs to work many other problems by this ſphere, it is needleſs to enlarge any farther upon it.

3. *Directions for uſing Globes.*

In uſing globes, keep the eaſt ſide of the horizon towards you (unleſs the problem requires the turning of it), which ſide you may know by the word Eaſt upon the horizon; for then you have the graduated ſide of the meridian towards you, the quadrant of altitude before you, and the globe divided exactly into two equal parts, by the graduated ſide of the meridian.

In working ſome problems, it will be neceſſary to turn the whole globe and horizon about, that you may look on the weſt ſide thereof; which turning will be apt to jog the ball ſo, as to ſhift away that degree of the globe which was before ſet to the horizon or meridian: to avoid which inconvenience, you may thruſt in the feather-end of a quill between the ball of the globe and the brazen meridian; which, without hurting the ball, will keep it from turning in the meridian, whilſt you turn the weſt ſide of the horizon towards you.

Prob. I. *To find the latitude and longitude of any given place upon the globe*—Turn the globe on its axis, until the given place comes exactly under that graduated ſide of the braſen meridian on which the degrees are numbered from the equator; and obſerve what degree of the meridian the place then lies under; which is its latitude, north or ſouth, as the place is north or ſouth of the equator.

The globe remaining in this poſition, the degree of the equator, which is under the braſen meridian, is the longitude of the place, which is eaſt or weſt, as the place lies on the eaſt or weſt ſide of the firſt meridian of the globe.—All the Atlantic ocean, and America, is on the weſt ſide of the meridian of London; and the greateſt part of Europe, and of Africa, together with all Aſia, is on the eaſt ſide of the meridian of London, which is reckoned the *firſt meridian* of the globe by the Britiſh geographers and aſtronomers.

Prob. II. *The longitude and latitude of a place being given, to find that place on the globe.*—Look for the given longitude in the equator (counting it eaſtward or weſtward from the firſt meridian, as it is mentioned to be eaſt or weſt;) and bringing the point of longitude in the equator to the braſen meridian, on that ſide which is above the ſouth point of the horizon: then count from the equator, on the braſen meridian, to the degree of the given latitude, towards the north or ſouth pole, according as the latitude is north or ſouth; and under that degree of latitude on the meridian, you will have the place required.

Prob. III. *To find the difference of longitude, or difference of latitude, between any two given places.*—Bring each of theſe places to the braſen meridian, and ſee what its latitude is: the leſſer latitude ſubtracted from the greater, if both places are on the ſame ſide of the equator, or both latitudes added together if they are on different ſides of it, is the difference of latitude required. And the number of degrees contained between theſe places, reckoned on the equator, when they are brought ſeparately under the braſen meridian, is their difference of longitude, if it be leſs than 180; but if more, let it be ſubtracted from 360, and the remainder is the difference of longitude required. Or,

Having brought one of the places to the braſen meridian, and ſet the hour-index to XII, turn the globe until the other place comes to the braſen meridian; and the number of hours and parts of an hour, paſſed over by the index, will give the longitude in time; which may be eaſily reduced to degrees, by allowing 15 degrees for every hour, and one degree for every four minutes.

N. B. When we ſpeak of bringing any place to the braſen meridian, it is the graduated ſide of the meridian that is meant.

Prob. IV. *Any place being given, to find all thoſe places that have the ſame longitude or latitude with it.*—Bring the given place to the braſen meridian; then all thoſe places which lie under that ſide of the meridian, from pole to pole, have the ſame longitude with the given place. Turn the globe round its axis; and all thoſe places which paſs under the ſame degree of the meridian that the given place does, have the ſame latitude with that place.

Since all latitudes are reckoned from the equator, and all longitudes are reckoned from the firſt meridian, it is evident, that the point of the equator which is cut by the firſt meridian, has neither latitude nor longitude.—The greateſt latitude is 90 degrees, becauſe no place is more than 90 degrees from the equator: And the greateſt longitude is 180 degrees, becauſe no place is more than 180 degrees from the firſt meridian.

Prob. V. *To find the* antœci, periœci, *and* antipodes, *of any given place.*—Bring the given place to the braſen meridian; and having found its latitude, keep the globe in that ſituation, and count the ſame number of degrees of latitude from the equator towards the contrary pole; and where the reckoning ends, you have the *antœci* of the given place upon the globe. Thoſe who live at the equator have no *antœci.*

The globe remaining in the ſame poſition, ſet the hour-index to the upper XII on the horary circle, and turn the globe until the index comes to the lower XII; then, the place which lies under the meridian, in the ſame latitude with the given place, is the *periœci* required. Thoſe who live at the poles have no *periœci.*

As the globe now ſtands (with the index at the lower XII), the *antipodes* of the given place will be under the ſame point of the braſen meridian where its *antœci* ſtood before. Every place upon the globe has its *antipodes.*

Prob. VI. *To find the diſtance between any two places on the globe.*—Lay the graduated edge of the quadrant of altitude over both the places, and count the number of degrees intercepted between them on the quadrant; then multiply theſe degrees by 60, and the product will give the diſtance in geographical miles: but to find the diſtance in miles, multiply the degrees by 69½, and the product will be the number of miles required. Or, take the diſtance betwixt any two places with a pair of compaſſes, and apply that extent to the equator; the number of degrees, intercepted between the points of the compaſſes, is the diſtance in degrees of a great circle; which may be reduced either to geographical miles, or to Engliſh miles, as above.

Prob. VII. *A place on the globe being given, and its diſtance from any other place; to find all the other places upon the globe which are at the ſame diſtance from the given place.*—Bring the given place to the braſen meridian, and ſcrew the quadrant of altitude to the meridian directly over that place; then keeping the globe in that poſition, turn the quadrant quite round upon it, and the degree of the quadrant that touches the ſecond place will paſs over all the other places which are equally diſtant with it from the given place.

This is the ſame as if one foot of a pair of compaſſes was ſet in the given place, and the other foot extended to the ſecond place, whoſe diſtance is known; for if the compaſſes be then turned round the firſt place as a centre, the moving foot will go over all thoſe places which are at the ſame diſtance with the ſecond from it.

Prob. VIII. *The hour of the day at any place being given, to find all thoſe places where it is noon at that time.*—Bring the given place the braſen meridian, and ſet the index to the given hour; this done, turn the globe until the index points to the upper XII, and then all the places that lie under the braſen meridian have noon at that time.

N. B. The upper XII always ſtands for noon; and when the bringing of any place to the braſen meridian is mentioned, the ſide of that meridian on which the degrees are reckoned from the equator is meant, unleſs the contrary ſide be mentioned.

Prob. IX. *The hour of the day at any place being given, to find what o'clock it then is at any other place.*—Bring the given place to the braſen meridian, and ſet the index to the given hour; then turn the globe, untill the place where the hour is required comes to the meridian, and the index will point out the hour at that place.

Prob. X. *To find the ſun's place in the ecliptic, and his declination, for any given day of the year.*—Look on the horizon for the given day, and right againſt it you have the degree of the ſign in which the ſun is (or his place) on that day at noon. Find the ſame degree of that ſign in the ecliptic line upon the globe, and having brought it to the braſen meridian, obſerve what degree of the meridian ſtands over it; for that is the ſun's declination, reckoned from the equator.

Prob. XI. *The day of the month being given, to find all thoſe places of the earth over which the ſun will paſs vertically on that day.*—Find the ſun's place in the ecliptic for the given day, and having brought it to the braſen meridian, obſerve what point of the meridian is over it; then, turning the globe round its axis, all thoſe places which paſs under that point of the meridian are the places required; for as their latitude is equal, in degrees and parts of a degree, to the ſun's declination, the ſun muſt be directly over-head to each of them at its reſpective noon.

Prob. XII. *A place being given in the torrid zone, to find thoſe two days of the year on which the ſun ſhall be vertical to that place.*—Bring the given place to the braſen meridian, and mark the degree of latitude that is exactly over it on the meridian; then turn the globe round its axis, and obſerve the two degrees of the ecliptic which paſs exactly under that degree of latitude: laſtly, find on the wooden horizon, the two days of the year in which the ſun is in thoſe degrees of the ecliptic, and they are the days required: for on them, and none elſe, the ſun's delination is equal to the latitude of the given place; and conſequently, he will then be vertical to it at noon.

Prob. XIII. *To find all thoſe places of the north frigid zone, where the ſun begins to ſhine conſtantly without ſetting, on any given day, from the 21ſt of March to the 23d of September.*—On theſe two days, the ſun is in the equinoctial, and enlightens the globe exactly from pole to pole: therefore, as the earth turns round its axis, which terminates in the poles, every place upon it will go equally through the light and the dark, and ſo make the day and night equal to all places of the earth. But as the ſun declines from the equator, towards either pole, he will ſhine juſt as many degrees round that pole, as are equal to his declination from the equator: ſo that no place within that diſtance of the pole will then go through any part of the dark, and conſequently the ſun will not ſet to it. Now, as the ſun's declination is northward, from the 21ſt of March to the 23d of September, he muſt conſtantly ſhine round the north pole all that time; and on the day that he is in the northern tropic, he ſhines upon the whole north frigid zone; ſo that no place within the north polar circle goes through any part of the dark on that day. Therefore,

Having brought the ſun's place for the given day to the braſen meridian, and found his declination (by Prob. IX.) count as many degrees on the meridian, from the north pole, as are equal to the ſun's declination from the equator, and mark that degree from the pole where the reckoning ends: then turning the globe round its axis, obſerve what places in the north frigid zone paſs directly under that mark; for they are the places required.

The like may be done for the ſouth frigid zone, from the 23d of September to the 21ſt of March, during which time the ſun ſhines conſtantly on the ſouth pole.

Prob. XIV. *To find the place over which the ſun is vertical at any hour of a given day.*—Having found the ſun's declination for the given day (by Prob. X.) mark it with a chalk on the brazen meridian: then bring the place where you are (ſuppoſe Edinburgh) to the brazen meridian, and ſet the index to the given hour; which done, turn the globe on its axis, until the index points to XII at noon; and the place on the globe, which is then directly under the point of the ſun's declination marked upon the meridian, has the ſun that moment in the zenith, or directly over head.

Prob. XV. *The day and hour of a lunar eclipſe being given; to find all thoſe places of the earth to which it will be viſible.*—The moon is never eclipſed but when ſhe is full, and ſo directly oppoſite to the ſun, that the earth's ſhadow falls upon her. Therefore, whatever place of the earth the ſun is vertical to at that time, the moon muſt be vertical to the antipodes of that place: ſo that the ſun will be then viſible to one half of the earth, and the moon to the other.

Find the place to which the ſun is vertical at the given hour (by Prob. XIV.) elevate the pole to the latitude of that place, and bring the place to the upper part of the brazen meridian, as in the former problem: then, as the ſun will be viſible to all thoſe parts of the globe which are above the horizon, the moon will be viſible to all thoſe parts which are below it, at the time of her greateſt obſcuration.

Prob. XVI. *To rectify the globe for the latitude, the zenith, and the ſun's place.*—Find the latitude of the place, (by Prob. I.) and if the place be in the northern hemiſphere, raiſe the north pole above the north point of the horizon, as many degrees (counted from the pole upon the brazen meridian) as are equal to the latitude of the place. If the place be in the ſouthern hemiſphere, raiſe the ſouth pole above the ſouth point of the horizon as many degrees as are equal to the latitude. Then, turn the globe till the place comes under its latitude on the braſen meridian, and faſten the quadrant of altitude ſo, that the chamfered edge of its nut (which is even with the graduated edge) may be joined to the zenith, or point of latitude. This done, bring the ſun's place in the ecliptic for the given day (found by Prob. X.) to the graduated ſide of the brazen meridian, and ſet the hour-index to XII at noon, which is the uppermoſt XII on the hour-circle; and the globe will be rectified.

Prob. XVII. *The latitude of any place, not exceeding 66½ degrees, and the day of the month, being given; to find the time of ſun riſing and ſetting, and conſequently the length of the day and night.*—Having rectified the globe for the latitude, and for the ſun's place on the given day (as directed in the preceding problem), bring the ſun's place in the ecliptic to the eaſtern ſide of the horizon, and the hour-index will ſhew the time of ſun-riſing; then turn the globe on its axis, until the ſun's place comes to the weſtern ſide of the horizon, and the index will ſhew the time of ſun-ſetting.

The hour of ſun-ſetting doubled, gives the length of the day; and the hour of ſun-riſing doubled, gives the length of the night.

Prob. XVIII. *The latitude of any place, and the day of the month, being given; to find when the morning twilight begins, and the evening twilight ends, at that place.*—This problem is often limited: for, when the ſun does not go 18 degrees below the horizon, the twilight continues the whole night; and for ſeveral nights together in ſummer, between 49 and 66½ degrees of latitude; and the nearer to 66½, the greater is the number of theſe nights. But when it does begin and end, the following method will ſhew the time for any given day.

Rectify the globe, and bring the ſun's place in the ecliptic to the eaſtern ſide of the horizon; then mark with a chalk that point of the ecliptic which is in the weſtern ſide of the horizon, it being the point oppoſite to the ſun's place: this done, lay the quadrant of altitude over the ſaid point, and turn the globe eaſtward, keeping the quadrant at the chalk mark, until it is juſt 18 degrees high on the quadrant; and the index will point out the time when the morning twilight begins: for the ſun's place will then be 18 degrees below the eaſtern ſide of the horizon. To find the time when the evening twilight ends, bring the ſun's place to the weſtern ſide of the horizon; and the point oppoſite to it, which was marked with the chalk, will be riſing in the eaſt: then, bring the quadrant over that point, and keeping it thereon, turn the globe weſtward, until the ſaid point be 18 degrees above the horizon on the quadrant, and the index will ſhew the time when the evening twilight ends; the ſun's place being then 18 degrees below the weſtern ſide of the horizon.

Prob. XIX. *To find on what day of the year the ſun begins to ſhine conſtantly without ſetting, on any given place in the north frigid zone; and how long he continues to do ſo*—Rectify the globe to the latitude of the place, and turn it about until ſome point of the ecliptic, between Aries and Cancer, coincides with the north point of the horizon where the brazen meridian cuts it; then find, on the wooden horizon, what day of the year the ſun is in that point of the ecliptic; for that is the day on which the ſun begins to ſhine conſtantly on the given place, without ſetting. This done, turn the globe, until ſome point of the ecliptic, between Cancer and Libra, coincides with the north point of the horizon, where the brazen meridian cuts it; and find, on the wooden horizon, on what day the ſun is in that point of the ecliptic; which is the day that the ſun leaves off conſtantly ſhining on the ſaid place, and riſes and ſets to it as to other places on the globe. The number of natural days, or complete revolutions of the ſun about the earth, between the two days above found, is the time that the ſun keeps conſtantly above the horizon without ſetting: for all that portion of the ecliptic, which lies between the two points which interſect the horizon in the very north, never ſets below it; and there is juſt as much of the oppoſite part of the ecliptic that never riſes: therefore, the ſun will keep as long conſtantly below the horizon in winter, as above it in ſummer.

Prob. XX. *To find in what latitude the ſun ſhines conſtantly without ſetting, for any length of time leſs than 182½ of our days and nights.*—Find a point in the ecliptic half as many degrees from the beginning of Cancer (either toward Aries or Libra) as there are natural days in the time given; and bring that point to the north ſide of the brazen meridian, on which the degrees are numbered from the pole towards the equator: then, keep the globe from turning on its axis, and ſlide the meridian up or down until the foreſaid point of the ecliptic comes to the north point of the horizon, and then the elevation of the pole will be equal to the latitude required.

Prob. XXI. *The latitude of a place, not exceeding 66½ degrees, and the day of the month, being given; to find the ſun's amplitude or point of the compaſs on which he riſes or ſets.*—Rectify the globe, and bring the ſun's place to the eaſtern ſide of the horizon; then obſerve what point of the compaſs on the horizon ſtands right againſt the ſun's place, for that is his amplitude at riſing. This done, turn the globe weſtward, until the ſun's place comes to the weſtern ſide of the horizon, and it will cut the point of his amplitude at ſetting. Or, you may count the riſing amplitude in degrees, from the eaſt point of the horizon, to that point where the ſun's place cuts it; and the ſetting amplitude, from the weſt point of the horizon, to the ſun's place at ſetting.

Prob. XXII. *The latitude, the ſun's place, and his altitude, being given; to find the hour of the day, and the ſun's azimuth, or number of degrees that he is diſtant from the meridian.*—Rectify the globe, and bring the ſun's place to the given height upon the quadrant of altitude; on the eaſtern ſide of the horizon, if the time be in the forenoon; or the weſtern ſide, if it be in the afternoon: then the index will ſhew the hour; and the number of degrees in the horizon, intercepted between the quadrant of altitude and the ſouth point, will be the ſun's true azimuth at that time.

Prob. XXIII. *The latitude, hour of the day, and the ſun's place, being given; to find the ſun's altitude and azimuth.*—Rectify the globe, and turn it until the index points to the given hour; then lay the quadrant of altitude over the ſun's place in the ecliptic, and the degree of the quadrant cut by the ſun's place is his altitude at that time above the horizon; and the degree of the horizon cut by the quadrant is the ſun's azimuth, reckoned from the ſouth.

Prob. XXIV. *The latitude, the ſun's altitude, and his*

his azimuth being given; to find his place in the ecliptic, the day of the month, and hour of the day, though they had all been loſt.—Rectify the globe for the latitude and zenith, and ſet the quadrant of altitude to the given azimuth in the horizon; keeping it there, turn the globe on its axis until the ecliptic cuts the quadrant in the given altitude: that point of the ecliptic which cuts the quadrant there, will be the ſun's place; and the day of the month anſwering thereto, will be found over the like place of the ſun on the wooden horizon. Keep the quadrant of altitude in that poſition; and, having brought the ſun's place to the brazen meridian, and the hour-index to XII at noon, turn back the globe, until the ſun's place cuts the quadrant of altitude again, and the index will ſhew the hour.

Any two points of the ecliptic, which are equidiſtant from the beginning of Cancer or of Capricorn, will have the ſame altitude and azimuth at the ſame hour, though the months be different; and therefore it requires ſome care in this problem, not to miſtake both the month and the day of the month: to avoid which, obſerve, that from the 20th of March to the 21ſt of June, that part of the ecliptic which is between the beginning of Aries and beginning of Cancer is to be uſed; from the 21ſt of June to the 23d of September, between the beginning of Cancer and beginning of Libra; from the 23d of September to the 21ſt of December, between the beginning of Libra and the beginning of Capricorn; and from the 21ſt of December to the 20th of March, between the beginning of Capricorn and beginning of Aries. And as one can never be at a loſs to know in what quarter of the year he takes the ſun's altitude and azimuth, the above caution with regard to the quarters of the ecliptic will keep him right as to the month and day thereof.

PROB. XXV. *To find the length of the longeſt day at any given place.*—If the place be on the north ſide of the equator (find its latitude by Prob. I.) and elevate the north pole to that latitude; then, bring the beginning of Cancer to the brazen meridian, and ſet the hour-index to XII at noon. But if the given place be on the ſouth ſide of the equator, elevate the ſouth pole to its latitude, and bring the beginning of Capricorn to the braſs meridian, and the hour-index to XII. This done, turn the globe weſtward, until the beginning of Cancer or Capricorn (as the latitude is north or ſouth) comes to the horizon; and the index will then point out the time of ſun-ſetting, for it will have gone over all the afternoon hours, between midday and ſun-ſet; which length of time being doubled, will give the whole length of the day from ſun-riſing to ſun-ſetting. For, in all latitudes, the ſun riſes as long before mid-day, as he ſets after it.

PROB. XXVI. *To find in what latitude the longeſt day is, of any given length, leſs than 24 hours.*—If the latitude be north, bring the beginning of Cancer to the braſen meridian, and elevate the north pole to about 66½ degrees; but if the latitude be ſouth, bring the beginning of Capricorn to the meridian, and elevate the ſouth pole to about 66½ degrees; becauſe the longeſt day in north latitude is, when the ſun is in the firſt point of Cancer; and in ſouth latitude, when he is in the firſt point of Capricorn. Then ſet the hour-index to XII at noon, and turn the globe weſtward, until the index points at half the number of hours given; which done, keep the globe from turning on its axis, and ſlide the meridian down in the notches, until the aforeſaid point of the ecliptic (*viz.* Cancer or Capricorn) comes to the horizon; then, the elevation of the pole will be equal to the latitude required.

PROB. XXVII. *The latitude of any place, not exceeding 66½ degrees, being given; to find in what climate the place is.*—Find the length of the longeſt day at the given place, by Prob. XXV. and whatever be the number of hours whereby it exceedeth twelve, double that number, and the ſum will give the climate in which the place is.

PROB. XXVIII. *The latitude, and the day of the month, being given; to find the hour of the day when the ſun ſhines.*—Set the wooden horizon truly level, and the braſen meridian due north and ſouth by a mariner's compaſs; then, having rectified the globe, ſtick a ſmall ſewing-needle into the ſun's place in the ecliptic, perpendicular to that part of the ſurface of the globe: this done, turn the globe on its axis, until the needle comes to the braſen meridian, and ſet the hour-index to XII at noon; then, turn the globe on its axis, until the needle points exactly towards the ſun (which it will do when it caſts no ſhadow on the globe), and the index will ſhew the hour of the day.

4. *The Uſe of the Celeſtial Globe.*

HAVING done for the preſent with the terreſtrial globe, we ſhall proceed to the uſe of the celeſtial; firſt premiſing, that as the equator, ecliptic, tropics, polar-circles, horizon, and braſen meridian, are exactly alike on both globes, all the former problems concerning the ſun are ſolved the ſame way by both globes. The method alſo of rectifying the celeſtial globe is the ſame as rectifying the terreſtrial. *N. B.* The ſun's place for any day of the year ſtands directly over that day on the horizon of the celeſtial globe, as it does on that day of the terreſtrial.

The *latitude* and *longitude* of the ſtars, or of all other celeſtial phenomena, are reckoned in a very different manner from the latitude and longitude of places on the earth: for all terreſtrial latitudes are reckoned from the equator; and longitudes from the meridian of ſome remarkable place, as of London by the Britiſh, and of Paris by the French. But the aſtronomers of all nations agree in reckoning the latitudes of the moon, ſtars, planets, and comets, from the ecliptic; and their longitudes from the equinoctial colure, in that ſemi-circle of it which cuts the ecliptic at the beginning of Aries; and thence eaſtward, quite round, to the ſame ſemi-circle again. Conſequently thoſe ſtars which lie between the equinoctial and the northern half of the ecliptic, have north declination and ſouth latitude; thoſe which lie between the equinoctial and the ſouthern half of the ecliptic, have ſouth declination and north latitude; and all thoſe which lie between the tropics and poles, have their declinations and latitudes of the ſame denomination.

There are ſix great circles on the celeſtial globe, which cut the ecliptic perpendicularly, and meet in two oppoſite points in the polar circles; which points are each ninety degrees from the ecliptic, and are called

led its poles. Theſe polar points divide thoſe circles into 12 ſemicircles; which cut the ecliptic at the beginnings of the twelve ſigns. They reſemble ſo many meridians on the terreſtrial globe: and as all places which lie under any particular meridian-ſemicircle on that globe, have the ſame longitude; ſo all thoſe points of the heaven, through which any of the above ſemicircles are drawn, have the ſame longitude.—And as the greateſt latitudes on the earth are at the north and ſouth poles of the earth, ſo the greateſt latitudes in the heaven are at the north and ſouth poles of the ecliptic.

For the diviſion of the ſtars into conſtellations, &c. ſee Astronomy, n° 203. 206.

Prob. I. *To find the right aſcenſion and declination of the ſun, or any fixed ſtar.*—Bring the ſun's place in the ecliptic to the braſen meridian: then that degree in the equinoctial which is cut by the meridian, is the ſun's *right aſcenſion;* and that degree of the meridian which is over the ſun's place, is his *declination.* Bring any fixed ſtar to the meridian, and its right aſcenſion will be cut by the meridian in the equinoctial; and the degree of the meridian that ſtands over it, is its declination.

So that right aſcenſion and declination, on the celeſtial globe, are found in the ſame manner as longitude and latitude on the terreſtrial.

Prob. II. *To find the latitude and longitude of any ſtar.*—If the given ſtar be on the north ſide of the ecliptic, place the 90th degree of the quadrant of altitude on the north pole of the ecliptic, where the twelve ſemicircles meet, which divide the ecliptic into the 12 ſigns; but if the ſtar be on the ſouth ſide of the ecliptic, place the 90th degree of the quadrant on the ſouth pole of the ecliptic: keeping the 90th degree of the quadrant on the proper pole, turn the quadrant about, until its graduated edge cuts the ſtar: then, the number of degrees in the quadrant, between the ecliptic and the ſtar, is its latitude; and the degree of the ecliptic, cut by the quadrant, is the ſtar's longitude, reckoned according to the ſign in which the quadrant then is.

Prob. III. *To repreſent the face of the ſtarry firmament, as ſeen from any given place of the earth, at any hour of the night.*—Rectify the celeſtial globe for the given latitude, the zenith, and ſun's place, in every reſpect, as taught by the XVIth problem for the terreſtrial; and turn it about, until the index points to the given hour: then, the upper hemiſphere of the globe will repreſent the viſible half of the heaven for that time; all the ſtars upon the globe being then in ſuch ſituations, as exactly correſpond to thoſe in the heaven. And if the globe be placed duly north and ſouth, by means of a ſmall ſea-compaſs, every ſtar in the globe will point toward the like ſtar in the heaven: by which means, the conſtellations and remarkable ſtars may be eaſily known. All thoſe ſtars which are in the eaſtern ſide of the horizon, are then riſing in the eaſtern ſide of the heaven; all in the weſtern, are ſetting in the weſtern ſide; and all thoſe under the upper part of the braſen meridian, between the ſouth point of the horizon and the north pole, are at their greateſt altitude, if the latitude of the place be north; but if the latitude be ſouth, thoſe ſtars which lie under the upper part of the meridian, between the north point of the horizon and the ſouth pole, are at their greateſt altitude.

Prob. IV. *The latitude of the place, and day of the month, being given; to find the time when any known ſtar will riſe, or be upon the meridian, or ſet.*—Having rectified the globe, turn it about until the given ſtar comes to the eaſtern ſide of the horizon, and the index will ſhew the time of the ſtar's riſing; then turn the globe weſtward, and when the ſtar comes to the braſen meridian, the index will ſhew the time of the ſtar's coming to the meridian of your place; laſtly, turn on, until the ſtar comes to the weſtern ſide of the horizon, and the index will ſhew the time of the ſtar's ſetting. *N. B.* In northern latitudes, thoſe ſtars which are leſs diſtant from the north pole than the quantity of its elevation above the north point of the horizon, never ſet; and thoſe which are leſs diſtant from the ſouth pole than the number of degrees by which it is depreſſed below the horizon, never riſe: and *vice verſa* in ſouthern latitudes.

Prob. V. *To find at what time of the year a given ſtar will be upon the meridian, at a given hour of the night.*—Bring the given ſtar to the upper ſemicircle of the braſs meridian, and ſet the index to the given hour; then turn the globe, until the index points to XII at noon, and the upper ſemicircle of the meridian will then cut the ſun's place, anſwering to the day of the year ſought; which day may be eaſily found againſt the like place of the ſun among the ſigns on the wooden horizon.

Prob. VI. *The latitude, day of the month, and azimuth of any known ſtar, being given; to find the hour of the night.*—Having rectified the globe for the latitude, zenith, and ſun's place, lay the quadrant of altitude to the given degree of azimuth in the horizon: then turn the globe on its axis, until the ſtar comes to the graduated edge of the quadrant; and when it does, the index will point out the hour of the night.

Prob. VII. *The latitude of the place, the day of the month, and altitude of any known ſtar, being given; to find the hour of the night.*—Rectify the globe as in the former problem, gueſs at the hour of the night, and turn the globe until the index points at the ſuppoſed hour: then lay the graduated edge of the quadrant of altitude over the known ſtar; and if the degree of the ſtar's height in the quadrant upon the globe anſwers exactly to the degree of the ſtar's obſerved altitude in the heaven, you have gueſſed exactly: but if the ſtar on the globe is higher or lower than it was obſerved to be in the heaven, turn the globe backwards or forewards, keeping the edge of the quadrant upon the ſtar, until its centre comes to the obſerved altitude in the quadrant; and then the index will ſhew the true time of the night.

Prob. VIII. *An eaſy method for finding the hour of the night by any two known ſtars, without knowing either their altitude or azimuth; and then, of finding both their altitude and azimuth, and thereby the true meridian.*—Tie one end of a thread to a common muſket-bullet; and, having rectified the globe as above, hold the other end of the thread in your hand, and carry it ſlowly round betwixt your eye and the ſtarry heaven, until you find it cuts any two known ſtars at once. Then gueſſing at the hour of the night, turn the globe until the index points to that time in the hour-circle;

which done, lay the graduated edge of the quadrant over any one of theſe two ſtars on the globe, which the thread cut in the heaven. If the ſaid edge of the quadrant cuts the other ſtar alſo, you have gueſſed the time exactly; but if it does not, turn the globe ſlowly backwards or forwards, until the quadrant (kept upon either ſtar) cuts them both through their centres: and then, the index will point out the exact time of the night; the degree of the horizon, cut by the quadrant, will be the true azimuth of both theſe ſtars from the ſouth; and the ſtars themſelves will cut their true altitudes in the quadrant. At which moment, if a common azimuth-compaſs be ſo ſet upon a floor or level pavement, that theſe ſtars in the heaven may have the ſame bearing upon it (allowing for the variation of the needle) as the quadrant of altitude has in the wooden horizon of the globe, a thread extended over the north and ſouth points of that compaſs will be directly in the plane of the meridian: and if a line be drawn upon the floor or pavement, along the courſe of the thread, and an upright wire be placed in the ſouthmoſt end of the line, the ſhadow of the wire will fall upon that line, when the ſun is on the meridian, and ſhines upon the pavement.

Prob. IX. *To find the place of the moon, or of any planet; and thereby to ſhew the time of its riſing, ſouthing, and ſetting.* Seek in Parker's or Weaver's ephemeris the geocentric place of the moon or planet in the ecliptic, for the given day of the month; and, according to its longitude and latitude, as ſhewn by the ephemeris, mark the ſame with a chalk upon the globe. Then, having rectified the globe, turn it round its axis weſtward; and as the ſaid mark comes to the eaſtern ſide of the horizon, to the braſen meridian, and to the weſtern ſide of the horizon, the index will ſhew at what time the planet riſes, comes to the meridian, and ſets, in the ſame manner as it would do for a fixed ſtar.

For an explanation of the harveſt-moons by a globe, ſee Astronomy, n° 168.

For the deſcription and uſe of a planetary globe, ſee Astronomy, n° 320.

For the equation of time, ſee Astronomy, n° 181.

41 Solution of ſeveral problems by an analemma.

Most of the above problems may alſo be performed by means of accurate maps; but this requires a great deal of calculation, which is often very troubleſome. The Analemma, or Orthographic Projection, delineated on 2^{d} Plate CXVI. will ſolve many of the moſt curious; and with the aſſiſtance of the maps will be almoſt equivalent to a terreſtrial globe. The parallel lines drawn on this figure repreſent the degrees of the ſun's declination from the equator, whether north or ſouth, amounting to $23\frac{1}{2}$ nearly. On theſe lines are marked the months and days which correſpond to ſuch and ſuch declinations. The ſize of the figure does not admit of having every day of the year inſerted; but by making allowance for the intermediate days, in proportion to the reſt, the declination may be gueſſed at with tolerable exactneſs. The elliptical lines are deſigned to ſhew the hours of ſun-riſing or ſun-ſetting before or after ſix o'clock. As 60 minutes make an hour of time, a fourth part of the ſpace between each of the hour-lines will repreſent 15 minutes; which the eye can readily gueſs at, and which is as great exactneſs as can be expected from any mechanical invention, or as is neceſſary to anſwer any common purpoſe. The circles drawn round the centre at the diſtance of $11\frac{1}{4}$ each, ſhew the point of the compaſs on which the ſun riſes and ſets, and on what point the twilight begins and ends.

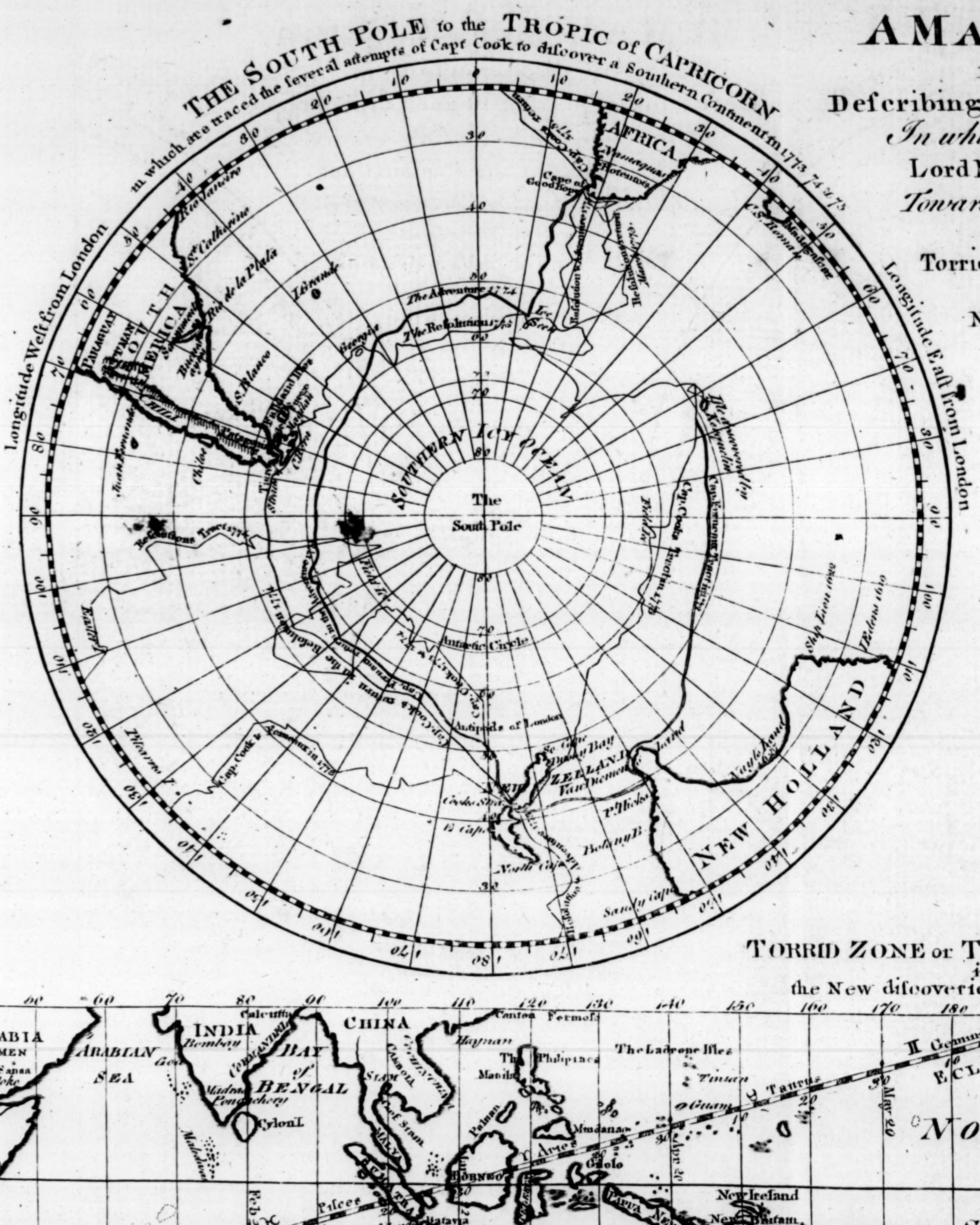
In order to make uſe of this analemma, it is only neceſſary to conſider, that, when the latitude of the place and the ſun's declination are both north or both ſouth, the ſun riſes before ſix o'clock, between the eaſt and the elevated pole; that is, towards the north, if the latitude and declination are north; or towards the ſouth, if the latitude and declination are ſouth. Let us now ſuppoſe it is required to find the time of the ſun's riſing and ſetting, the length of the days and nights, the time when the twilight begins and ends, and what point of the horizon the ſun riſes and ſets on, for the Lizard point in England, Frankfort in Germany, or Abbeville in France, on the 30th of April. The latitude of theſe places by the maps will be found nearly 50° north. Place the moveable index ſo that its point may touch 50° on the quadrant of north latitude in the figure; then obſerve where its edge cuts the parallel line on which April 30th is wrote. From this reckon the hour-lines towards the centre, and you will find that the parallel-line is cut by the index nearly at the diſtance of one hour and 15 minutes. So the ſun riſes at one hour fifteen minutes before ſix, or 45 minutes after four in the morning, and ſets 15 minutes after ſeven in the evening. The length of the day is 14 hours 30 minutes. Obſerve how far the interſection of the edge of the index with the parallel of April 30th is diſtant from any of the concentric circles; which you will find to be a little beyond that marked *two points of the compaſs*; and this ſhews, that on the 30th of April the ſun riſes two points and ſomewhat more from the eaſt towards the north, or a little to the northward of E. N. E. and ſets a little to the northward of W. N. W. To find the beginning and ending of twilight, take from the graduated arch of the circle $17\frac{1}{2}$ degrees with a pair of compaſſes; move one foot of the compaſſes extended to this diſtance along the parallel for the 30th of April, till the other juſt touches the edge of the index, which muſt ſtill point at 50. The place where the other foot reſts on the parallel of April 30th, then denotes the number of hours before ſix at which the twilight begins. This is ſomewhat more than three hours and an half; which ſhews, that the twilight then begins ſoon after two in the morning, and likewiſe that it begins to appear near five points from the eaſt towards the north. The uſes of this analemma may be varied in a great number of ways; but the example juſt now given will be ſufficient for the ingenious reader.—The ſmall circles on the ſame plate, marked *Iſland*, *Promontory*, &c. are added in order to render the maps more intelligible, by ſhewing how the different ſubjects are commonly delineated on them.

Having thus explained the uſe of the globes, and general principles of geography, we muſt refer to the *maps* for the ſituation of each particular country, with regard to longitude, latitude, &c. and to the *names* of the countries as they occur in the order of the alphabet, for the moſt remarkable particulars concerning them.

GEOGRAPHY

A MAP of the WO

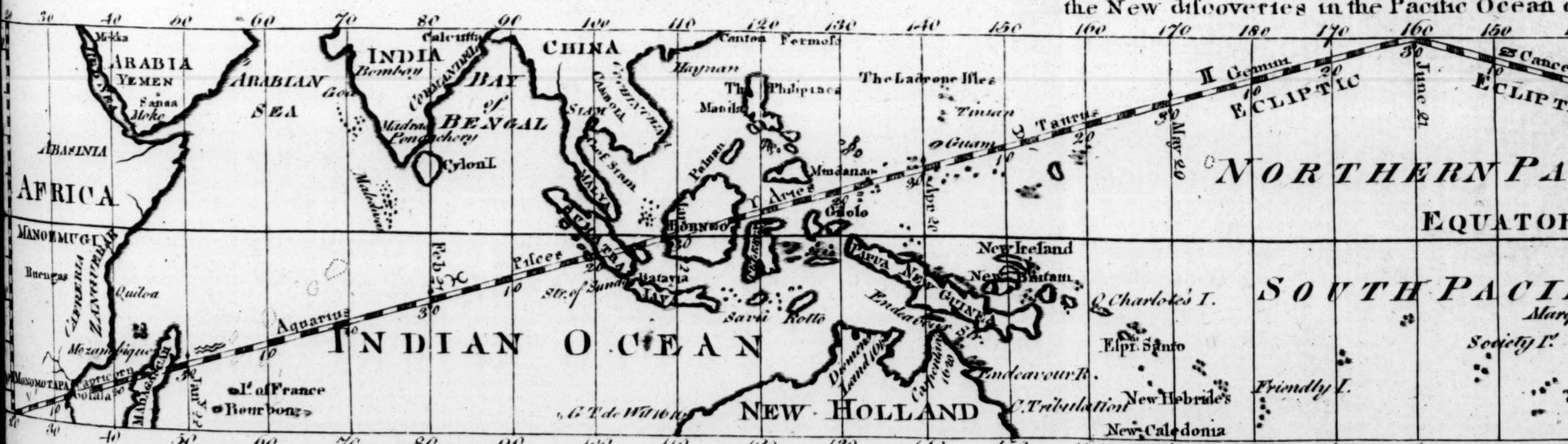
in three Sections,
Describing the Polar Regions to
In which are traced the T
Lord Mulgrave and Captain C
Towards the North & South
and the
Torrid Zone or Tropical Regio
with the
New Discoveries in the
SOUTH SEA



THE SOUTH POLE to the TROPIC of CAPRICORN in which are traced the several attempts of Capt Cook to discover a Southern Continent in 1773, 74 & 75

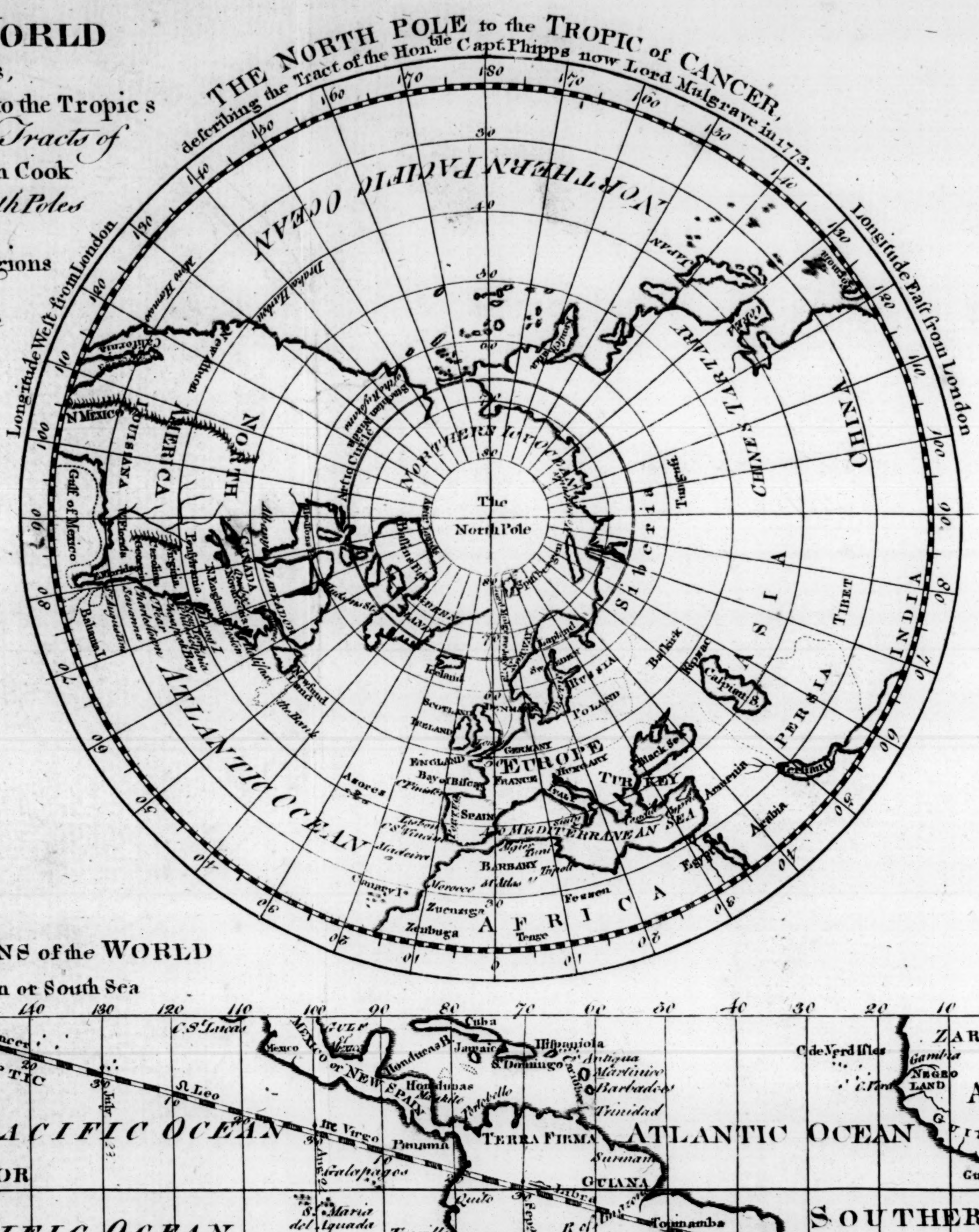
Longitude West from London
Longitude East from London
The South Pole
SOUTHERN ICY OCEAN
AFRICA
Cape of Good Hope
SOUTH AMERICA
Rio de la Plata
St Catherine
Rio Janeiro
Georgia
The Adventure 1774
The Resolution 1775
Antarctic Circle
Antipods of London
NEW ZEELAND
Van Diemens
Botany B.
Sandy Cape
North Cape
Cooks Str.
NEW HOLLAND
Cap. Cooks Track in 1773
Pitcairns I.
Easter I.
Juan Fernandes
Chiloe

TORRID ZONE or TROPICAL REGIONS in which are laid down the New discoveries in the Pacific Ocean

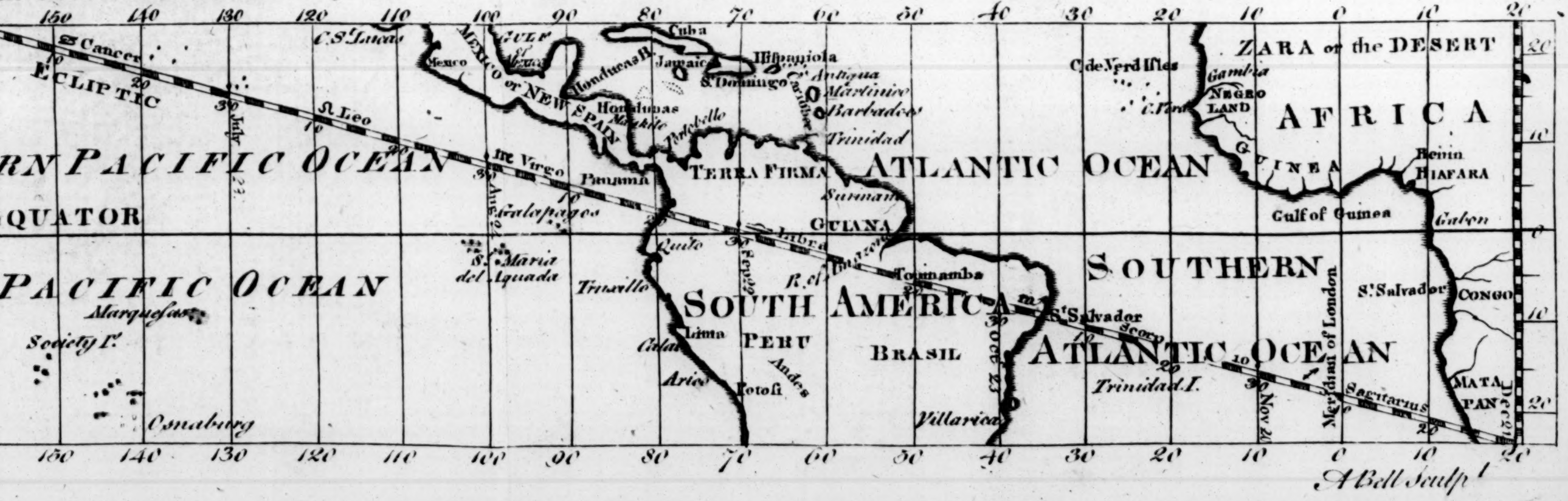


ARABIA
YEMEN
ABASINIA
AFRICA
ARABIAN SEA
INDIA
Bombay
BAY of BENGAL
Calcutta
CHINA
Canton
Hayman
The Philippines
The Ladrone Isles
Tinian
Guam
Mindanao
BORNEO
SUMATRA
JAVA
Batavia
Str. of Sunda
Cylon I.
INDIAN OCEAN
NEW HOLLAND
Endeavour R.
C. Tribulation
New Ireland
New Britain
NEW GUINEA
Q. Charlotes I.
New Hebrides
New Caledonia
Friendly I.
Society I.
NORTHERN PA
SOUTH PACI
EQUATOR
ECLIPTIC
Tropic of Capricorn
Quiloa
Mozambique
MADAGASCAR
I. of France
Bourbon

APHY
he WORLD
ections,
egions to the Tropic s
ed the Tracts of
Captain Cook
t & South Poles
e
pical Regions
&
hes in the
SEA

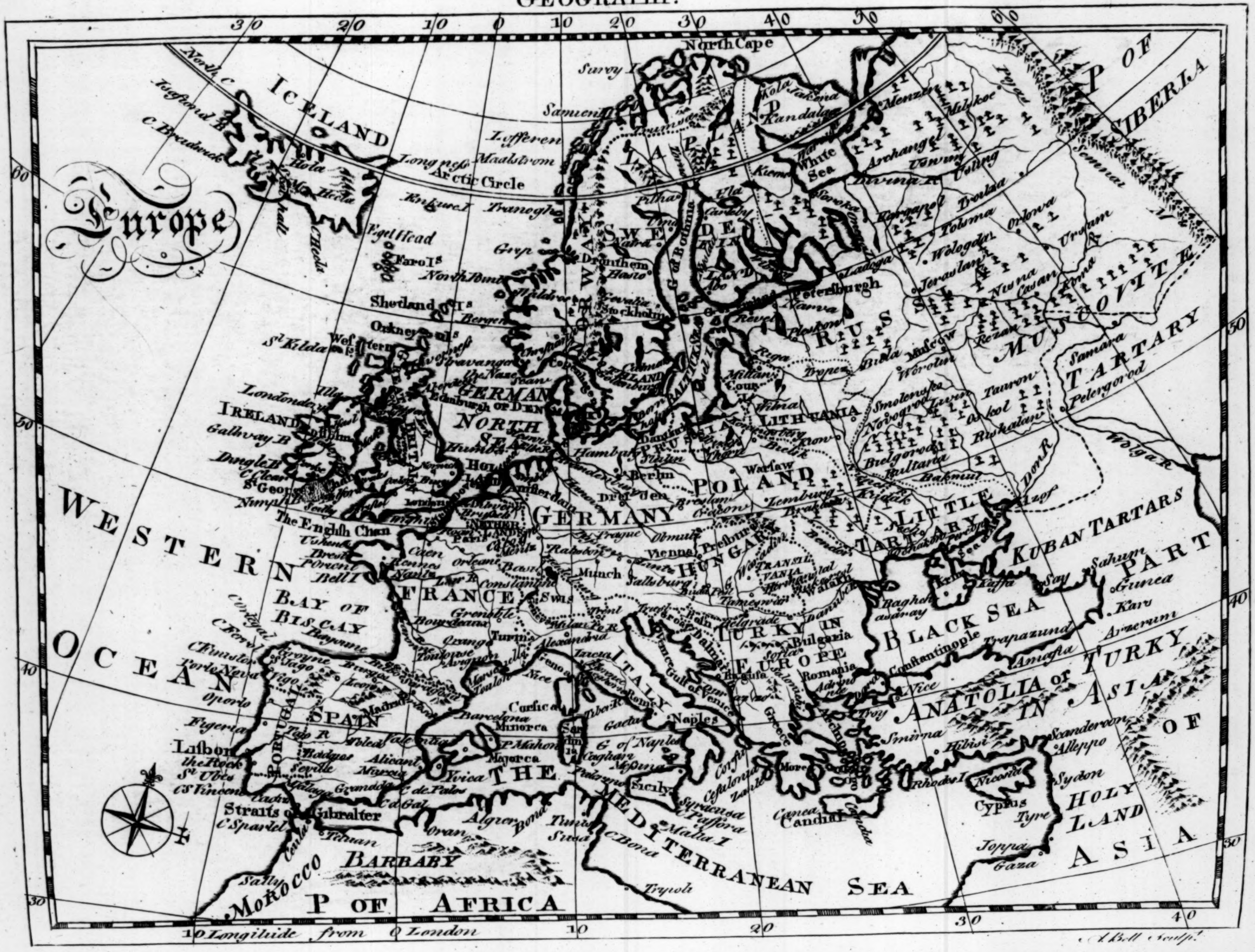

THE NORTH POLE to the TROPIC of CANCER, describing the Tract of the Honble Capt. Phipps now Lord Mulgrave in 1773.
Longitude West from London
Longitude East from London
NORTHERN PACIFIC OCEAN
NORTHERN ICY OCEAN
The North Pole
NORTH AMERICA
CANADA
LOUISIANA
N Mexico
California
Gulf of Mexico
ATLANTIC OCEAN
Iceland
SCOTLAND
IRELAND
ENGLAND
Bay of Biscay
FRANCE
SPAIN
GERMANY
POLAND
RUSSIA
Lapland
EUROPE
TURKEY
Black Sea
MEDITERRANEAN SEA
BARBARY
AFRICA
Azores
Madeira
Canary Is.
Siberia
ASIA
CHINESE TARTARY
CHINA
TIBET
INDIA
PERSIA
Arabia
Egypt
Caspian S.
Japan
Kamtschatka

REGIONS of the WORLD
id down
fic Ocean or South Sea

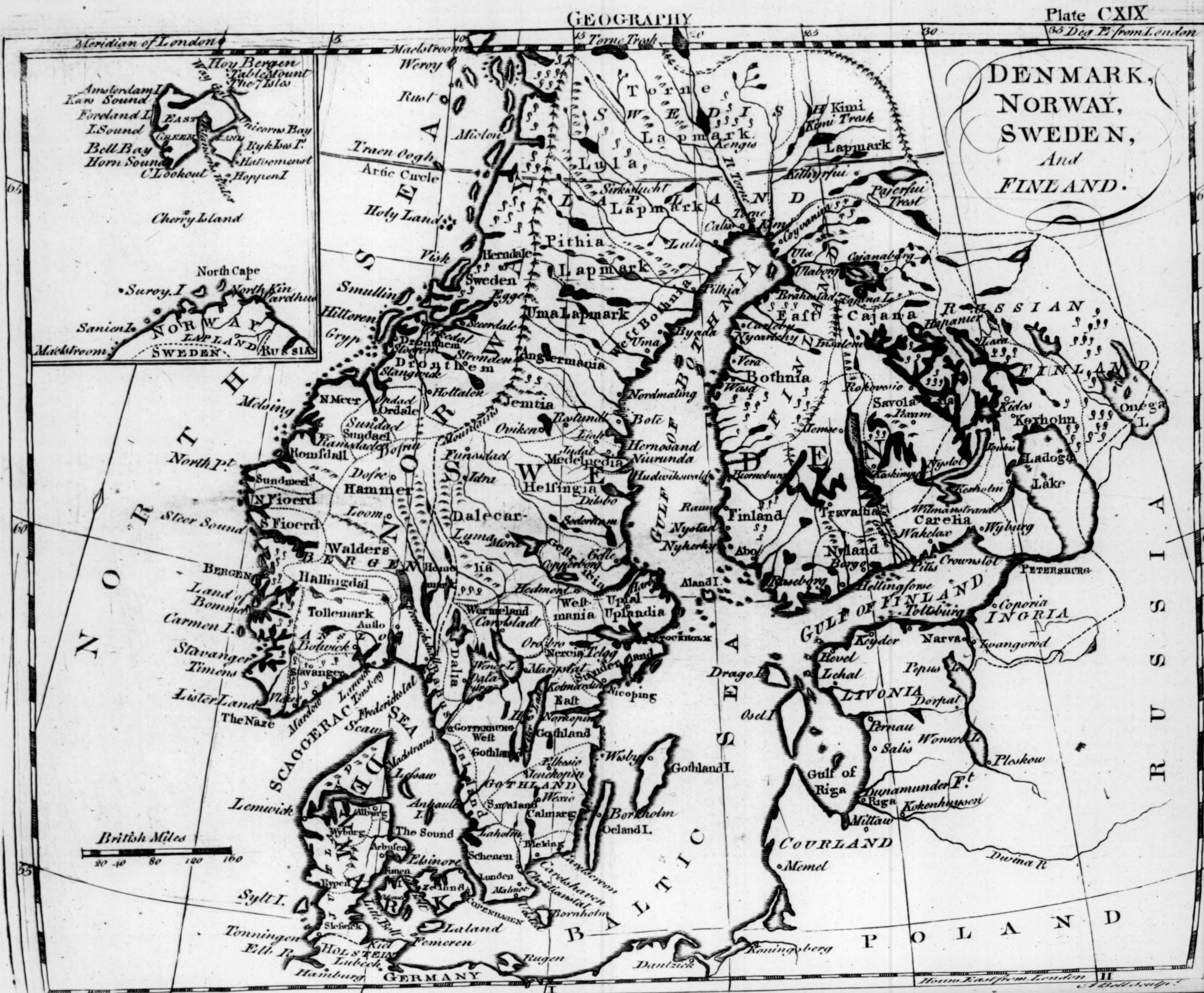

Cancer
ECLIPTIC
RN PACIFIC OCEAN
QUATOR
PACIFIC OCEAN
Marquesas
Society Is.
Osnaburg
Galapagos
Mexico
GULF of MEXICO
NEW SPAIN
Cuba
Jamaica
Hispaniola
Antigua
Martinico
Barbadoes
Trinidad
Panama
TERRA FIRMA
GUIANA
Surinam
SOUTH AMERICA
PERU
Lima
Potosi
Andes
BRASIL
Villarica
Trinidad I.
ATLANTIC OCEAN
SOUTHERN ATLANTIC OCEAN
C de Verd Isles
ZARA or the DESERT
NEGRO LAND
AFRICA
GUINEA
Gulf of Guinea
Benin
BIAFARA
Gabon
CONGO
St. Salvador
MATAPAN
Meridian of London
Sagittarius
Leo
Virgo
Libra

A Bell Sculpt

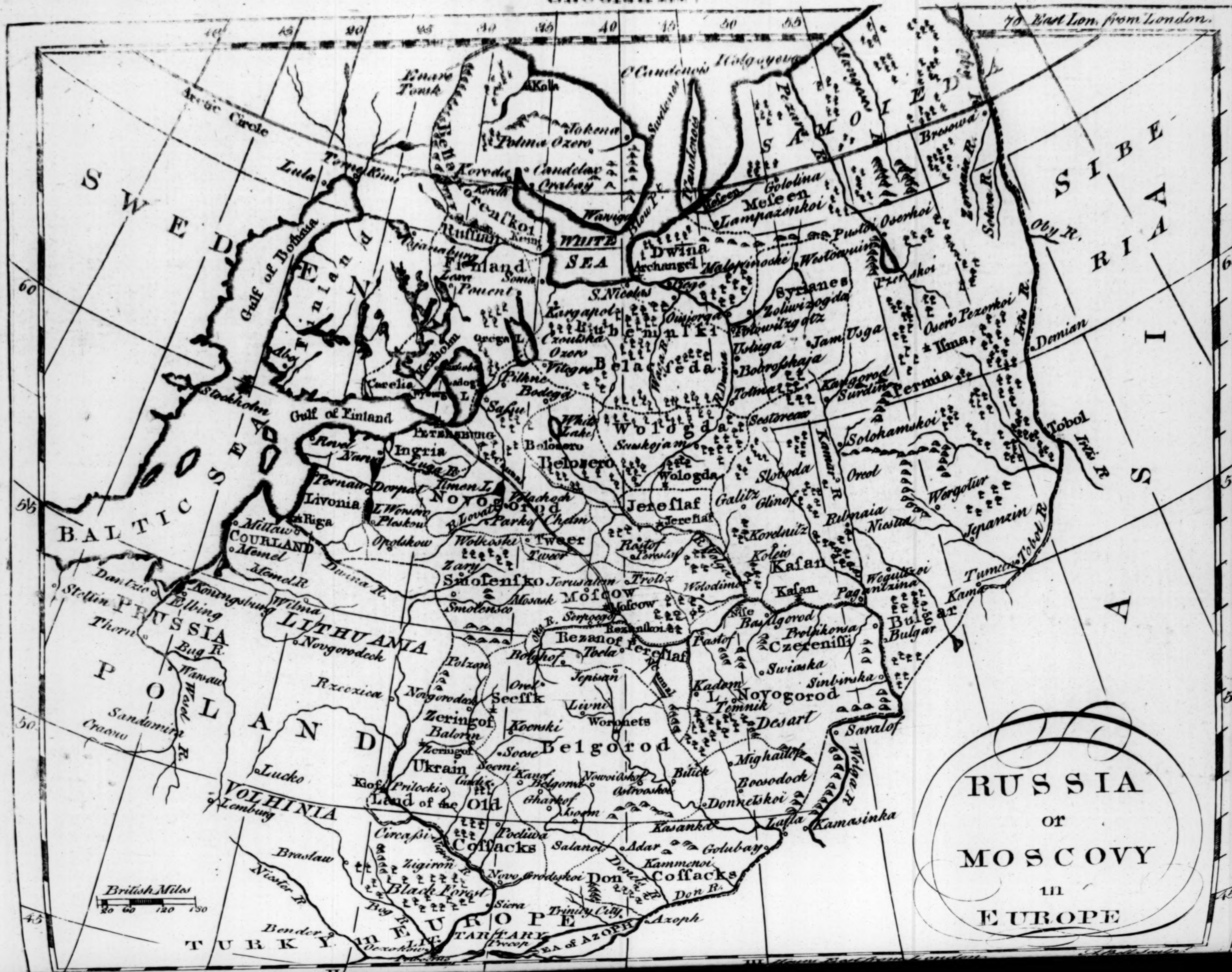
3 MA 53


Europe
ICELAND
Arctic Circle
North Cape
LAPLAND
White Sea
SWEDEN
NORWAY
SIBERIA
RUSSIA
MUSCOVITE
TARTARY
Petersburgh
Moscow
Archangel
IRELAND
BRITAIN
NORTH SEA
GERMANY
POLAND
LITHUANIA
HUNGARY
LITTLE TARTARY
KUBAN TARTARS
BLACK SEA
Constantinople
TURKY IN EUROPE
ANATOLIA or TURKY IN ASIA
PART OF ASIA
HOLY LAND
WESTERN OCEAN
BAY OF BISCAY
FRANCE
SPAIN
PORTUGAL
Lisbon
Straits of Gibralter
ITALY
THE MEDITERRANEAN SEA
BARBARY
MOROCCO
P OF AFRICA
Longitude from London
A. Bell Sculp.

3 MA 53


DENMARK, NORWAY, SWEDEN, And FINLAND.
Meridian of London
Deg. E. from London
Long. East from London
A. Bell Sculpt.
British Miles
20 40 80 120 160
NORTH SEA
SCAGGERAC SEA
BALTIC SEA
GULF OF BOTHNIA
GULF OF FINLAND
Gulf of Riga
NORWAY
SWEDEN
DENMARK
FINLAND
SWEDISH LAPLAND
RUSSIAN FINLAND
RUSSIA
POLAND
GERMANY
LIVONIA
COURLAND
INGRIA
Artic Circle
North Cape
Amsterdam I.
Cherry Island
Bergen
Drontheim
Stockholm
Copenhagen
Petersburg
Riga
Ladoga Lake
Onega L.
Gothland I.
Oeland I.
Bornholm
Aland I.

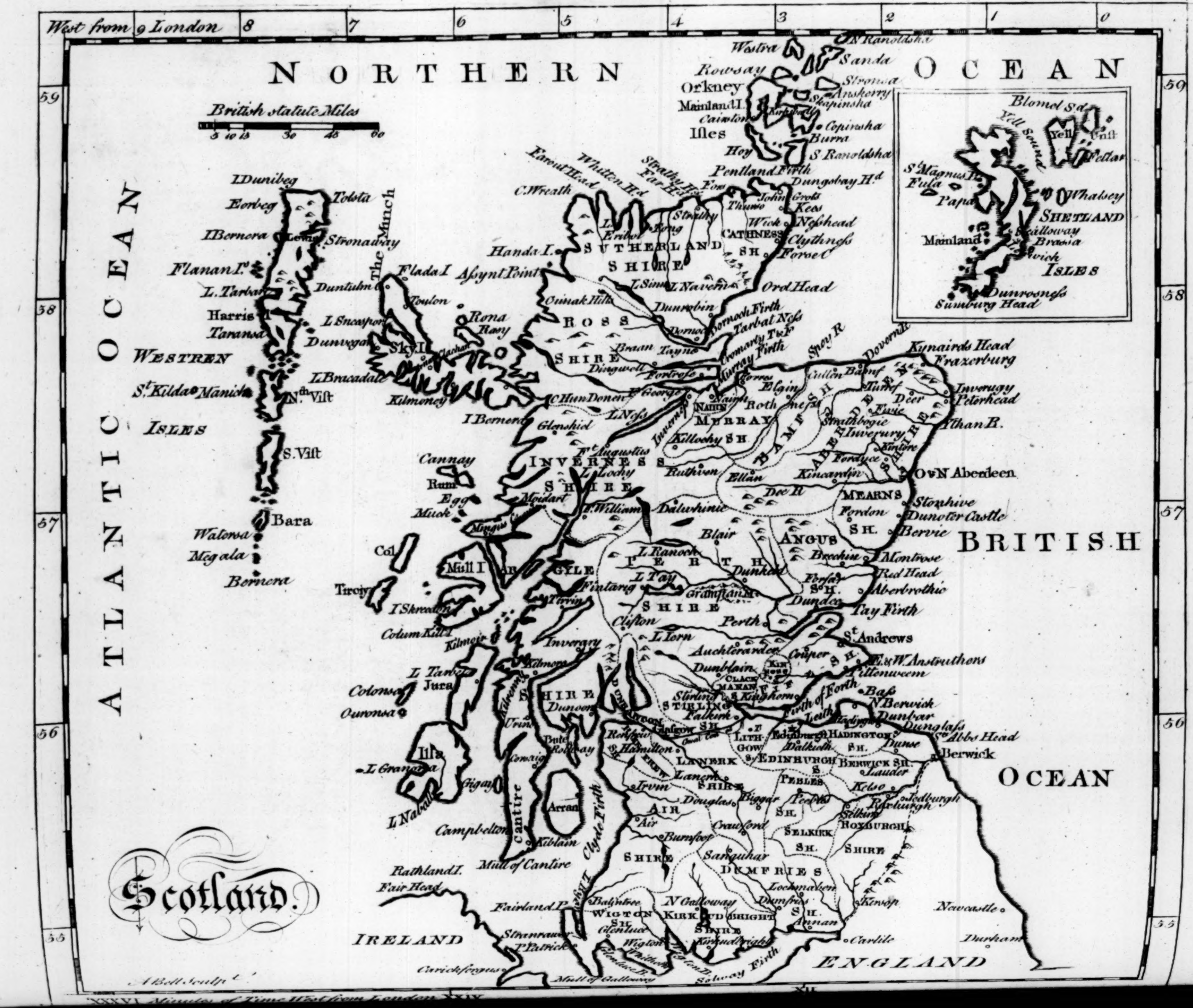
3 MA 53



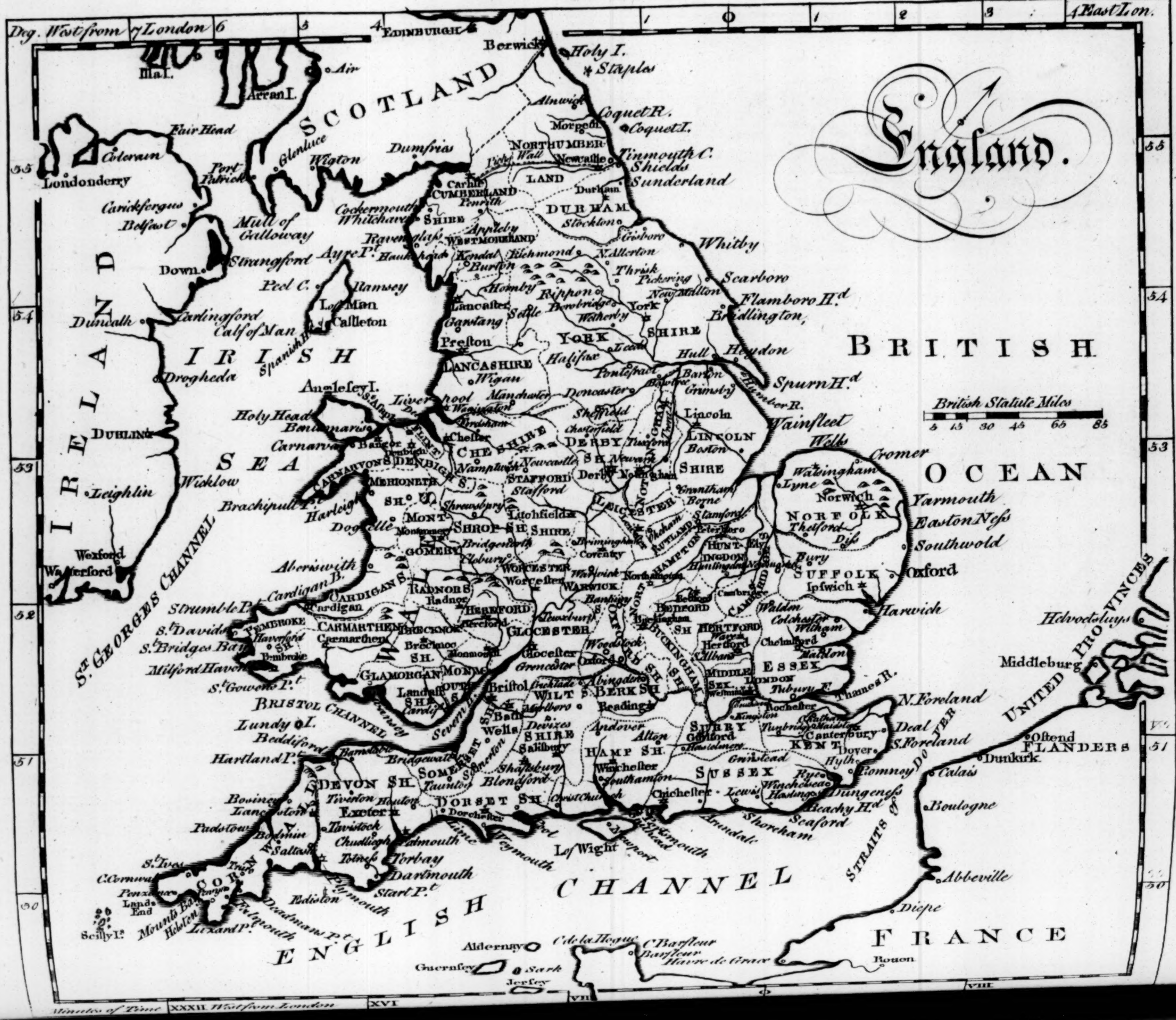
RUSSIA or MOSCOVY in EUROPE

East Lon. from London
Arctic Circle
SWEDEN
Gulf of Bothnia
Finland
Stockholm
Abo
Gulf of Finland
BALTIC SEA
Lula
Tornea
Kimi
Enare
Tonsk
Kola
Tokena
Polma Ozero
Candelax
Crabay
Kereda
Kerdi
Orenskoi
Russian
Kemi
Warsuga
WHITE SEA
C. Candenois
Kolgoyeva
Swetenos
Kandenois
Slow R.
Meseen
Gololina
Lampaznikoi
Dwina
Archangel
Malapinoske
Westowia
Pustoi Oserkoi
SAMOIEDA
Pezora R.
Brosowa
Zerwaia R.
Selwa R.
SIBERIA
Oby R.
Demian
Irtis R.
Tobol
Tobol R.
Tumin
Kama
Finland
Pouent
Soma
Kexholm
Carelia
Petersburg
Onega L.
Ladoga L.
Kargapol
Czoulska Ozero
Vitegra
Pilkno
Bodoga
Sasne
S. Nicolas
Bela Ozero
Oujerga
Syrianes
Zoliwizogda
Tolowitzgaltz
Toluga
Bobroskaja
Jam Usga
Pustozerskoi
Osero Pezorkoi
Ilma
Permia
Surdin
Kaigorod
Solokamskoi
Worgotur
Jepanzin
Niasta
White Lake
Beloosero
Belosero
Wologda
Swaskojam
Tolma
Sestorecz
Sloboda
Galitz
Glinof
Kemar R.
Oreol
Bulmaia
Revel
Narva
Ingria
Luga R.
Pernaw
Dorpat
Livonia
Ilmen L.
Novogorod
Parko
Plaskow
L. Worsero
Riga
Mittaw
COURLAND
Memel
Memel R.
Dwina R.
Opotskow
Wolkoski
Twer
Chelm
Jeneslaf
Rostof
Jereslaf
Koleis
Kasan
Korelnitz
Wologda
Zary
Smolensko
Jerusalem
Troitz
Wolodimer
Mosask
Moscow
Smolensko
Serpogow
Rezanskoi
Rezanof
Tocla
Pereslaf
Nise
Balagorod
Prolokonsa
Czerenissi
Wegulskoi
Paganzina
Bulgar
Pastof
Swiaska
Sinbirska
Kadom
Novogorod
Temnik
Desart
Saralof
Dantzic
Stettin
Konigsburg
Elbing
Wilna
PRUSSIA
Thorn
LITHUANIA
Novgorodeck
Bug R.
Warsaw
POLAND
Weisl R.
Sandomir
Cracow
Rzeczica
Polzen
Bolghof
Orel
Jepisan
Livni
Woronets
Novogorodeck
Seefk
Zeringof
Koenski
Balorin
Belgorod
Zeringof
Sosse
Ukrain
Soomi
Kiof
Prilocki
Gadic
Kanef
Belgorod
Nowoioskoi
Ostroskoi
Bitick
Mighailof
Boosodock
Donnetskoi
Lucko
VOLHINIA
Lemburg
Land of the Old
Circassi
Coffacks
Poltawa
Charkof
Isoom
Kasanka
Salanoi
Adar
Golubay
Kammenoi
Coffacks
Don
Donets R.
Don R.
Laffa
Kamasinka
Wolga R.
Braslaw
Niester R.
Zigiron
Novo Grodskoi
Black Forest
Siera
Trinity City
Azoph
British Miles
20 60 120 180
Bender
Oczakow
Bog R.
TURKY in EUROPE
TARTARY
Precop
SEA of AZOPH
ASIA
40
45
50
55
60
70
20
25
30
35

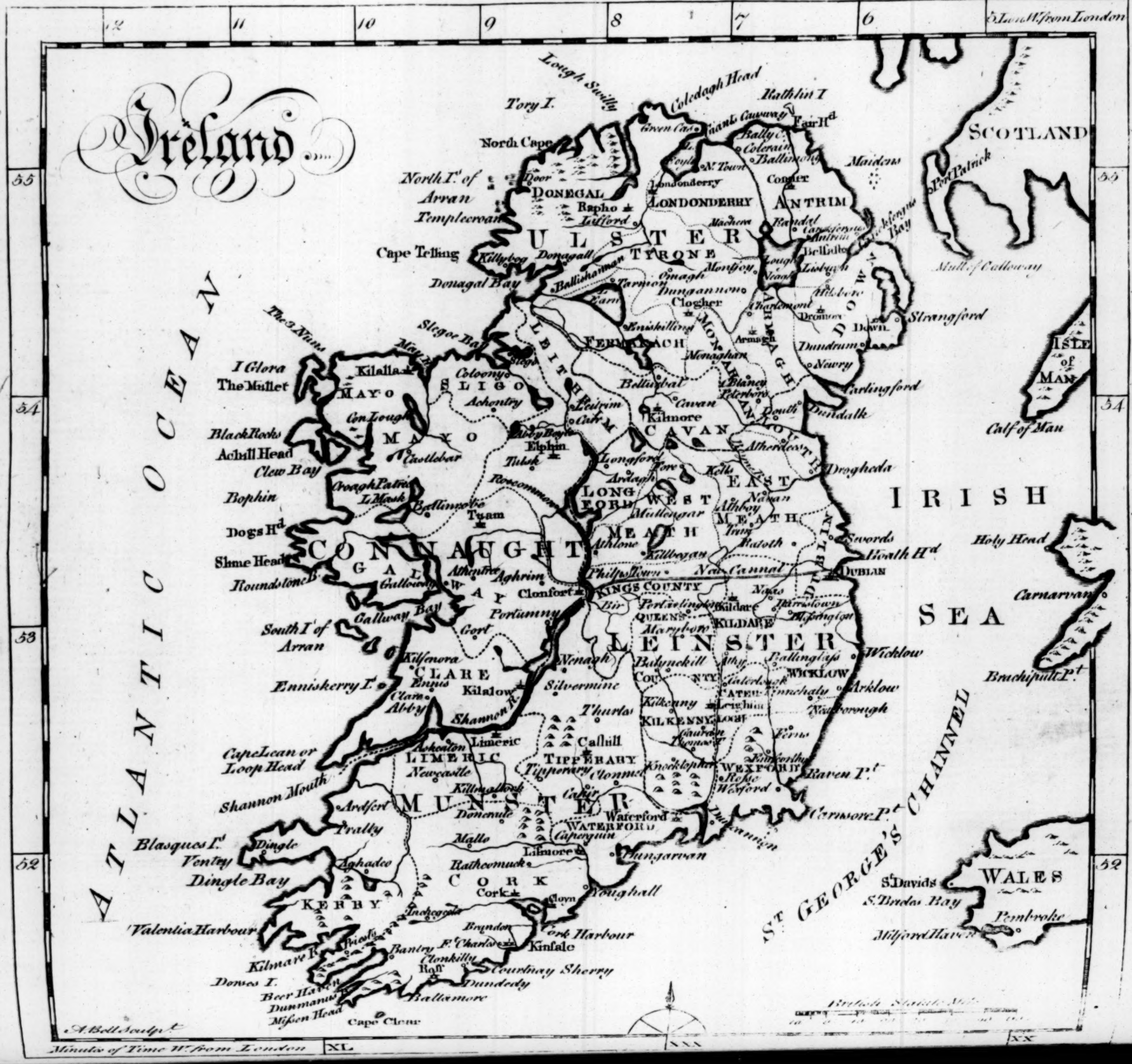
3 MA 53


Scotland.
West from London
9
8
7
6
5
4
3
2
1
0
59
58
57
56
55
NORTHERN OCEAN
ATLANTIC OCEAN
BRITISH OCEAN
British statute Miles
WESTREN ISLES
St. Kilda
Lewis
Harris
N. Vist
S. Vist
Bara
The Minch
Sky I.
Orkney Isles
Mainland I.
Hoy
Pentland Firth
SHETLAND ISLES
Yell
Unst
Fetlar
Fula
Mainland
Sumburg Head
SUTHERLAND SHIRE
CATHNESS SH.
ROSS SHIRE
INVERNESS SHIRE
MURRAY SH.
BAMFSH.
ABERDEEN SHIRE
MEARNS SH.
ANGUS
PERTH SHIRE
ARGYLE SHIRE
STIRLING SH.
LANERK SHIRE
EDINBURGH S.
HADINGTON SH.
BERWICK SH.
PEBLES SH.
SELKIRK SH.
ROXBURGH SHIRE
AIR SHIRE
DUMFRIES SH.
WIGTON SH.
KIRKCUDBRIGHT SHIRE
Mull I.
Jura
Ila
Arran
Cantire
Mull of Cantire
Clyde Firth
Firth of Forth
Tay Firth
Murray Firth
Perth
Dundee
St. Andrews
Aberdeen
Inverness
Edinburgh
Glasgow
Berwick
Carlile
Newcastle
Durham
IRELAND
ENGLAND
Solway Firth
A Bell Sculpt.
Minutes of Time West from London

3 MA 63

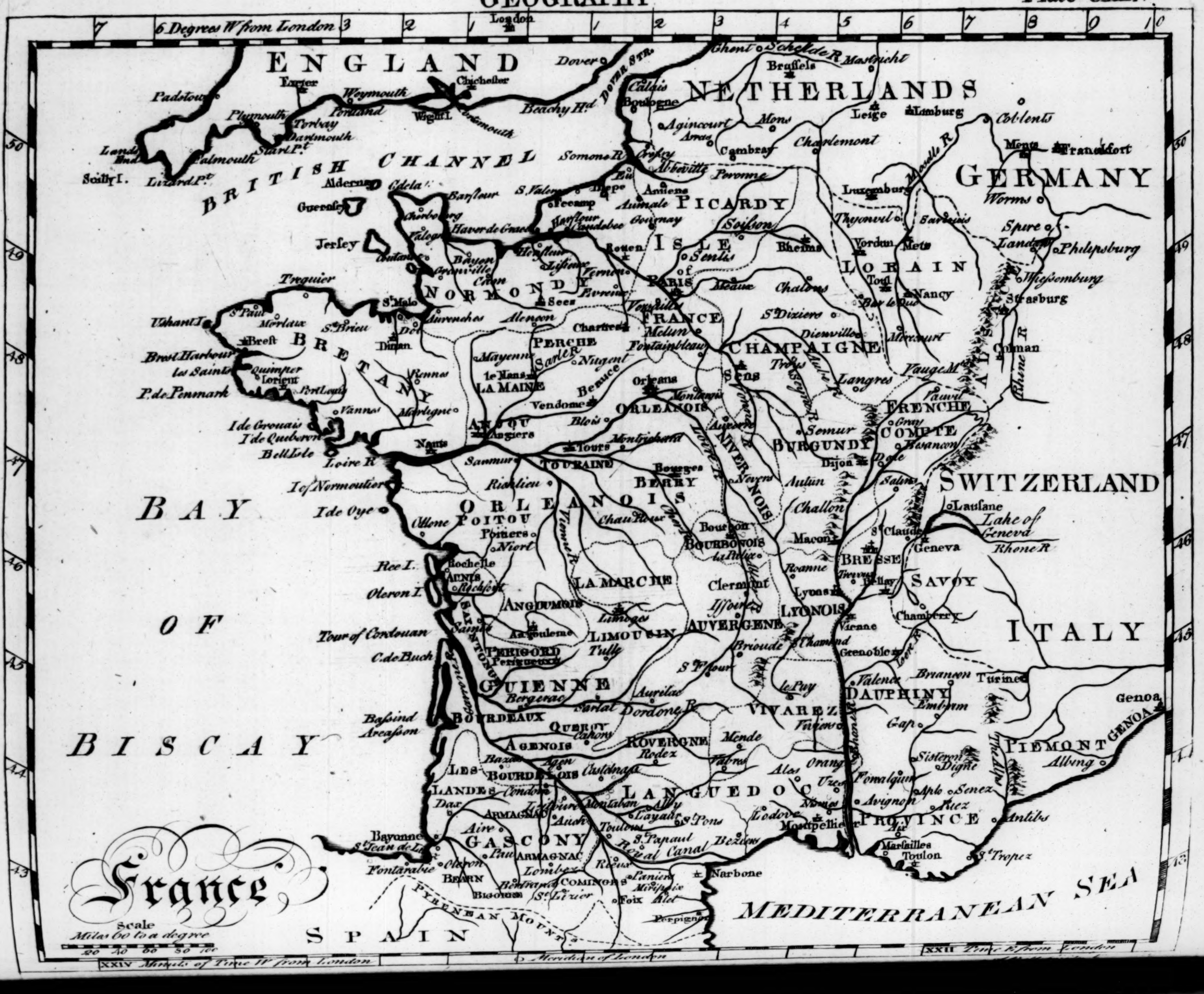

England.
SCOTLAND
IRELAND
IRISH SEA
St. GEORGES CHANNEL
BRITISH OCEAN
ENGLISH CHANNEL
STRAITS of DOVER
FRANCE
UNITED PROVINCES
FLANDERS
British Statute Miles
5 15 30 45 65 85
Deg. West from London
East Lon.
Minutes of Time
XXXII West from London
XVI
VIII
NORTHUMBERLAND
CUMBERLAND
DURHAM
WESTMORELAND
YORK SHIRE
LANCASHIRE
CHESHIRE
DERBY
LINCOLN SHIRE
NORFOLK
SUFFOLK
ESSEX
KENT
SUSSEX
SURRY
HAMP SH.
DORSET SH.
DEVON SH.
CORNWALL
SOMERSET
WILTS
BERKS
GLOCESTER
HERTFORD
BEDFORD
BUCKINGHAM
OXFORD SH.
WARWICK
WORCESTER
STAFFORD
SHROP SH.
HEREFORD
LEICESTER
RUTLAND
HUNTINGDON
CAMBRIDGE
MIDDLESEX
Berwick
Holy I.
Staples
Coquet I.
Tinmouth C.
Shields
Sunderland
Whitby
Scarboro
Flamboro Hd.
Bridlington
Spurn Hd.
Wainfleet
Cromer
Yarmouth
Easton Ness
Southwold
Harwich
N. Foreland
Deal
S. Foreland
Dover
Dungeness
Beachy Hd.
Isle of Wight
Lands End
Scilly Is.
Lizard P.t
Start P.t
Lundy I.
Bristol Channel
Holy Head
Anglesey I.
Isle of Man
Dublin
Wicklow
Wexford
Waterford
Londonderry
Belfast
Edinburgh
Dumfries
Carlisle
Newcastle
Durham
York
Lincoln
Norwich
Ipswich
London
Canterbury
Bristol
Exeter
Plymouth
Calais
Boulogne
Dunkirk
Ostend
Abbeville
Diepe
Rouen
Alderney
Guernsey
Jersey
Sark
Middleburg
Helvoetsluys

3 MA 53

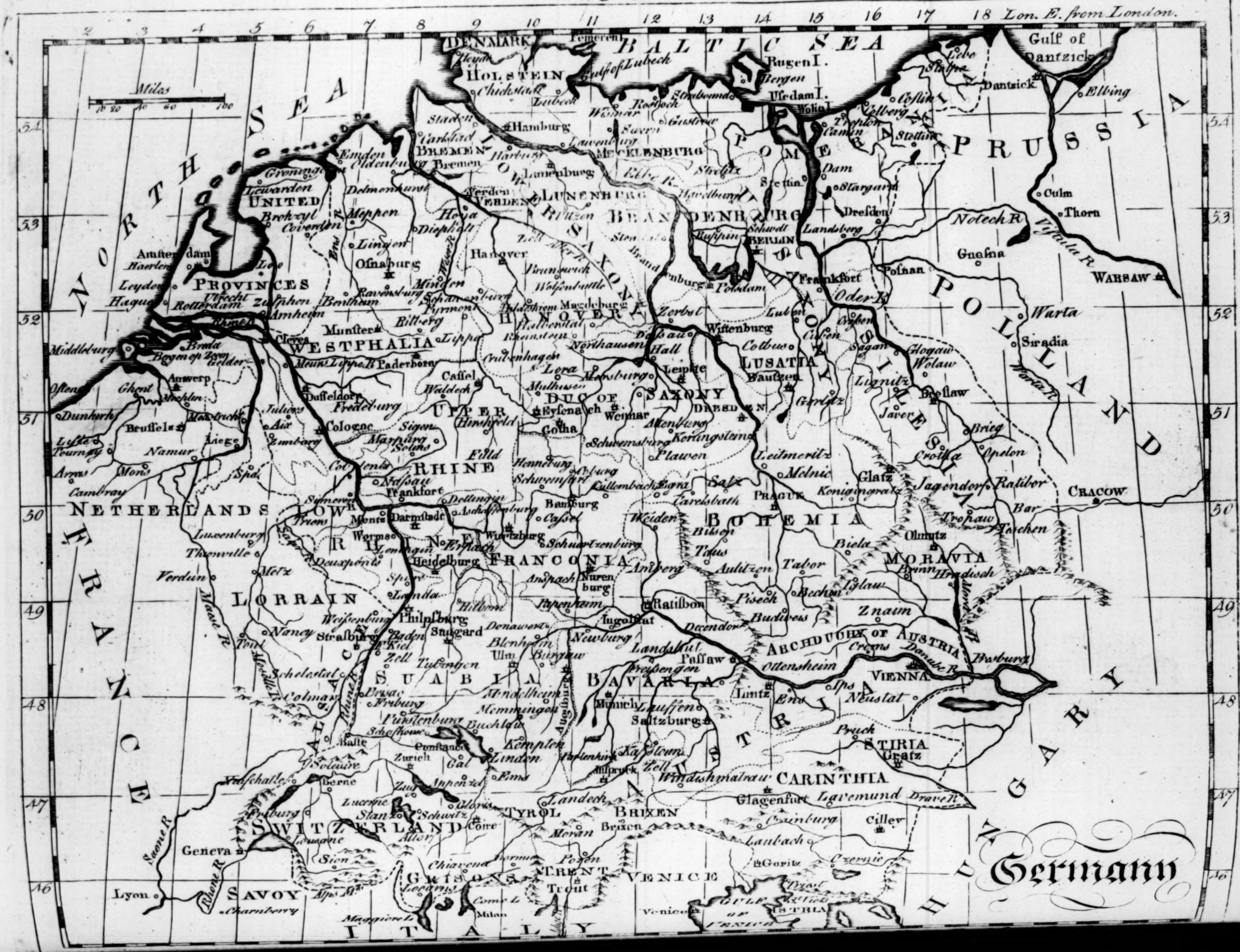

Ireland
ATLANTIC OCEAN
IRISH SEA
ST GEORGE'S CHANNEL
SCOTLAND
WALES
ISLE of MAN
ULSTER
CONNAUGHT
LEINSTER
MUNSTER
DONEGAL
LONDONDERRY
ANTRIM
TYRONE
DOWN
ARMAGH
FERMANAGH
MONAGHAN
CAVAN
LEITRIM
SLIGO
MAYO
GALWAY
LONGFORD
WEST MEATH
EAST MEATH
LOUTH
DUBLIN
KINGS COUNTY
QUEENS COUNTY
KILDARE
WICKLOW
CATERLOUGH
KILKENNY
WEXFORD
CLARE
LIMERIC
TIPPERARY
WATERFORD
CORK
KERRY
Tory I.
Lough Swilly
North Cape
Coledagh Head
Rathlin I
Fair Hd
Maidens
Port Patrick
Mull of Galloway
Calf of Man
Holy Head
Carnarvan
Brachipult Pt
Strangford
Carlingford
Dundalk
Drogheda
Swords
Hoath Hd
Dublin
Wicklow
Arklow
Raven Pt
Carnsore Pt
St Davids
S. Brides Bay
Milford Haven
Pembroke
North I. of Arran
Templecroan
Cape Telling
Donagal Bay
Slegoe Bay
The 3 Nuns
I Glora
The Mullet
Black Rocks
Achill Head
Clew Bay
Bophin
Dogs Hd
Slime Head
Roundstone B.
South I. of Arran
Galway Bay
Enniskerry I.
Cape Lean or Loop Head
Shannon Mouth
Blasques Is
Ventry
Dingle Bay
Valentia Harbour
Kilmare R.
Dorses I.
Beer Haven
Dunmanus
Misen Head
Cape Clear
Baltimore
Courtnay Sherry
Kinsale
Cork Harbour
Youghall
Dungarvan
Waterford
Cork
Limeric
Athlone
Londonderry
Coleraine
Belfast
Armagh
Kilkenny
Wexford
Galway
Sligo
Castlebar
Tuam
Ennis
Clonmel
Thurles
Cashell
Mallo
Lismore
Kinsale
British Statute Miles
A. Bell Sculpt.
Minutes of Time W. from London
XL
XXX
XX
Longitude West from London
12
11
10
9
8
7
6
55
54
53
52

3 MA 53

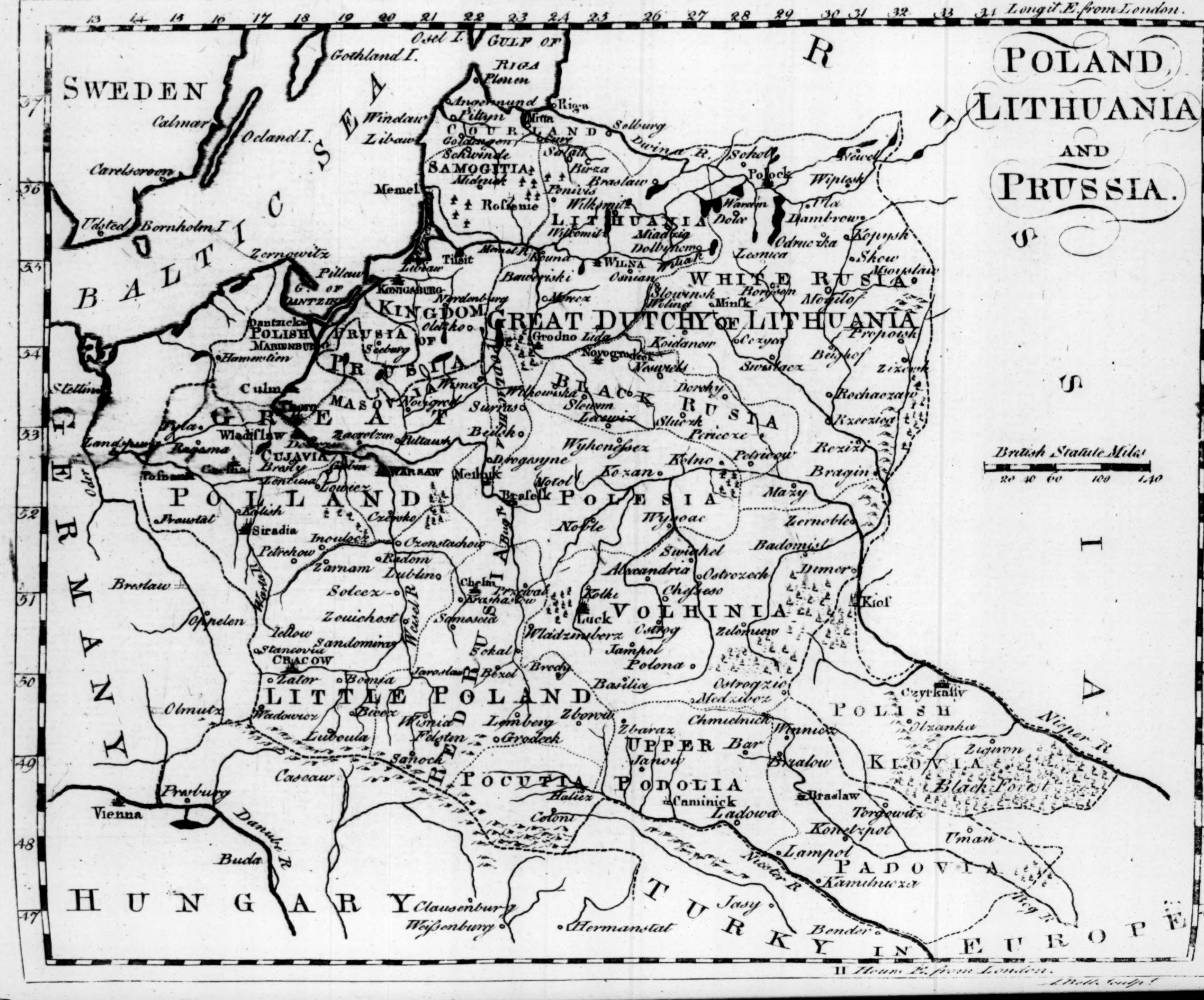
Plate CXXIV


France
Scale
Miles 60 to a degree
20 40 60 80 100
6 Degrees W from London
London
XXIV Minutes of Time W from London
Meridian of London
XXII Time E from London
ENGLAND
BRITISH CHANNEL
BAY OF BISCAY
MEDITERRANEAN SEA
NETHERLANDS
GERMANY
SWITZERLAND
ITALY
SPAIN
PYRENEAN MOUNTS
PICARDY
ISLE OF FRANCE
NORMONDY
BRETANY
CHAMPAIGNE
LORAIN
BURGUNDY
FRENCHE COMTE
ORLEANOIS
POITOU
LA MAINE
ANJOU
TOURAINE
BERRY
NIVERNOIS
BOURBONOIS
LA MARCHE
LIMOUSIN
AUVERGENE
LYONOIS
BRESSE
SAVOY
DAUPHINY
PROVINCE
LANGUEDOC
VIVAREZ
ROVERGNE
QUERCY
AGENOIS
GUIENNE
PERIGORD
ANGOUMOIS
GASCONY
ARMAGNAC
BEARN
COMINGES
LANDES
BOURDELOIS
PIEMONT
GENOA
PARIS
Orleans
Lyons
Bourdeaux
Marseilles
Toulon
Brest
Nantes
Rochelle
Bayonne
Narbone
Perpignan
Strasburg
Geneva
Lake of Geneva
Rhone R
Loire R
Garonne R
Royal Canal
Dover Str.
Jersey
Guernsey
Alderney

3 MA 55

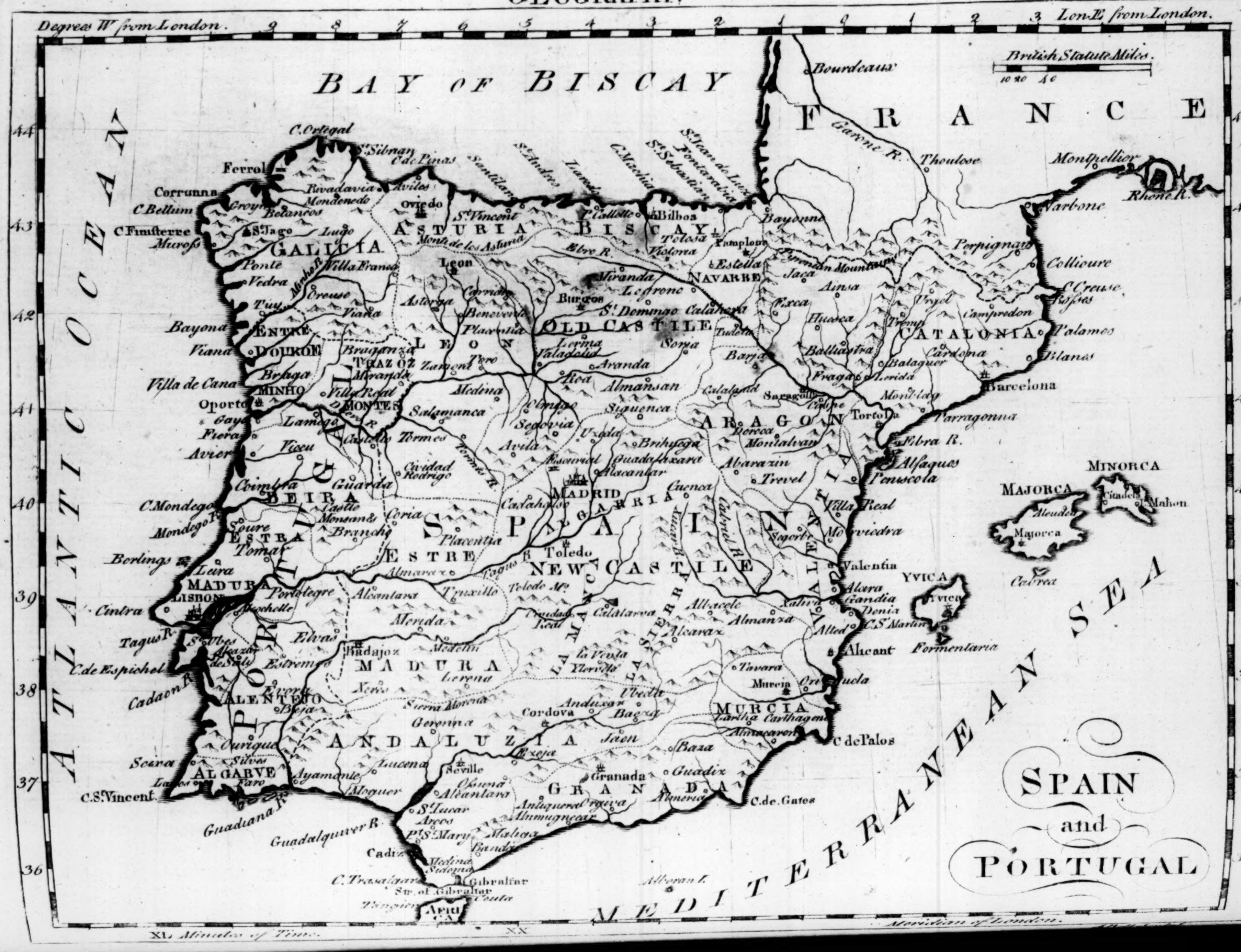

Germany
Lon. E. from London.
Miles
NORTH SEA
BALTIC SEA
Gulf of Dantzick
DENMARK
HOLSTEIN
UNITED PROVINCES
WESTPHALIA
LOWER SAXONY
HANOVER
BREMEN
LUNENBURG
MECKLENBURG
POMERANIA
BRANDENBURG
PRUSSIA
POLLAND
UPPER SAXONY
DUC OF SAXONY
LUSATIA
SILESIA
UPPER RHINE
LOW RHINE
NETHERLANDS
LORRAIN
FRANCE
ALSACE
FRANCONIA
BOHEMIA
MORAVIA
ARCHDUCHY OF AUSTRIA
SUABIA
BAVARIA
AUSTRIA
TYROL
CARINTHIA
STIRIA
SWITZERLAND
GRISONS
SAVOY
TRENT
VENICE
ITALY
HUNGARY
Gulf of Venice
Danube R.
Elbe R.
Oder R.
Rhine R.
Vistula R.
Warta R.
Weser R.
Ems R.
Maese R.
Moselle R.
Saone R.
Rhone R.
Notech R.
Drave R.
Hamburg
Lubeck
Bremen
Hanover
Berlin
Dresden
Leipsic
Prague
Vienna
Munich
Augsburg
Ratisbon
Nurenburg
Frankfort
Cologne
Amsterdam
Rotterdam
Antwerp
Brussels
Warsaw
Cracow
Dantzick
Breslaw
Stettin
Geneva
Lyon
Strasburg
Salzburg

3 MA 53

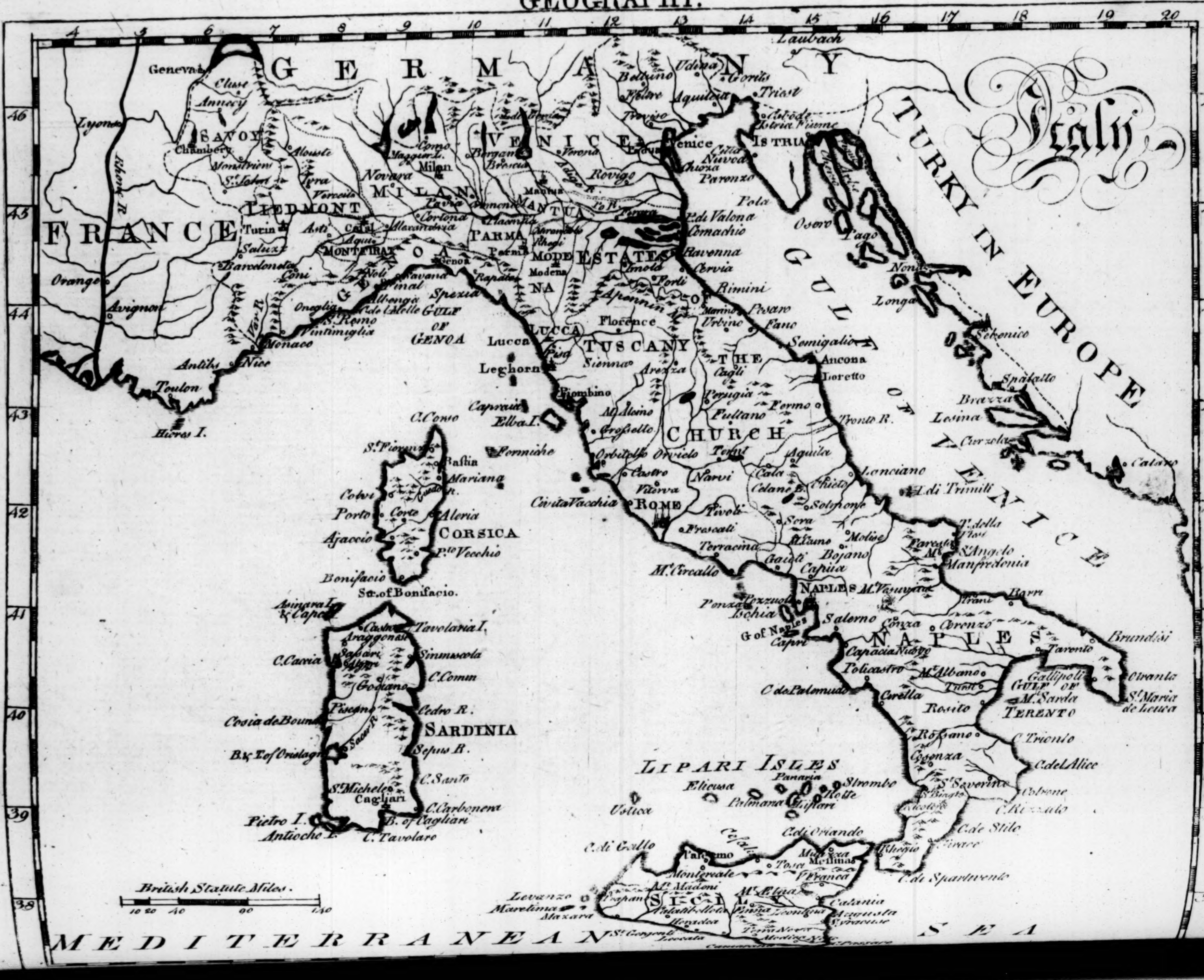

POLAND, LITHUANIA AND PRUSSIA.
Longit. E. from London.
British Statute Miles
20 40 60 100 140
SWEDEN
Calmar
Carelscroon
Oeland I.
Udsted
Bornholm I.
Gothland I.
Osel I.
GULF OF RIGA
Riga
BALTIC SEA
Windaw
Libaw
Memel
COURLAND
SAMOGITIA
Rossenie
Selburg
Duina R.
Braslaw
Polock
Wipiski
Dambrow
LITHUANIA
Wilkomir
Wilna
Minsk
WHITE RUSIA
Mohilof
GREAT DUTCHY OF LITHUANIA
Grodno
Novogrodeck
Koidanow
BLACK RUSIA
Sluck
Rochaczow
Rezizi
Bragin
KINGDOM OF PRUSSIA
Konigsburg
Tilsit
Pillau
GULF OF DANTZIC
Dantzick
POLISH PRUSSIA
Marienburg
Culm
Thorn
Stettin
Oder
GREAT POLAND
MASOVIA
CUJAVIA
Wladislaw
Posnan
Kalish
Siradia
WARSAW
POLLAND
POLESIA
Brzesc
Pinsk
Mazy
Zernoble
Badomisl
Kiof
VOLHINIA
Luck
Ostrog
Zytomir
Czenstachow
Radom
Lublin
Chelm
Zamoscia
Sandomir
Cracow
LITTLE POLAND
Sokal
Lemberg
Zbarow
Zbaraz
RED RUSIA
POCUTIA
Halicz
UPPER PODOLIA
Caminick
Bar
Braslaw
Winnicza
POLISH UKRAINE
Czyrkaliy
KIOVIA
Black Forest
Uman
PADOVIA
Kamiemcza
Niester R.
Nieper R.
Bender
Jasy
TURKY IN EUROPE
HUNGARY
Clausenburg
Weissenburg
Hermanstat
Buda
Danube R.
Presburg
Vienna
GERMANY
Olmutz
Oppelen
Breslaw
Cascaw
Weisel R.
RUSSIA
II Hours E. from London.

A. Bell Sculp.

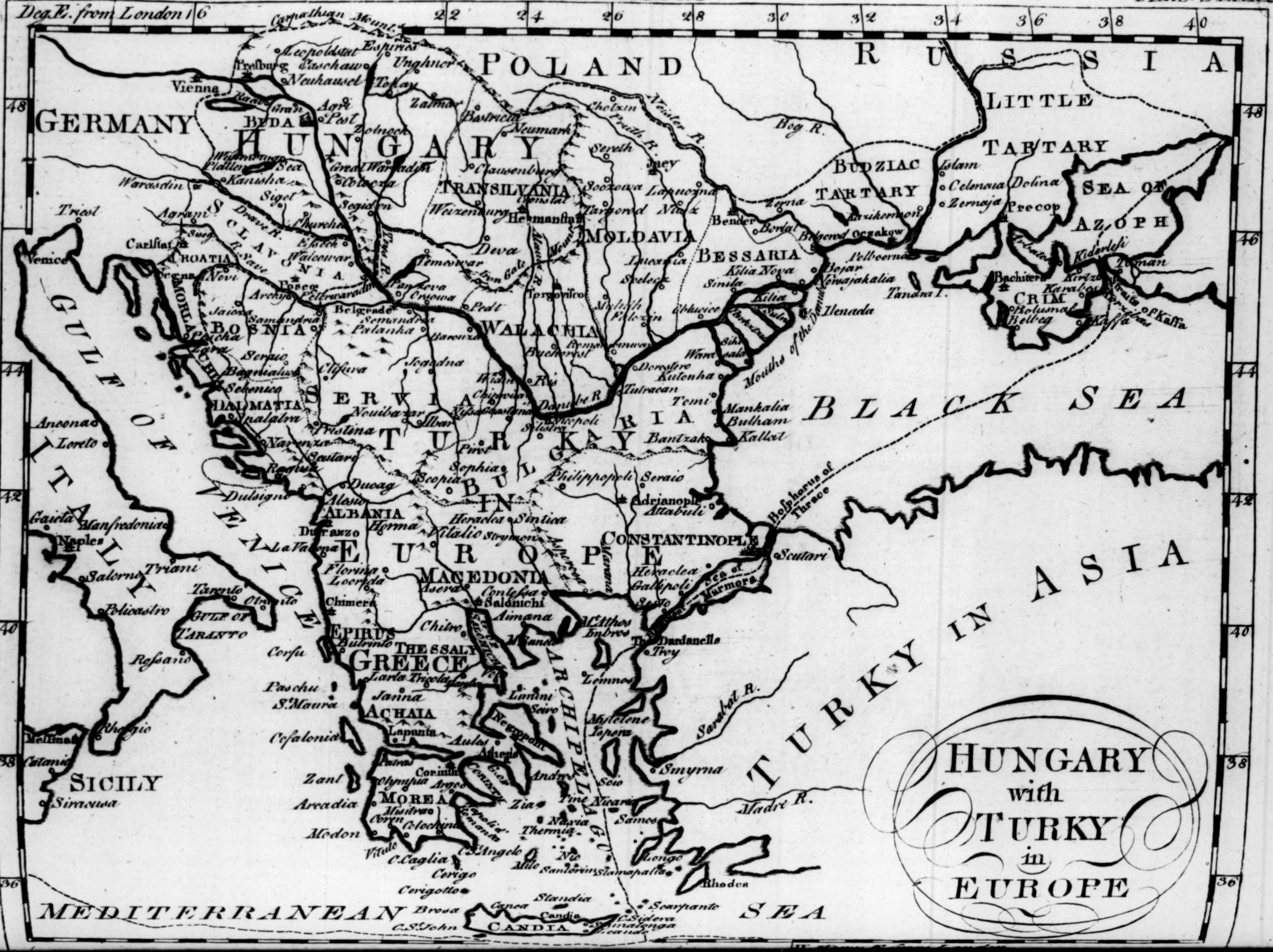
3 MA 53


SPAIN
and
PORTUGAL
Degrees W. from London.
Lon. E. from London.
British Statute Miles.
ATLANTIC OCEAN
BAY OF BISCAY
FRANCE
MEDITERRANEAN SEA
SPAIN
PORTUGAL
GALICIA
ASTURIA
BISCAY
NAVARRE
CATALONIA
ARAGON
OLD CASTILE
NEW CASTILE
LEON
ENTRE DOURO E MINHO
TRAZ OZ MONTES
BEIRA
ESTRA MADURA
ALENTEJO
ALGARVE
ESTRE MADURA
ANDALUZIA
GRANADA
MURCIA
VALENCIA
LA MANCHA
LA SIERRA
MAJORCA
MINORCA
YVICA
Madrid
Lisbon
Oporto
Bourdeaux
Thoulose
Montpellier
Narbone
Perpignan
Barcelona
Tarragona
Valentia
Alicant
Carthagena
Granada
Sevill
Cadiz
Gibraltar
Str. of Gibraltar
Ceuta
Tangier
Cordova
Toledo
Salamanca
Burgos
Leon
Oviedo
Bilbao
Pamplona
Saragossa
Corrunna
Ferrol
C. Ortegal
C. Finisterre
C. St. Vincent
C. de Palos
C. de Gates
C. Trafalgar
Tagus R.
Ebro R.
Guadiana R.
Guadalquiver R.
Garone R.
Rhone R.
XL Minutes of Time.
XX
Meridian of London.

3 MA 55


Italy
GERMANY
FRANCE
SAVOY
PIEDMONT
MILAN
VENICE
MANTUA
PARMA
MODENA
MONTFERRAT
GENOA
LUCCA
TUSCANY
THE ESTATES OF THE CHURCH
ROME
NAPLES
ISTRIA
TURKY IN EUROPE
GULF OF VENICE
GULF OF GENOA
GULF OF TERENTO
CORSICA
SARDINIA
SICILY
LIPARI ISLES
MEDITERRANEAN SEA
British Statute Miles.
10 20 40 90 140
Geneva
Lyons
Chambery
Turin
Orange
Avignon
Nice
Toulon
Antibs
Hieras I.
Monaco
Genoa
Milan
Novara
Pavia
Bergam
Brescia
Verona
Rovigo
Parma
Modena
Bologna
Ferrara
Ravenna
Rimini
Pesaro
Fano
Ancona
Loretto
Lucca
Leghorn
Pisa
Florence
Sienna
Piombino
Elba I.
Bastia
Ajaccio
Bonifacio
Str. of Bonifacio
Cagliari
Civita Vecchia
Naples
Salerno
Capri
Taranto
Otranto
Brundisi
Palermo
Messina
Catania
Syracuse
Laubach
Trieste
Udina
Venice
Spalatto
Zara
Longa
Lesina
Brazza
Catero
Manfredonia
Barri
Reggio
C. di Spartivento
Ustica
Stromboli

3 MA 53



HUNGARY with TURKY in EUROPE

Deg. E. from London
16
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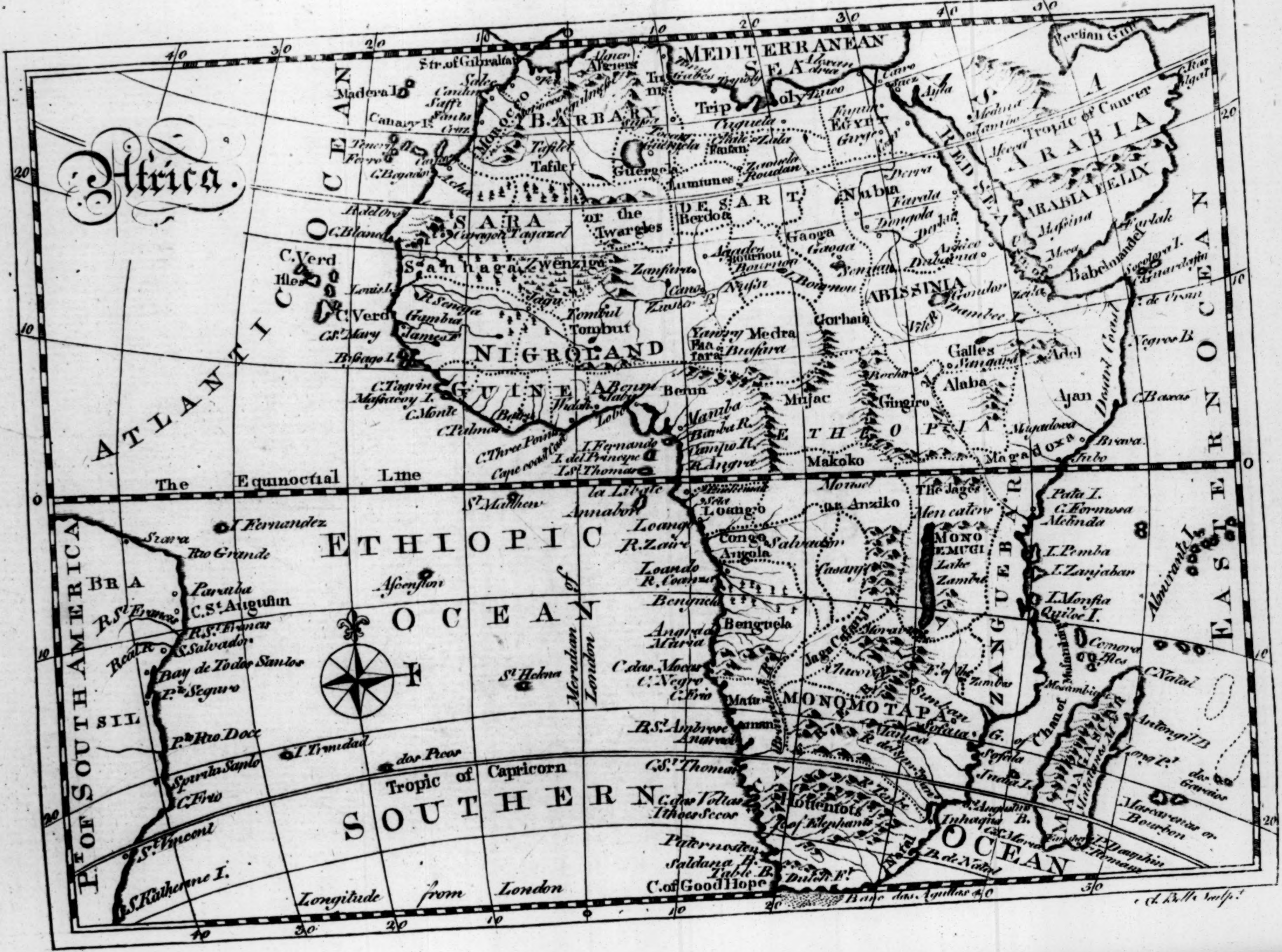
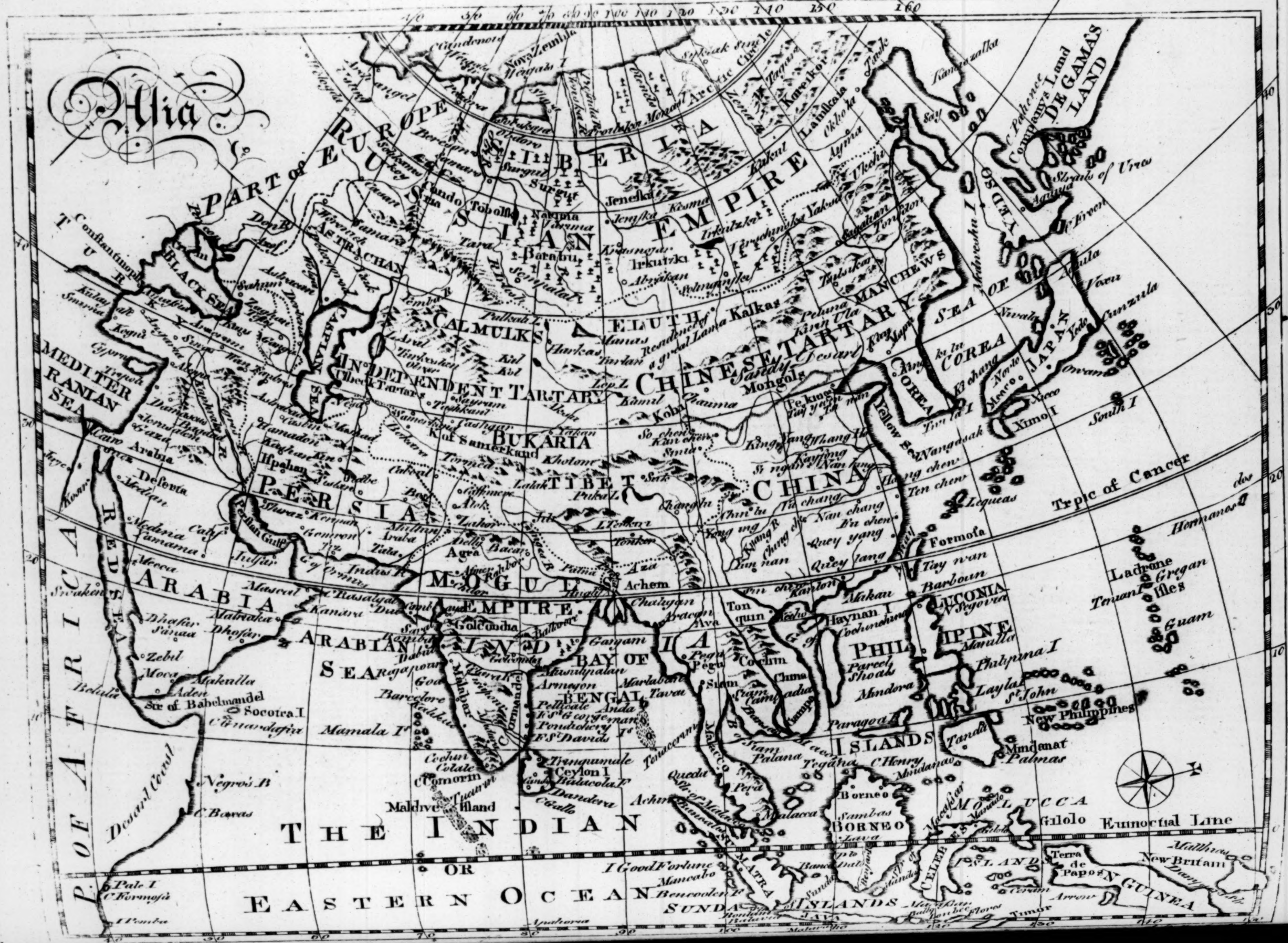
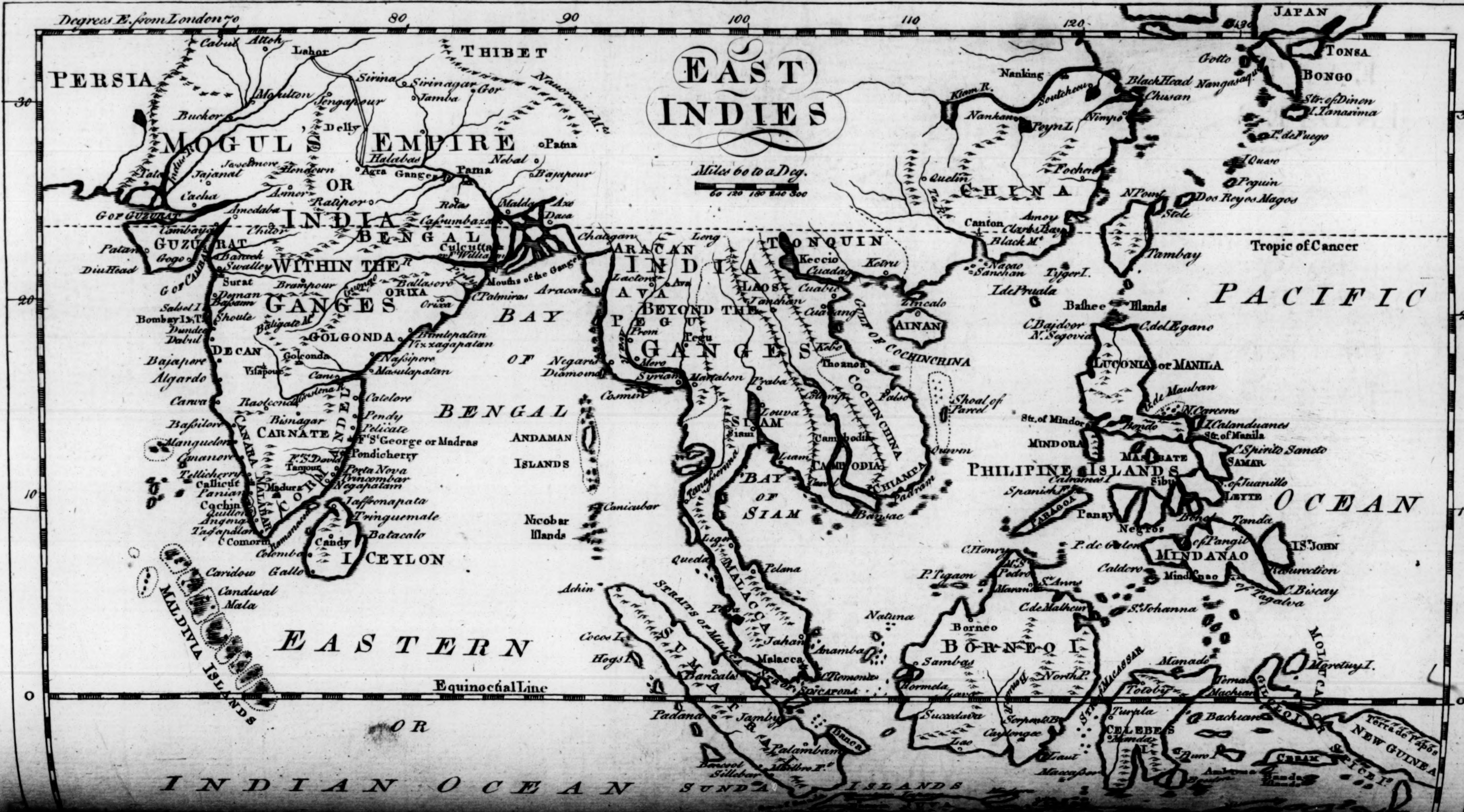
36
POLAND
RUSSIA
LITTLE TARTARY
GERMANY
HUNGARY
BUDA
Vienna
Presburg
TRANSILVANIA
MOLDAVIA
BESSARIA
BUDZIAC TARTARY
SEA OF AZOPH
CRIM
SCLAVONIA
CROATIA
BOSNIA
SERVIA
WALACHIA
BULGARIA
DALMATIA
TURKY IN EUROPE
ALBANIA
MACEDONIA
EPIRUS
THESSALY
GREECE
ACHAIA
MOREA
CONSTANTINOPLE
BLACK SEA
Sea of Marmora
Bosphorus of Thrace
Mouths of the Danube
ARCHIPELAGO
TURKY IN ASIA
GULF OF VENICE
GULF OF TARANTO
ITALY
SICILY
CANDIA
MEDITERRANEAN SEA
Belgrade
Adrianople
Philippopoli
Sophia
Salonichi
Smyrna
Scutari
Dardanells
Troy
Rhodes
Venice
Naples
Ancona
Corfu
Cefalonia
Zant
Danube R.
Niester R.
Bog R.
Madre R.
Sarabat R.

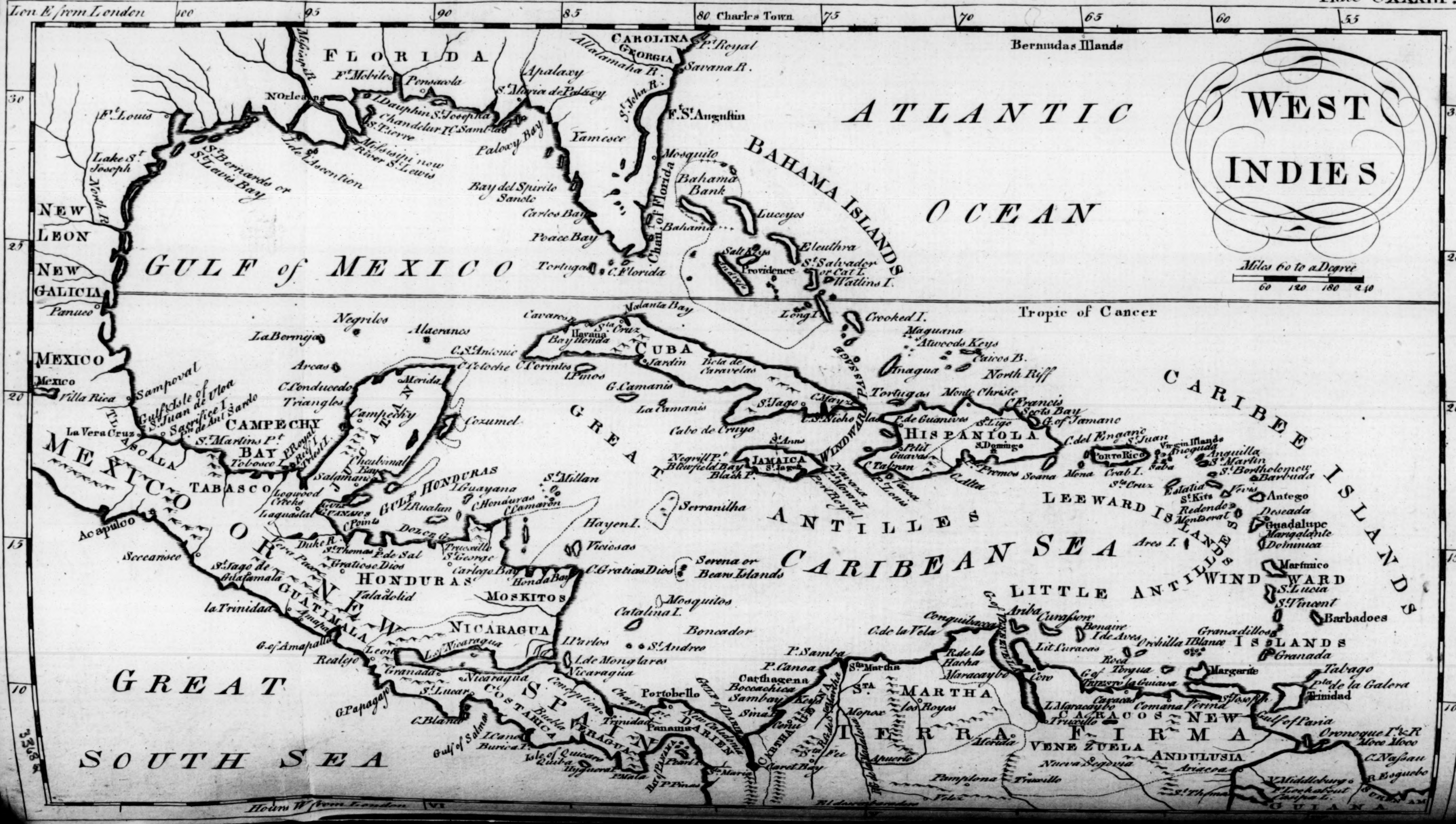
3 MA 53


Africa.
MEDITERRANEAN SEA
BARBARY
SARA or the DESART
NIGROLAND
GUINEA
ABISSINIA
ETHIOPIA
ARABIA
ARABIA FELIX
RED SEA
Tropic of Cancer
ATLANTIC OCEAN
The Equinoctial Line
ETHIOPIC OCEAN
Meridian of London
MONOMOTAPA
ZANGUEBAR
MADAGASCAR
SOUTHERN OCEAN
EASTERN OCEAN
Tropic of Capricorn
P.t OF SOUTH AMERICA
BRASIL
C. of Good Hope
Longitude from London
A. Bell sculp.

3 MA 53


Asia
PART of EUROPE
RUSSIAN EMPIRE
SIBERIA
MEDITERRANIAN SEA
BLACK SEA
CASPIAN SEA
ASTRACHAN
CALMUKS
ELUTH
INDEPENDENT TARTARY
BUKARIA
TIBET
CHINESE TARTARY
MANCHEWS
COREA
SEA OF COREA
JAPAN
YEDSO
Company's Land
DE GAMA'S LAND
C. Patience
Straits of Uries
CHINA
Formosa
Tropic of Cancer
PERSIA
ARABIA
RED SEA
ARABIAN SEA
MOGUL EMPIRE
INDIA
BAY OF BENGAL
Ceylon I
PHILIPPINE ISLANDS
Ladrone Isles
Guam
New Philippines
MOLUCCA
BORNEO
CELEBES
SUMATRA
SUNDA ISLANDS
NEW GUINEA
New Britain
Equinoctial Line
THE INDIAN OR EASTERN OCEAN
P. OF AFRICA
Desart Coast
Arctic Circle
Kamtschatka
Tobolski
Irkutzki
Jeneskoi
Constantinople
Ispahan
Agra
Golconda
Pekin
Nanking
Canton
Siam
Pegu
Malacca
Maldive Island
Socotra I
Str. of Babelmandel
Mecca
Aden


EAST INDIES
Miles 60 to a Deg.
60 120 180 240 300
Degrees E. from London 70
80
90
100
110
120
130
30
20
10
0
PERSIA
MOGUL'S EMPIRE OR INDIA
BENGAL
GUZURAT
INDIA WITHIN THE GANGES
ORIXA
GOLGONDA
DECAN
CARNATE
CANARA
MALABAR
COROMANDEL
CEYLON
Candy
Colombo
Gallo
Jaffrenapata
Trinquemale
Batacalo
MALDIVIA ISLANDS
Caridow
Candusal
Mala
Cabul
Attok
Lahor
Sirina
Sirinagar
Gor
Jamba
Moulton
Jengapour
Bucker
Delly
Agra
Halabas
Ganges
Patna
Nebal
Bajapour
Tata
Jajanat
Cacha
Amedabat
Cambaya
Patan
Gogo
Diu Head
Surat
Daman
Bombay
Salset I.
Dabul
Bajapore
Algardo
Carwar
Bassilore
Manguelore
Cananore
Tellicherry
Callicut
Paniani
Cochin
Quilon
Angenga
Tuticorin
C. Comorin
Bisnagar
Madura
Tanjour
Ft. St. George or Madras
Pondicherry
Porta Nova
Trincombar
Negapatam
Pelicate
Pendy
Catelore
Masulapatan
Vizagapatan
Bimlepatan
Golconda
Visapour
Brampour
Ballasore
Calcutta
Ft. William
Mouths of the Ganges
C. Palmiras
Maldo
Daca
Chatigam
Rotas
THIBET
Naugracut Mts.
BAY OF BENGAL
ANDAMAN ISLANDS
Nicobar Islands
Canicubar
Negrais
Diamond
Cosmin
ARACAN
AVA
PEGU
INDIA BEYOND THE GANGES
Prem
Pegu
Mero
Syrian
Martabon
TONQUIN
Keccio
Cuadai
Kotru
LAOS
Tanchan
Cuabis
Cuacang
GULF OF COCHINCHINA
AINAN
COCHINCHINA
Thoanoa
Falso
SIAM
Louva
Siam
CAMBODIA
CHIAMPA
Padram
Bassac
Shoal of Parcel
BAY OF SIAM
Tenasserim
Ligor
Queda
Pelana
MALACCA
Jahan
Malacca
C. Romonia
Sincapora
Anamba
Natuna
Achin
Cocos I.
Hogs I.
STRAITS OF MALACCA
SUMATRA
Padana
Jamby
Palambam
Banca
Bencoolen
Sillebar
Equinoctial Line
EASTERN OR INDIAN OCEAN
SUNDA ISLANDS
CHINA
Nanking
Kiam R.
Nankan
Poyn L.
Soutcheou
Nimpo
Black Head
Chusan
Quelin
Fochen
Canton
Amoy
Clarks Bay
Black Mt.
Nacao
Sanchan
Tyger I.
I. de Pruala
N. Pouf
Stele
Tambay
Bashee Islands
Tropic of Cancer
JAPAN
TONSA
BONGO
Gotto
Nangasaqui
Str. of Dinen
I. Tanasima
I. de Fuego
I. Quaro
Peguin
Dos Reyes Magos
PACIFIC OCEAN
C. Bajador
N. Segovia
C. del Egano
LUCONIA or MANILA
C. de Mauban
N. Carcems
I. Calanduanes
Str. of Manila
Str. of Mindoro
MINDORO
MASBATE
C. Spirito Sancto
SAMAR
PHILIPINE ISLANDS
Calamianes I.
Spanish
PARAGOA
Panay
Sibu
LEYTE
Negros
Bohol
Tanda
MINDANAO
St. John
Resurrection
C. Biscay
C. Henry
P. de Galera
Caldero
Mindanao
Pangil
P. Tigaon
St. Pedro
Marana
St. Anns
C. de Malheur
St. Johanna
Tagalva
BORNEO I.
Borneo
Sambas
Hormela
Lava
North P.
Succadana
Banjar
Serpent B.
Caytongee
Laue
Laut
Macassar
Str. of MACASSAR
CELEBES
Totoby
Turpla
Manado
Ternate
Machian
Bachian
GILOLO
MOLUCCA OR SPICE Is.
Morotay I.
CERAM
Amboina
Banda
Bouro I.
Terra de Papos
NEW GUINEA


WEST INDIES
Miles 60 to a Degree
60 120 180 240
Lon. E. from London
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80 Charles Town
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Hours W. from London
VI
Tropic of Cancer
ATLANTIC OCEAN
GULF of MEXICO
GREAT ANTILLES
CARIBEAN SEA
LITTLE ANTILLES
CARIBEE ISLANDS
LEEWARD ISLANDS
WINDWARD ISLANDS
BAHAMA ISLANDS
GREAT SOUTH SEA
FLORIDA
CAROLINA
GEORGIA
P.t Royal
Savana R.
Allatamaha R.
S.t John R.
F.t S.t Augustin
Mosquito
Chan. of Florida
C. Florida
Tortugas
Poace Bay
Carlos Bay
Bay del Spirito Sancto
Paloxy Bay
Yamesee
Apalaxy
S.t Maria de Paloxy
Pensacola
F.t Mobile
N. Orleans
Misisipi R.
I. Dauphin
S.t Joseph
Chandelur I.
C. Samblas
S.t Pierre
Misisipi now River S.t Lewis
I. de l'Ascention
F.t Lous
Lake S.t Joseph
North R.
S.t Bernards or S.t Lewis Bay
NEW LEON
NEW GALICIA
Panuco
MEXICO
Mexico
Villa Rica
La Vera Cruz
TLASCALA
Sampoval
Gulf Isle of S.t Juan de Ulua
Sacrifice I.
P.t de Ant. Sardo
CAMPECHY BAY
S.t Martins P.t
Tobosco
TABASCO
P. Royal
Reef I.
Triest I.
MEXICO OR NEW SPAIN
Acapulco
Seccarisco
S.t Jago de Guatamala
GUATIMALA
la Trinidad
Amapalla
G. of Amapalla
Realejo
Leon
Granada
L. of Nicaragua
Nicaragua
NICARAGUA
S.t Lucar
G. Papagajo
C. Blanco
COSTA RICA
Gulf of Salinas
I. Cano
Burica P.t
Isle of Quicaro
Quiba
Hyguera P.t
P. Mala
VERAGUA
Cartago
Concepcion
Trinidad
Chagre R.
Portobello
Panama
DARIEN
Gulf of Darien
New Caledonia
Pearl I.
P. Pinos
S.t Maria
Bay of Panama
Negrilos
La Bermeja
Alacranes
Arcas
C. Conducedo
Triangles
C. S.t Antonio
C. Catoche
Merida
Campechy
JUCATAN
Cozumel
Chetumal Bay
Salamanca
Logwood Creeks
Laguastal
Gulf of HONDURAS
I. Guayana
I. Ruatan
C. Honduras
C. Camaron
Dozen G.
Duke R.
S.t Thomas
P. de Sal
Graties a Dios
Truxillo
S.t George
Carlago Bay
HONDURAS
Valadolid
Honda Bay
MOSKITOS
C. Gratias Dios
S.t Millan
Hayen I.
Viciosas
Serranilha
Serena or Bears Islands
Mosquitos
Catalina I.
Boncador
S.t Andreo
I. Parlos
I. de Monglares
CUBA
Havana
S.ta Cruz
Bay Honda
Matanza Bay
Cavaros
C. Corintes
I. Pinos
Jardin
Bela de Caravelas
G. Camanis
La Camanis
Cabo de Cruyo
S.t Jago
C. Mayzi
C. S.t Nicholas
WINDWARD PASSAGE
JAMAICA
S.t Anns
S.t Jago
Negrill P.t
Bluefield Bay
Black P.
Port Royal
Navasa
Bahama
Bahama Bank
Lucayos
Eleuthra
Salt Keys
Providence
S.t Salvador or Cat I.
Watlins I.
Long I.
Crooked I.
Maguana
Atwoods Keys
Caicos B.
North Riff
Inagua
Tortugas
Monte Christe
C. Francis
Scots Bay
G. of Samana
HISPANIOLA
S.t Domingo
C. del Engano
P. de Guanives
Petit Guavas
C. Tiburon
Saona
Mona
PORTO RICO
S.t Juan
Crab I.
S.ta Cruz
Virgin Islands
Anguilla
S.t Martin
S.t Bartholomew
Barbuda
Saba
Eustatia
S.t Kits
Nevis
Redondo
Montserat
Antego
Deseada
Guadalupe
Marigalante
Dominica
Aves I.
Martinico
S.t Lucia
S.t Vincent
Barbadoes
Granadillos
Granada
Tabago
P.ta de la Galera
Trinidad
Bermudas Islands
Ariba
Curason
Bonaire
I. de Aves
Orchilla
I. Blanco
Roca
Tortuga
Margarite
Lit. Curacas
C. de la Vela
Conquibacoa
G. of Venezuela
R. de la Hacha
Maracaybo
Coro
L. Maracaybo
Truxillo
Caracas
Comana
Verina
S.t Joseph
Gulf of Paria
P. Samba
S.ta Martha
P. Canoa
Carthagena
Bocachica
Sambay Keys
Sina
Mopox
S.ta MARTHA
los Royas
TERRA FIRMA
NEW ANDULUSIA
CARACOS
VENEZUELA
Merida
Nueva Segovia
Pampilona
Truxillo
Ariacoa
Oronoque R.
Moco Moco
C. Nassau
R. Esquebo
N. Middleburg
S.t Thomas
GUIANA
CARTHAGENA

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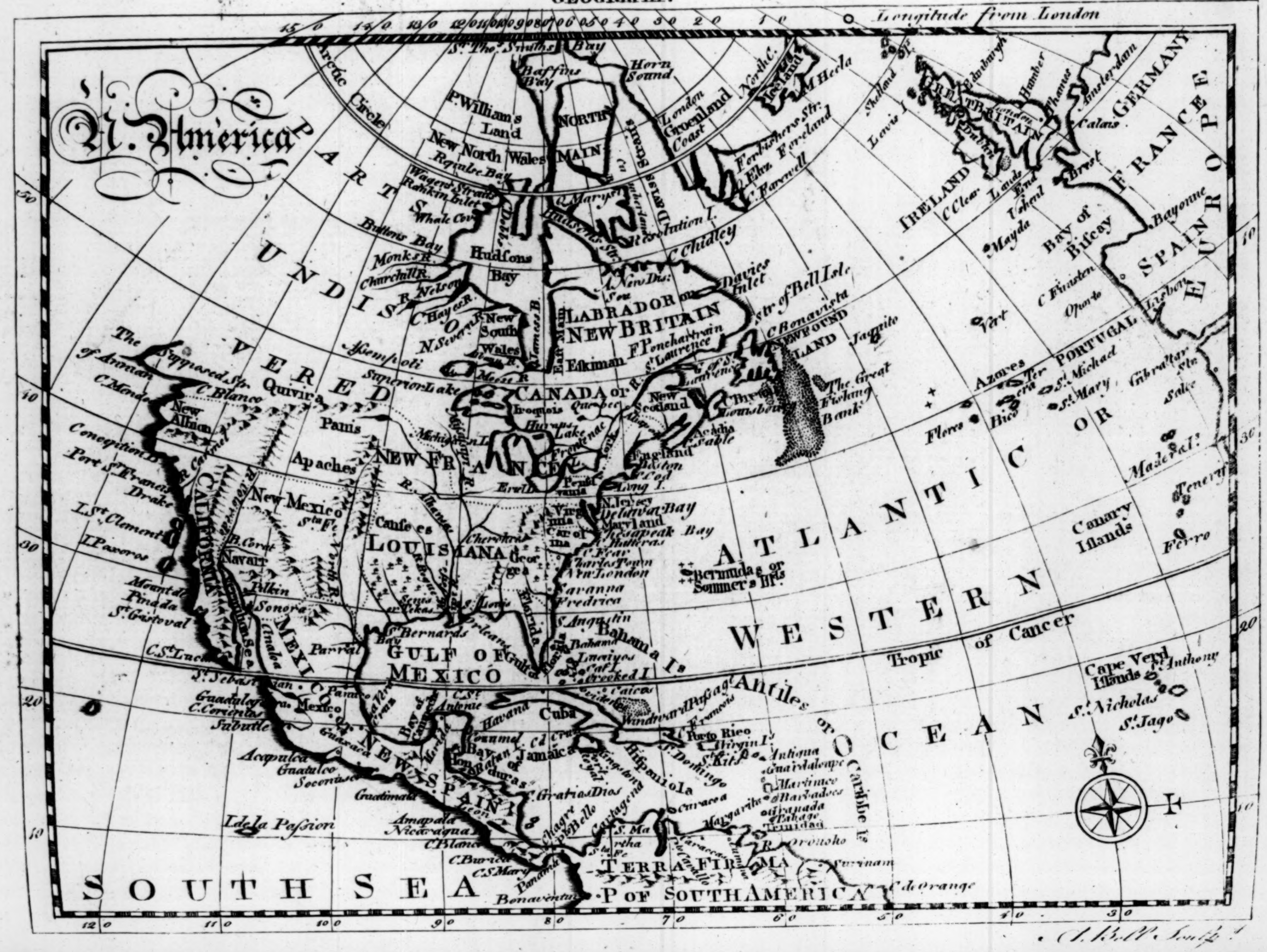
N. America
Longitude from London
Arctic Circle
PARTS UNDISCOVERED
P. William's Land
New North Wales
New South Wales
Hudsons Bay
Baffins Bay
Davis Straits
Groenland
Iceland
LABRADOR
NEW BRITAIN
CANADA
NEW FRANCE
LOUISIANA
New Mexico
CALIFORNIA
MEXICO
GULF OF MEXICO
NEW SPAIN
Cuba
Jamaica
Hispaniola
Bahama Is
Antiles or Caribbe Is
TERRA FIRMA
P OF SOUTH AMERICA
SOUTH SEA
ATLANTIC OR WESTERN OCEAN
Tropic of Cancer
Bermudas or Sommer's Isles
Azores
Canary Islands
Cape Verd Islands
NEWFOUND LAND
The Great Fishing Bank
IRELAND
GREAT BRITAIN
FRANCE
SPAIN
PORTUGAL
GERMANY
EUROPE
Bay of Biscay
120
110
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A. Bell Sculp.

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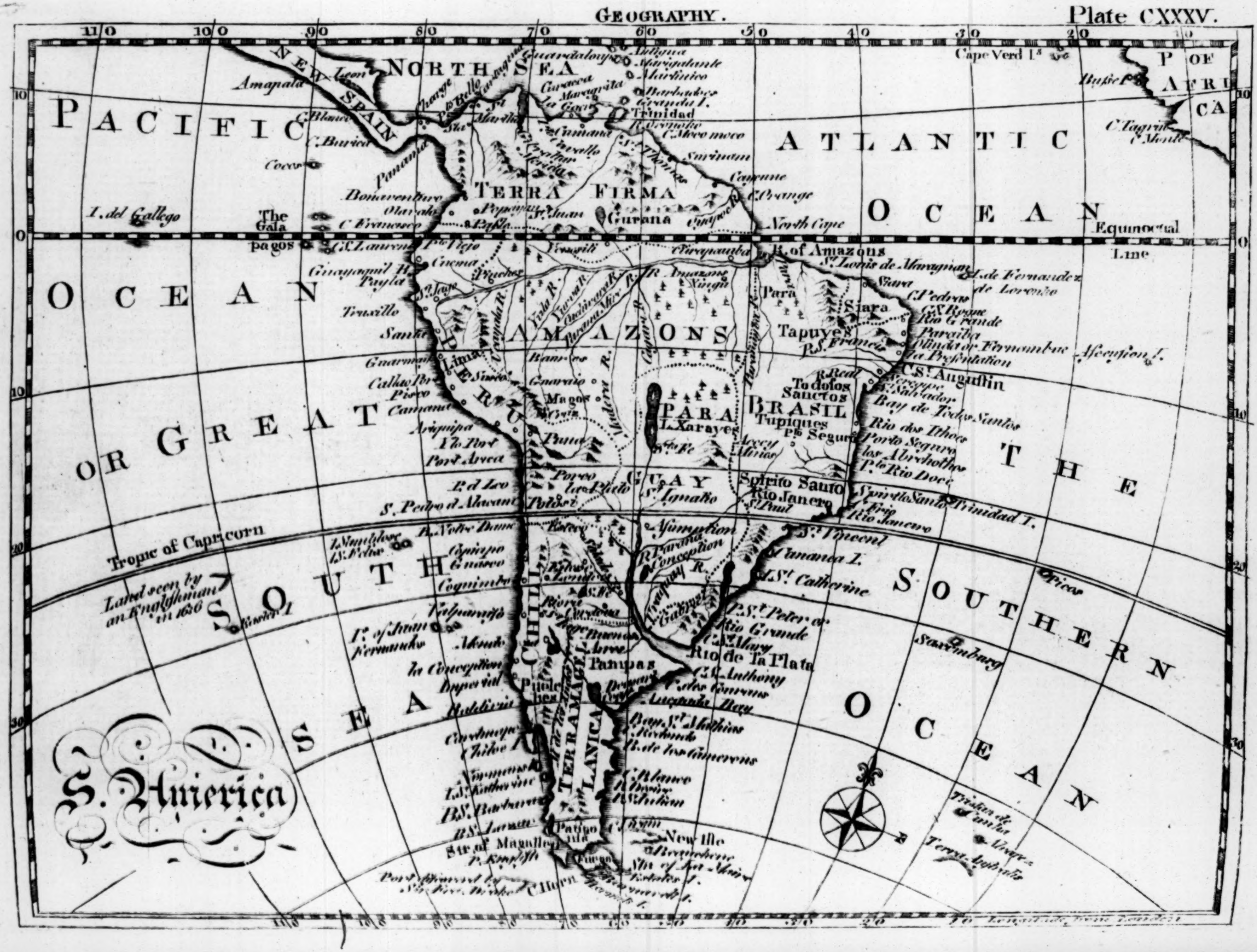
3 MA 53


S. America
PACIFIC OCEAN OR GREAT SOUTH SEA
ATLANTIC OCEAN
THE SOUTHERN OCEAN
NORTH SEA
NEW SPAIN
TERRA FIRMA
AMAZONS
PERU
BRASIL
PARAGUAY
CHILI
TERRA MAGELLANICA
Pampas
Equinoctial Line
Tropic of Capricorn
R. of Amazons
Rio de la Plata
Str. of Magellan
C. Horn
Land seen by an Englishman in 1636
The Galapagos
I. del Gallego
Cape Verd Is.
P OF AFRICA
Panama
Lima
Cusco
Potosi
Rio Janero
C. St. Augustin
Trinidad I.
Ascension I.
New Isle
Staten I.
Tristan de Cunha
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3 MA 53

GEOMETRY

ORIGINALLY ſignified no more than the art of meaſuring the earth, or any diſtances or dimenſions within it: but at preſent it denotes the ſcience of magnitude in general; comprehending the doctrine and relations of whatever is ſuſceptible of augmentation or diminution, conſidered in that light.

Hence to geometry may be referred the conſideration not only of lines, ſurfaces, and ſolids; but alſo of time, velocity, number, weight, *&c.*

This ſcience had its riſe among the Egyptians, who were in a manner compelled to invent it, to remedy confuſion which generally happened in their lands, from the inundations of the river Nile, which carried away all boundaries, and effaced all the limits of their poſſeſſions. Thus this invention, which at firſt conſiſted only in meaſuring the lands, that every perſon might have what belonged to him, was called *geometry*, or the art of meaſuring land; and it is probable that the draughts and ſchemes, which they were annually compelled to make, helped them to diſcover many excellent properties of theſe figures; which ſpeculations continued to be gradually improved, and are ſo to this day.

From Egypt geometry paſſed into Greece; where it continued to receive new improvements in the hands of Thales, Pythagoras, Archimedes, Euclid, *&c.* The Elements of Geometry, written by this laſt in 15 books, are a moſt convincing proof to what perfection this ſcience was carried among the ancients. However, it muſt be acknowledged, that it fell ſhort of modern geometry; the bounds of which, what by the invention of fluxions, and the diſcovery of the almoſt infinite orders of curves, are greatly enlarged.

We may diſtinguiſh the progreſs of geometry into three ages; the firſt of which was in its meridian glory at the time when Euclid's Elements appeared; the ſecond, beginning with Archimedes, reaches to the time of Des Cartes, who, by applying algebra to the elements of geometry, gave a new turn to this ſcience, which has been carried to its utmoſt perfection by Sir Iſaac Newton and Mr Leibnitz.

In treating this uſeful ſubject, we ſhall divide it into two parts; the firſt containing the general principles; and the ſecond, the application of theſe principles to the menſuration of ſurfaces, ſolids, *&c.*

PART I.

GENERAL PRINCIPLES OF GEOMETRY.

Art. 1. A Point is that which is not made up of parts, or which is of itſelf indiviſible.

2. A line is a length without breadth, as B——

3. The extremities of a line are points; as the extremities of the line AB, are the points A and B, fig. 1.

4. If the line AB be the neareſt diſtance between its extremes A and B, then it is called a *ſtrait line*, as AB; but if it be not the neareſt diſtance, then it is called a *curve line*, as *a b*, fig. 1.

5. A ſurface is that which is conſidered as having only length and breadth, but no thickneſs, as fig. 2.

6. The terms or boundaries of a ſurface are lines.

7. A plain ſurface is that which lies equally between its extremes.

8. The inclination between two lines meeting one another, (provided they do not make one continued line), or the opening between them, is called an *angle*; thus the inclination of the line AB to the line CB (fig. 3.) meeting one another at B, or the opening between the two lines AB and CB, is called an *angle*.

9. When the lines forming the angle are right lines, then it is called a *right-lined angle*, as fig. 4.; if one of them be right and the other curved, it is called a *mixed angle*, as fig. 5.; if both of them be curved it is called a *curve-lined angle*, as fig. 6.

10. If a right line AB fall upon another DC, (fig. 7.) ſo as to incline neither to one ſide nor to the other; but make the angles ABD, ABC, on each ſide equal to one another; then the line AB is ſaid to be *perpendicular* to the line DC, and the two angles are called *right-angles*.

11. An obtuſe angle is that which is greater than a right one, as fig. 8.; and an acute angle, that which is leſs than a right one, as fig. 9.

12. If a right line DC be faſtened at one of its ends C, and the other end D be carried quite round, then the ſpace comprehended is called a *circle*; the curve-line deſcribed by the point D, is called the *periphery* or *circumference* of the circle; the fixed point C is called the *centre* of it; fig. 10.

13. The deſcribing line CD is called the *radius*, *viz.* any line drawn from the centre to the circumference; whence all radii of the ſame or equal circles are equal.

14. Any line drawn through the centre, and terminated both ways by the circumference, is called a *diameter*, as BD is a diameter of the circle BADE. And the diameter divides the circle and circumference into two equal parts, and is double the radius.

15. The circumference of every circle is ſuppoſed to be divided into 360 equal parts, called *degrees*; and each degree is divided into 60 equal parts, called *minutes*; and each minute into 60 equal parts, called *ſeconds*; and theſe into *thirds*, *fourths*, &c. theſe parts being greater or leſs according as the radius is.

16. Any part of the circumference is called an *arch*, or *arc*; and is called an arc of as many degrees as it contains parts of the 360, into which the circumference was divided: thus if AD be the $\frac{1}{8}$ of the circumference, then the arc AD is an arc of 45 degrees.

17. A line drawn from one end of an arc to the other, is called a *chord*, and is the meaſure of the arc:

thus the right line AB is the chord of the arc ADB, fig. 11.

18. Any part of a circle cut off by a chord, is called a *ſegment;* thus the ſpace comprehended between the chord AB and circumference ADB (which is cut off by the chord AB) is called a *ſegment.* Whence it is plain,

1*ſt*, That all chords divide the circle into two ſegments.

2*dly*, The leſs the chord is, the more unequal are the ſegments, and *e contra.*

3*dly*, When the chord is greateſt, *viz.* when it is a diameter, then the ſegments are equal, *viz.* each a ſemicircle.

19. Any part of a circle (leſs than a ſemicircle) contained between two radii and an arc, is called a *ſector;* thus the ſpace contained between the two radii, AC, BC, and the arc AB, is called the ſector, fig. 12.

20. The right ſine of any arc, is a line drawn perpendicular from one end of the arc, to a diameter drawn through the other end of the ſame arc; thus (fig. 13.) AD is the right ſine of the arc AB, it being a line drawn from A, the one end of the arc AB, perpendicular to CB, a diameter paſſing through B, the other end of the arc AB.

Now the ſines ſtanding on the ſame diameter, ſtill increaſe till they come to the centre, and then becoming the radius, it is plain that the radius EC is the greateſt poſſible ſine, and for that reaſon it is called the *whole ſine.*

Since the whole ſine EC muſt be perpendicular to the diameter FB (by def. 20.), therefore producing the diameter EG, the two diameters FB, EG, muſt croſs one another at right angles, and ſo the circumference of the circle muſt be divided by them into four parts, EB, BG, GF, and FE, and theſe four parts are equal to one another (by def. 10.), and ſo EB a quadrant, or fourth part of the circumference; therefore the radius EC is always the ſine of the quadrant, or fourth part of the circle EB.

Sines are ſaid to be of ſo many degrees, as the arc contains parts of the 360, into which the circumference is ſuppoſed to be divided; ſo the radius being the ſine of a quadrant, or fourth part of the circumference, which contains 90 degrees (the fourth part of 360), therefore the radius muſt be the ſine of 90 degrees.

21. The part of the radius comprehended between the extremity of the right ſine and the lower end of the arc, *viz.* DB, is called the verſed ſine of the arc AB.

22. If to any point in the circumference, *viz.* B, there be drawn a diameter FCB, and from the point B, perpendicular to that diameter, there be drawn the line BH; that line is called a *tangent* to the circle in the point B; which tangent can touch the circle only in one point B, elſe if it touched it in more, it would go within it, and ſo not be a tangent but a chord, (by art. 17.)

23. The tangent of any arc AB, is a right line drawn perpendicular to a diameter through the one end of the arc B, and terminated by a line CAH, drawn from the centre through the other end A; thus BH is the tangent of the arc AB.

24. And the line which terminates the tangent, *viz.* CH, is called the ſecant of the arc AB.

25. What an arc wants of a quadrant is called the *complement* of that arc; thus AE, being what the arc AB wants of the quadrant EB, is called the complement of the arc AB.

26. And what an arc wants of a ſemicircle is called the *ſupplement* of that arc; thus ſince AF is what the arc AB wants of the ſemicircle BAF, it is the ſupplement of the arc AB.

27. The ſine, tangent, *&c.* of the complement of any arc, is called the *co-ſine, co-tangent,* &c. of that arc; thus the ſine, tangent, *&c.* of the arc AE is called the co-ſine, co-tangent, *&c.* of the arc AB.

28. The ſine of the ſupplement of an arc is the ſame with the ſine of the arc itſelf; for, drawing them according to the definitions, there reſults the ſelf-ſame line.

29. A right-lined angle is meaſured by an arc of a circle deſcribed upon the angular point as a centre, comprehended between the two legs that form the angle; thus (fig. 14.) the angle ABD is meaſured by the arc AD of the circle CADE that is deſcribed upon the point B as a centre; and the angle is ſaid to be of as many degrees as the arc is; ſo if the arc AD be 45 degrees, then the angle ABD is ſaid to be an angle of 45 degrees.

Hence the angles are greater or leſs, according as the arc deſcribed about the angular point and terminated by the two legs contain a greater or a leſs number of degrees.

30. When one line falls perpendicularly on another, as AB on CD, fig. 15. then the angles are right (by the 10th def.); and deſcribing a circle on the centre B, ſince the angles ABC ABD are equal, their meaſures muſt be ſo too, *i. e.* the arcs AC AD muſt be equal; but the whole CAD is a ſemicircle, ſince CD, a line paſſing through the centre B, is a diameter; therefore each of the parts AC AD is a quadrant, *i. e.* 90 degrees; ſo the meaſure of a right angle is always 90 degrees.

31. If one line AB fall any way upon another, CD, then the ſum of the two angles ABC ABD is always equal to the ſum of two right angles; fig. 16. For on the point B, deſcribing the circle CAD, it is plain, that CAD is a ſemicircle (by the 14th); but CAD is equal to CA and AD the meaſure of the two angles; therefore the ſum of the two angles is equal to a ſemicircle, that is, to two right angles, (by the laſt).

Cor. 1. From whence it is plain, that all the angles which can be made from a point in any line, towards one ſide of the line, are equal to two right angles.

2. And that all the angles which can be made about a point, are equal to four right ones.

32. If one line AC croſs another BD in the point E, then the oppoſite angles are equal, *viz.* BEA to CED, and BEC equal to AED; fig. 17. For upon the point E, as a centre, deſcribing the circle ABCD, it is plain ABC is a ſemicircle, as alſo BCD (by the 14th); therefore the arc ABC is equal to the arc BCE; and from both taking the common arc BC, there will remain AB equal to CD, *i. e.* the angle BEA equal to the angle CED (by art. 29.) After the ſame

manner we may prove, that the angle BEC is equal to the angle AED.

33. Lines which are equally diſtant from one another, are called *parallel lines;* as AB, CD, fig. 18.

34. If a line GH croſs two parallels AB, CD, (fig. 19.) then the external oppoſite angles are equal, *viz.* GEB equal to CFH, and AEG equal to HFD. For ſince AB and CD are parallel to one another, they may be conſidered as one broad line, and GH croſſing it; then the vertical or oppoſite angles GEB CFH are equal (by art. 32.), as alſo AEG and HFD by the ſame.

35. If a line GH croſs two parallels AB CD, then the alternate angles, *viz.* AEF and EFD, or CFE and FEB, are equal; that is, the angle AEF is equal to the angle EFD, and the angle CFE is equal to the angle FEB, for GEB is equal to AEF (by art. 32.), and CFH is equal to EFD (by the ſame); but GEB is equal to CFH (by the laſt); therefore AEF is equal to EFD. The ſame way we may prove FEB equal to EFC.

36. If a line GH croſs two parallel lines AB, CD, then the external angle GEB is equal to the internal oppoſite one EFD, or GEA equal to CFE. For the angle AEF is equal to the angle EFD (by the laſt); but AEF is equal to GEB (by art. 32.), therefore GEB is equal to EFD. The ſame way we may prove AEG equal to CFE.

37. If a line GH croſs two parallel lines AB, CD, then the ſum of the two internal angles, *viz.* BEF and DFE, or AEF and CFE, are equal to two right angles; for ſince the angle GEB is equal to the angle EFD (by art. 36.), to both add the angle FEB, then GEB and BEF are equal to BEF and DFE; but GEB and BEF are equal to two right angles (by art. 31.), therefore BEF and DFE are alſo equal to two right angles. The ſame way we may prove that AEF and CFE are equal to two right angles.

38. A figure is any part of ſpace bounded by lines or a line. If the bounding lines be ſtrait, it is called a *rectilineal figure*, as fig. 20. if they be curved, it is called a *curvineal figure*, as fig. 21. and fig. 22.; if they be partly curve lines and partly ſtrait, it is called a *mixt figure*, as fig. 23.

39. The moſt ſimple rectilinear figure is that which is bounded by three right lines, and is called a *triangle*, as fig. 24.

40. Triangles are divided into different kinds, both with reſpect to their ſides and angles: with reſpect to their ſides they are commonly divided into three kinds, *viz.*

41. A triangle having all its three ſides equal to one another, is called an *equilateral triangle*, as fig. 25.

42. A triangle having two of its ſides equal one another, and the third ſide not equal to either of them, is called an *Iſoſceles triangle*, as fig. 26.

43. A triangle having none of its ſides equal to one another, is called a *ſcalene triangle*, as fig. 27.

44. Triangles, with reſpect to their angles, are divided in three different kinds, *viz.*

45. A triangle having one of its angles right, is called a *right-angled triangle*, as fig. 28.

46. A triangle having one of its angles obtuſe, or greater than a right angle, is called an *obtuſe-angled triangle*, as fig. 29.

47. Laſtly, a triangle having all its angles acute, is called an *acute-angled triangle*, as fig. 30.

48. In all right-angled triangles, the ſides comprehending the right angle are called the *legs*, and the ſide oppoſite to the right angle is called the *hypothenuſe*. Thus in the right-angled triangle ABC, fig. 31. (the right angle being at B) the two ſides AB and BC, which comprehend the right angle ABC, are the legs of the triangle; and the ſide AC, which is oppoſite to the right angle ABC, is the hypothenuſe of the right-angled triangle ABC.

49. Both obtuſe and acute angled triangles are in general called *oblique-angled triangles;* in all which any ſide is called the *baſe*, and the other two the *ſides*.

50. The perpendicular height of any triangle is a line drawn from the vertex to the baſe perpendicularly; thus if the triangle ABC (fig. 32.) be propoſed, and BC be made its baſe, then A will be the vertex, *viz.* the angle oppoſite to the baſe; and if from A you draw the line AD perpendicular to BC, then the line AD is the height of the triangle ABC ſtanding on BC as its baſe.

Hence all triangles ſtanding between the ſame parallels have the ſame height, ſince all the perpendiculars are equal by the nature of parallels.

51. A figure bounded by four ſides is called a *quadrilateral* or *quadrangular figure*, as ABDC, fig. 33.

52. Quadrilateral figures whoſe oppoſite ſides are parallel, are called *parallelograms*. Thus in the quadrilateral figure ABDC, if the ſide AC be parallel to the ſide BD which is oppoſite to it, and AB be parallel to CD, then the figure ABDC is called a parallelogram.

53. A parallelogram having all its ſides equal and angles right, is called a *ſquare*, as fig. 34.

54. That which hath only the oppoſite ſides equal and its angles right, is called a *rectangle*, as fig. 35.

55. That which hath equal ſides but oblique angles, is called a *rhombus*, as fig. 36. and is juſt an inclined ſquare.

56. That which hath only the oppoſite ſides equal and the angles oblique, is called a *rhomboides*, as fig. 37. and may be conceived as an inclined rectangle.

57. When none of the ſides are parallel to another, then the quadrilateral figure is called a *trapezium*.

58. Every other right lined figure, that has more ſides than four, is in general called a *polygon*. And figures are called by particular names according to the number of their ſides, *viz.* one of five ſides is called a *pentagon*, of ſix a *hexagon*, of ſeven a *heptagon*, and ſo on. When the ſides forming the polygon are equal to one another, the figure is called a regular figure or polygon.

59. *In any triangle* ABC (fig. 38.) *one of its legs, as* BC, *being produced towards* D, *the external angle* ACD *is equal to both the internal oppoſite ones taken together*, viz. *to* ABC *and* BAC. In order to prove this, through C, draw CE parallel to AB; then ſince CE is parallel to AB, and the lines AC and BD croſſeth them, the angle ECD is equal to ABC (by art. 36.) and the angle ACE equal to CAB (by art. 35.); therefore the angles ECD and ECA are equal to the angles ABC and CAB; but the angles ECD and ECA are to-

gether equal to the angle ACD; therefore the angle ACD is equal to both the angles ABC and CAB taken together.

Cor. Hence it may be proved, that if two lines AB and CD (fig. 39.) be croſſed by a third line EF, and the alternate angles AEF and EFD be equal, the lines AB and CD will be parallel; for if they are not parallel, they muſt meet one another on one ſide of the line EF (ſuppoſe at G) and ſo form the triangle EFG, one of whoſe ſides GE being produced to A, the exterior angle AEF muſt (by this article) be equal to the ſum of the two angles EFG and EGF; but, by ſuppoſition, it is equal to the angles EFG alone; therefore the angle AEF muſt be equal to the ſum of the two angles EFG and EGF, and at the ſame time equal to the angle EFG alone, which is abſurd; ſo the lines AB and CD cannot meet, and therefore muſt be parallel.

60. *In any triangle* ABC, *all the three angles taken together are equal to two right angles.* To prove this, you muſt produce BC, one of its legs, to any diſtance, ſuppoſe to D; then by the laſt propoſition, the external angle, ACD, is equal to the ſum of the two internal oppoſite ones CAB and ABC; to both add the angle ACB, then the ſum of the angles ACD and ACB will be equal to the ſum of the angles CAB and CBA and ACB. But the ſum of the angles ACD and ACB, is equal to two right ones (by art. 32.), therefore the ſum of the three angles CAB and CBA and ACB, is equal to two right angles; that is, the ſum of the three angles of any triangle ACB is equal to two right angles.

Cor. 1. Hence in any triangle given, if one of its angles be known, the ſum of the other two is alſo known: for ſince (by the laſt) the ſum of all the three is equal to two right angles, or a ſemicircle, it is plain, that taking any one of them from a ſemicircle or 180 degrees, the remainder will be the ſum of the other two. Thus (in the former triangle ABC) if the angle ABC be 40 degrees, by taking 40 from 180 we have 140 degrees; which is the ſum of the two angles BAC, ACB: the converſe of this is alſo plain, *viz.* the ſum of any two angles of a triangle being given, the other angle is alſo known by taking that ſum from 180 degrees.

2. In any right-angled triangle, the two acute angles muſt juſt make up a right one between them; conſequently, any one of the oblique angles being given, we may find the other by ſubtracting the given one from 90 degrees, which is the ſum of both.

61. If in any two triangles, ABC (fig. 40.) DEF (fig. 41.) two legs of the one, *viz.* AB and AC, be equal to two legs of the other, *viz.* to DE and DF, each to each reſpectively, *i. e.* AB to DE and AC to DF; and if the angles included between the equal legs be equal, *viz.* the angle BAC equal to the angle EDF; then the remaining leg of the one ſhall be equal to the remaining leg of the other, *viz.* BC to EF; and the angles oppoſite to equal legs ſhall be equal, *viz.* ABC equal to DEF (being oppoſite to the equal legs AC and DF), alſo ACB equal to DFE (which are oppoſite to the equal legs AB and DE). For if the triangle ABC be ſuppoſed to be lifted up and put upon the triangle DEF, and the point A on the point D; it is plain, ſince BA and DE are of equal length, the point E will fall upon the point B; and ſince the angles BAC EDF are equal, the line AC will fall upon the line DF; and they being of equal length, the point C will fall upon the point F; and ſo the line BC will exactly agree with the line EF, and the triangle ABC will in all reſpects be exactly equal to the triangle DEF; and the angle ABC will be equal to the angle DEF, alſo the angle ACB will be equal to the angle DFE.

Cor. 1. After the ſame manner it may be proved, that if in any two triangles ABC, DEF, (ſee the preceding figure) two angles ABC and ACB of the one, be equal to two angles DEF and DFE of the other, each to each reſpectively, *viz.* the angle ABC to the angle DEF, and the angle ACB equal to the angle DFE, and the ſides included between theſe angles be alſo equal, *viz.* BC equal to EF, then the remaining angles and the ſides oppoſite to the equal angles, will alſo be equal each to each reſpectively; *viz.* the angle BAC equal to the angle EDF, the ſide AB equal to DE, and AC equal to DF: for if the triangle ABC be ſuppoſed to be lifted up and laid upon the triangle DEF, the point B being put upon the point E, and the line BC upon the line EF, ſince BC and EF are of equal lengths, the point C will fall upon the point F, and ſince the angle ACB is equal to the angle DFE, the line CA will fall upon the line FD, and by the ſame way of reaſoning the line BA will fall upon the line ED; and therefore the point of interſection of the two lines BA and CA, *viz.* A, will fall upon the point of interſection of the two lines ED and FD, *viz.* D, and conſequently BA will be equal to ED, and AC equal to DF, and the angle BAC equal to the angle EDF.

Cor. 2. It follows likewiſe from this article, that if any triangle ABC (fig. 42.) has two of its ſides AB and AC equal to one another, the angles oppoſite to theſe ſides will alſo be equal, *viz.* the angles ABC equal to the angle ACB. For ſuppoſe the line AD, biſecting the angle BAC, or dividing it into two equal angles BAD and CAD, and meeting BC in D, then the line AD will divide the whole triangle BAC into two triangles ABD and DAC; in which BA and AD two ſides of the one, are equal to CA and AD two ſides of the other, each to each reſpectively, and the included angles BAD and DAC are by ſuppoſition equal; therefore (by this article) the angle ABC muſt be equal to the angle ACB.

62. *Any angle, as* BAD (fig. 43.) *at the circumference of a circle* BADE, *is but half the angle* BCD *at the centre ſtanding on the ſame arch* BED. To demonſtrate this, draw through A and the centre C, the right line ACE, then the angle ECD is equal to both the angles DAC and ADC (by art. 59.); but ſince AC and CD are equal (being two radii of the ſame circle) the angles ſubtended by them muſt be equal alſo, (by *art.* 62. *cor.* 2.) *i. e.* the angle CAD equal to the angle CDA; therefore the ſum of them is double any one of them, *i. e.* DAC and ADC is double of CAD, and therefore ECD is alſo double of DAC: the ſame way it may be proved, that ECB is double of CAB; and therefore the angle BCD is double of the angle BAD, or BAD the half of BCD, which was to be proved.

Cor. 1. Hence an angle at the circumference is meaſured by half the arc it ſubtends; for the angle at the centre (ſtanding on the ſame arc) is meaſured by the whole arc (by art. 29.); but ſince the angle at the centre is double that at the circumference, it is plain the angle at the circumference muſt be meaſured by only half the arc it ſtands upon.

Cor. 2. Hence all angles, ACB, ADB, AEB, *&c.* (fig. 44.) at the circumference of a circle, ſtanding on the ſame chord AB, are equal to one another; for by the laſt corollary they are all meaſured by the ſame arc, *viz.* half the AB which each of them ſubtends.

Cor. 3. Hence an angle in a ſegment greater than a ſemicircle is leſs than a right angle: thus, if ADB be a ſegment greater than a ſemicircle, (ſee the laſt figure) than the arc AB, on which it ſtands, muſt be leſs than a ſemicircle, and the half of it leſs than a quadrant or a right angle; but the angle ADB in the ſegment is meaſured by the half of AB, therefore it is leſs than a right angle.

Cor. 4. An angle in a ſemicircle is a right angle. For ſince ABD (fig. 46.) is a ſemicircle, the arc AED muſt alſo be a ſemicircle: but the angle ABD is meaſured by half the arc AED, that is, by half a ſemicircle or quadrant; therefore the angle ABD is a right one.

Cor. 5. Hence an angle in a ſegment leſs than a ſemicircle, as ABD, (fig. 45.) is greater than a right angle: for ſince the arc ABD is leſs than a ſemicircle, the arc AED muſt be greater than a ſemicircle, and ſo it is half greater than a quadrant, *i. e.* than the meaſure of a right angle; therefore the angle ABD, which is meaſured by half the arc AED, is greater than a right angle.

63. *If from the centre* C *of the circle* ABE, (fig 47.) *there be let fall the perpendicular* CD *on the chord* AB, *then that perpendicular will biſect the chord* AB *in the point* D. To demonſtrate this, draw from the centre to the extremities of the chord the two lines CA, CB; then ſince the lines CA and CB are equal, the angles CAB, CBA, which they ſubtend muſt be equal alſo, (by *art.* 62. *cor.* 2.) but the perpendicular CD divides the triangle ACB into two right-angled triangles ACD and CDB, in which the ſum of the angles ACD and CAD in the one, is equal to the ſum of the angles DCB and CDB in the other, each being equal to a right angle, (by *cor.* 2. of *art.* 61.) but CAD is equal to CBD, therefore ACD is equal to BCD. So in the two triangles ACD and BCD, the two legs AC and CD in the one, are equal to the two legs BC and CD in the other, each to each reſpectively, and the included angles ACD and BCD are equal; therefore the remaining legs AD and BD are equal (by art. 61.) and conſequently AB biſected in D.

64. If from the centre C of a circle ABE, there be drawn a perpendicular CD on the chord AB, and produced till it meet the circle in F, then the line CF biſects the arch AB in the point F; for (ſee the foregoing figure) joining the points A and F, F and B by the ſtreight lines AF, FB, then in the triangles ADF, BDF, AD is equal to DB (by art. 63.) and DF common to both; therefore AD and DF, two legs of the triangle ADF, are equal to BD and DF, two legs of the triangle BDF, and the included angles ADF BDF are equal, being both right; therefore (by art. 61.) the remaining legs AF and FB are equal; but in the ſame circle equal lines are chords of equal arches, therefore the arches AF and FB are equal. So the whole arch AFB is biſected in the point F by the line CF.

Cor. 1. From art. 63. it follows, that any line biſecting a chord at right angles is a diameter; for ſince (by art. 63.) a line drawn from the centre perpendicular to a chord, biſects that chord at right angles; therefore, converſly, a line biſecting a chord at right angles, muſt paſs through the centre, and conſequently be a diameter.

Cor. 2. From the two laſt articles it follows, that the ſine of any arc is the half of the chord of twice the arc; for (ſee the foregoing ſcheme) AD is the ſine of the arc AF, by the definition of a ſine, and AF is half the arc AFB, and AD half the chord AB (by art. 63.); therefore the *corollary* is plain.

65. In any triangle, the half of each ſide is the ſine of the oppoſite angle; for if a circle be ſuppoſed to be drawn through the three angular points A, B, and D of the triangle ABD, fig. 48. then the angle DAB is meaſured by half the arch BKD (by *cor.* 1. of *art.* 62.) but the half of BD, *viz.* BE, is the ſine of half the arch BKD, *viz.* the ſine of BK (by *cor.* 2. of the laſt) which is the meaſure of the angle BAD; therefore the half of BD is the ſine of the angle BAD; the ſame way it may be proved, that the half of AD is the ſine of the angle ABD, and the half of AB is the ſine of the angle ADB.

66. The ſine, tangent, *&c.* of any arch is called alſo the *ſine*, *tangent*, &c. of the angle whoſe meaſure the arc is: thus becauſe the arc GD (fig. 49.) is the meaſures of the angle GCD; and ſince GH is the ſine, DE the tangent, HD the verſed ſine, CE the ſecant, alſo GK the co-ſine, BF the co-tangent, and CF the co-ſecant, *&c.* of the arch GD; then GH is called the *ſine*, DE the *tangent*, &c. of the angle GCD, whoſe meaſure is the arch GD.

67. *If two equal and parallel lines*, AB *and* CD (fig. 50.) *be joined by two others*, AC *and* BD; *then theſe ſhall alſo be equal and parallel.* To demonſtrate this, join the two oppoſite angles A and D with the line AD; then it is plain this line AD divides the quadrilateral, ACDB, into two triangles, *viz.* ABD, ACD, in which AB a leg of the one, is equal to DC a leg of the other, by ſuppoſition, and AD is common to both triangles; and ſince AB is parallel to CD, the angle BAD will be equal to the angle ADC, (by art. 36.) therefore in the two triangles BA and AD, and the angle BAD, is equal to CD and DA, and the angle ADC; that is, two legs and the included angle in the one, is equal to two legs and the included angle in the other; therefore (by art. 61.) BD is equal to AC, and ſince the angle DAC is equal to the angle ADB, therefore the lines BD, AC are parallel (by *cor.* *art.* 59.)

Cor. 1. Hence it is plain, that the quadrilateral ABDC is a parallelogram, ſince the oppoſite ſides are parallel.

Cor. 2. In any parallelogram the line joining the oppoſite angles (called the *diagonal*) as AD, divides the figure into two equal parts, ſince it has been proved that the triangles ABD ACD are equal to one another.

Cor. 3. It follows alſo, that a triangle ACD on the ſame baſe CD, and between the ſame parallels with a parallelogram ABDC, is the half of that parallelogram.

Cor. 4. Hence it is plain, that the oppoſite ſides of a parallelogram are equal; for it has been proved, that ABDC being a parallelogram, AB will be equal to CD, and AC equal to BD.

68. All parallelograms on the ſame or equal baſes, and between the ſame parallels, are equal to one another; that is, if BD and GH (fig. 51.) be equal, and the lines BH and AF be parallel, then the parallelograms ABDC, BDFE, and EFHG, are equal to one another. For AC is equal to EF, each being equal to BD, (by *cor.* 4. of 67.) To both add CE, then AE will be equal to CF. So in the two triangles ABE CDF, AB a leg of the one, is equal to CD a leg in the other; and AE is equal to CF, and the angle BAE is equal to the angle DCF (by art. 36.); therefore the two triangles ABE CDF are equal (by art. 61.); and taking the triangle CKE from both, the figure ABKC will be equal to the figure KDFE; to both which add the little triangle KBD, then the parallelogram ABDC will be equal to the parallelogram BDFE. The ſame way it may be proved, that the parallelogram EFHG is equal to the parallelogram EFDB; ſo the three parallelograms ABDC, BDFE, and EFHG will be equal to one another.

Cor. Hence it is plain, that triangles on the ſame baſe, and between the ſame parallels, are equal; ſince they are the half of the parallelograms on the ſame baſe and between the ſame parallels, (by *cor.* 3. of laſt *art.)*

69. *In any right-angled triangle,* ABC, (fig. 52.) *the ſquare of the hypothenuſe* BC, *viz.* BCMH, *is equal to the ſum of the ſquares made on the two ſides* AB *and* AC, viz. *to* ABDE *and* ACGF. To demonſtrate this, through the point A draw AKL perpendicular to the hypothenuſe BC, join AH, AM, DC, and BG; then it is plain that DB is equal to BA (by art. 53.), alſo BH is equal to BC (by the ſame); ſo in the two triangles DBC ABH, the two legs DB and BC in the one are equal to the two legs AB and BH in the other; and the included angles DBC and ABH are alſo equal; (for DBA is equal to CBH, being both right; to each add ABC, then it is plain that DBC is equal to ABH) therefore the triangles DBC ABH are equal (by art. 61.) but the triangle DBC is half of the ſquare ADBE (by *cor.* 3. of 67.) and the triangle ABH is half the parallelogram BKLH (by the ſame), therefore half the ſquare ABDE is equal to half the parallelogram BKLH. Conſequently the ſquare ABDE is equal to the parallelogram BKLH. The ſame way it may be proved, that the ſquare ACGF is equal to the parallelogram KCML. So the ſum of the ſquares ABDE and ACGF is equal to the ſum of the parallelograms BKLH and KCML, but the ſum of theſe parallelograms is equal to the ſquare BCMH; therefore the ſum of the ſquares on AB and AC is equal to the ſquare on BC.

Cor. 1. Hence in a right-angled triangle, the hypothenuſe and one of the legs being given, we may eaſily find the other, by taking the ſquare of the given leg from the ſquare of the hypothenuſe, and the ſquare root of the remainder will be the leg required.

Cor. 2. Hence, the legs in a right-angled triangle being given, we may find the hypothenuſe, by taking the ſum of the ſquares of the given legs, and extracting the ſquare root of that ſum.

70. If upon the line AB (fig. 53.) there be drawn a ſemicircle ADB, whoſe centre is C, and on the point C there be raiſed a perpendicular to the line AB, *viz.* CD; then it is plain the arc DB is a quadrant, or contains 90 degrees; ſuppoſe the arc DB to be divided into 9 equal arcs, each of which will contain 10 degrees, then on the point B raiſing BE perpendicular to the line AB, it will be a tangent to the circle in the point B, and if to every one of the diviſions of the quadrant, *viz.* B 10, B 20, B 30, B 40, *&c.* you draw the ſine, tangent, *&c.* (as in the ſcheme) we ſhall have the ſine, tangent, *&c.* to every 10 degrees in the quadrant: and the ſame way we may have the ſine, tangent, *&c.* to every ſingle degree in the quadrant, by dividing it into 90 equal parts beginning from B, and drawing the ſine, tangent, *&c.* to all the arcs beginning at the ſame point B. By this method they draw the lines of ſines, tangents, *&c.* of a certain circle on the ſcale; for after drawing them on the circle, they take the length of them, and ſet them off in the lines drawn for that purpoſe. The ſame way, by ſuppoſing the radius of any number of equal parts, (ſuppoſe 1000, or 10,000, *&c.*) it is plain the ſine, tangent, *&c.* of every arc muſt conſiſt of ſome number of theſe equal parts, and by computing them in parts of the radius, we have tables of ſines, tangents, &c. to every arc in the quadrant, called *natural ſines, tangents,* &c. and the logarithms of theſe give us tables of logarithmic ſines, tangents, *&c.* See LOGARITHMS.

71. In any triangle, ABC, (fig. 1.) if one of its ſides, as AC, be biſected in E, (and conſequently AC double of AE) and through E be drawn ED, parallel to BC, and meeting AB in D, then BC will be double of ED, and AB double of AD. Through D draw DF, parallel to AC, meeting BC in F: for ſince, by conſtruction, DF is parallel to AC, and DE parallel to BC; therefore, (by art. 36.) the angle BFD will be equal to the angle BCA, (and by the ſame article) the angle BCA will be equal to the angle DEA, conſequently the angle BFD will be equal to the angle DEA; alſo, (by art. 36.) the angle BDF will be equal to the angle DAE; and ſince DF is parallel to EC, and DE parallel to FC, the quadrilateral DFCE will be a parallelogram; and therefore, (by art. 59. cor. 4.) DF will be equal to EC, which, by conſtruction, is equal to AE; ſo in the two triangles BDF DAE, the two angles BFD and BDF in the one, are equal to the two angles DEA and DAE in the other, each to each reſpectively; and the included ſide DF, is equal to the included ſide AE; therefore, (by art 61. cor. 1.) AD will be equal to DB, and conſequently AB double of AD; alſo (by the ſame) DE will be equal to BF; but DE is alſo (by art. 67. cor. 4.) equal to FC; therefore BF and ED together, or BC, will be double of DE.

Geom Plates n° II.

After the ſame manner it may be proved, that if in the triangle AKG, (fig. 2.) AE be taken equal to a third part of AK, and through E be drawn ED, parallel to KG, and meeting AG in D; then ED will be equal to a third part of GK, and AD equal to a third part of AG.

Likewiſe if in any triangle ABC, (fig. 3.) upon the ſide AB, be taken AE, equal to one-fourth, one-fifth, one-ſixth, &c. of AB, and through E be drawn ED parallel to BC and meeting AC in D; then DE will be one-fourth, one-fifth, one-ſixth, &c. of BC, and AD the like part of AC; and, in general, if in any triangle ABC, there be aſſumed a point E on one of its ſides AB, and through that point be drawn a line ED, parallel to one of its ſides BC, and meeting the other ſide AC in D; then whatever part AE is of AB, the ſame part will ED be of BC, and AD of AC.

Cor. Hence it follows, that if in any triangle ABC, there be drawn ED, parallel to one of its ſides BC, and meeting the other two in the points E and D, then AE : AB :: ED : BC :: AD : AC; that is, AE is to AB, as ED is to BC, and that as AD to AC.

72. If any two triangles ABC, fig. 4. a b c, fig. 5. are ſimilar, or have all the angles of the one equal to all the angles of the other, each to each reſpectively; that is, the angle CAB equal to the angle c a b, and the angle ABC equal to the angle a b c, and the angle ACB equal to the angle a c b; then the legs oppoſite to the equal angles are proportioned, *viz.* AB : a b :: AC : a c :: and AB : a b :: BC : b c :: and AC : a c :: BC : b c. On AB of the largeſt triangle ſet off AE equal to a b, and through E draw ED parallel to BC, meeting AC in D; then ſince DE and BC are parallel, and AB croſſing them, the angle AED will (by art. 36.) be equal to the angle ABC, which (by ſuppoſition) is equal to the angle a b c, alſo the angle DAE is (by ſuppoſition) equal to the angle c a b; ſo in the two triangles AED, a b c, the two angles DAE AED of the one, are equal to two angles c a b a b c of the other, each to each reſpectively, and the included ſide AE is (by conſtruction) equal to the included ſide a b; therefore, (by art. 61. cor. 1.) AD is equal to a c, and DE equal to c b; but ſince, in the triangle ABC, there is drawn DE parallel to BC one of its ſides, and meeting the two other ſides in the points D and E, therefore (by cor. art. 71.) AB : AE :: AC : AD, and AB : AE :: BC : DE, and AC : AD :: BC : DE; and in the three laſt proportions, inſtead of the lines AE, DE, and AD, putting in their equals a b, b c, and a c, we ſhall have AB : a b :: AC : a c, and AB : a b :: BC : b c, and laſtly, AC : a c :: BC : b c.

73. The chord, ſine, tangent, &c. of any arc in one circle, is to the chord, ſine, tangent, &c. of the ſame arc in another, as the radius of the one is to the radius of the other, fig. 6, 6. Let ABD a b d be two circles, BD b d two arcs of theſe circles, equal to one another, or conſiſting of the ſame number of degrees; FD f d the tangents, BD b d the chords, BE b e the ſines, &c. of theſe two arcs BD b d, and CD c d the radii of the circles; then ſay, CD : c d :: FD : f d, and CD : c d :: BD : b d, and CD : c d :: BE : b e, &c. For ſince the arcs BD b d are equal, the angles BCD b c d will be equal; and FD f d, being tangents to the points D and d, the angles CDF c d f will be equal, being each a right angle (art. 22.) ſo in the two triangles CDF c d f, the two angles FCD CDF of the one, being equal to the two angles f c d c d f of the other, each to each, the remaining angle CFD, will be equal to the remaining angle c f d (by art. 60.); therefore the triangles CFD c f d are ſimilar, and conſequently (by art. 73.) CD : c d :: FD : f d. In the ſame manner it may be demonſtrated, that CD : c d :: BD : b d, and CD : c d :: BE b e, &c.

74. Let ABD (fig. 7.) be a quadrant of a circle deſcribed by the radius CD; BD any arc of it, and BA its complement; BG or CF the ſine, CG or BF the coſine; DE the tangent, and CE the ſecant of that arc BD. Then ſince the triangles CDE CGB are ſimilar or equiangular, it will be (by art. 72.) DE : EC :: GB : BC, *i. e.* the tangent of any arc, is to the ſecant of the ſame, as the ſine of it is to the radius. Alſo ſince DE : EC :: GB : BC; therefore, by inverting that proportion, we have EC : DE :: BC : GB, *i. e.* the ſecant is to the tangent, as the radius is to the ſine of any arc.

Again, ſince the triangles CDE CGB are ſimilar, therefore (by art. 72.) it will be CD : CE :: CG : CB, *i. e.* as the radius is to the ſecant of any arc, ſo is the co-ſine of that arc to the radius. And by inverting the proportion we have this, *viz.* as the ſecant of any arc is to the radius, ſo is the radius to the coſine of that arc.

75. In all circles the chord of 60 is always equal in length to the radius. Thus in the circle AEBD, (fig. 8.) if the arc AEB be an arc of 60 degrees, then drawing the chord AB, I ſay AB ſhall be equal to the radius CB or AC; for in the triangle ACB, the angle ACB is 60 degrees, being meaſured by the arc AEB; therefore the ſum of the other two angles is 120 degrees, (by *cor.* 1. of 60.); but ſince AC and CB are equal, the two angles CAB, CBA will alſo be equal; conſequently each of them half their ſum 120, *viz.* 60 degrees; therefore all the three angles are equal to one another, conſequently all the legs, therefore AB is equal to CB.

Cor. Hence the radius from which the lines on any ſcale are formed, is the chord of 60 on the line of chords.

Geometrical Problems.

Prob. I. From a point C (fig. 9.) in a given line AB to raiſe a perpendicular to that line.

Rule. From the point C take the equal diſtances CB, CA on each ſide of it. Then ſtretch the compaſſes to any diſtance greater than CB or CA, and with one foot of them in B, ſweep the arc EF with the other; again, with the ſame opening, and one foot in A, ſweep the arc GH with the other, and theſe two arcs will interſect one another in the point D; then join the given points C and D with the line CD, and that ſhall be the perpendicular required.

2. To divide a given right line AB (fig. 10.) into two equal parts; that is, to biſect it.

Rule. Take any diſtance with your compaſſes that you are ſure is greater than half the given line; then ſetting one foot of them in B, with the other ſweep the arc DFC; and with the ſame diſtance, and one foot in A, with the other ſweep the arc CED; theſe two arcs will interſect one another in the points CD, which joined by the right line DC will biſect AB in G.

3. From a given point D, (fig. 11.) to let fall a perpendicular on a given line AB.

Rule. Set one foot of the compaſſes in the point D, and extend the other to any diſtance greater than the leaſt diſtance between the given point and the line, and with that extent ſweep the arc AEB, cutting the line in the two points A and B, then (by the laſt prob.) biſect the line AB in the point C; laſtly join C and D, and that line CD is the perpendicular required.

4. (Fig. 12.) Upon the end B of a given right line BA, to raiſe a perpendicular.

Rule. Take any extent in your compaſſes, and with one foot in B fix the other in any point C without the given line; then with one point of the compaſſes in C, deſcribe with the other the circle EBD, and thro' E and C draw the diameter ECD meeting the circle in D; join D and B, and the right line DB is that required; for EBD is a right angle (by *cor*. 4. of 63.)

5. (Fig. 13.) To draw one line parallel to another given line AB, that ſhall be diſtant from one another by any given diſtance D.

Rule. Extend your compaſſes to the given diſtance D; then ſetting one foot of them in any point of the given line (ſuppoſe A,) with the other ſweep the arc FCG; again, at the ſame extent, and one foot in any other point of the given line B, ſweep the arc HDK, and draw the line CD touching them, and that will be parallel to the given line AB, and diſtant from it by the line D as was required.

6. (Fig. 14.) To divide a given line AB into any number of equal parts, ſuppoſe 7.

Rule. From the point A draw any line AD, making an angle with the line AB, then through the point B, draw a line BC parallel to AD; and from A, with any ſmall opening of the compaſſes, ſet off a number of equal parts (on the line AD,) leſs by one than the propoſed number (here 6.); then from B ſet off the ſame number of the ſame parts (on the line BC); laſtly, join 6 and 1, 2 and 5, 3 and 4, 4 and 3, 5 and 2, 6 and 1, and theſe lines will cut the given line as required.

7. (Fig. 15.) To quarter a given circle, or to divide it into four equal parts.

Rule. Through the centre C of the given circle, draw a diameter AB, then upon the point C raiſe a perpendicular DCE to the line AB; and theſe two diameters AB and DE ſhall quarter the circle.

8. (Fig. 16.) Through three given points A, B, and D, to draw a circle. *Note*, The three points muſt not lie in the ſame ſtreight line.)

Rule. Join A and B, alſo B and D, with the ſtreight lines AB BD; then (by prob. 2.) biſect AB with the line EC, alſo BD with the line FC, which two lines will cut one another in ſome point C; that is the centre of the circle required: then fixing one point of your compaſſes in D, and ſtretching the other to A, deſcribe the circle ABDG, which will paſs through the three points given. The reaſon of this is plain from cor. 1. of art. 64.

9. (Fig. 17.) From the point A of the given line AB, to draw another line (ſuppoſe AC) that ſhall make with AB an angle of any number of degrees, ſuppoſe 45.

Rule. Let the given line AB be produced, then take off your ſcale the length of the chord of 60 degrees, which is equal to the radius of the circle the ſcale was made for (by art. 75.); and ſetting one foot in A, with the other ſweep off the arc BC; then with your compaſſes take from your ſcale the chord of 45 degrees, and ſet off that diſtance from B to C. Laſtly, join A and C, and the line AC is that required. For the angle CAB, which is meaſured by the arc BC, is an angle of 45 degrees, as was required.

10. An angle BAC (fig. 18.) being given, to find how many degrees it contains.

Rule. With your compaſſes take the length of your chord of 60 from your ſcale. Then, ſetting one foot of them in A, with the other ſweep the arc BC, which is the arc comprehended between the two legs AB, AC produced if needful. Laſtly, take with your compaſſes the diſtance BC, and applying it to your line of chords on the ſcale, you will find how many degrees the arc BC contains, and conſequently the degrees of the angle BAC which was required.

11. Three lines *x*, *y*, and *z* being given, (fig. 19. 19.) to form a triangle of them; but any two of theſe lines taken together muſt always be greater than the third.

Rule. Make any one of them, as *x*, the baſe; then with your compaſſes take another of them, as *z*, and ſetting one foot in one end of the line *x*, as B, with the other ſweep the arc DE; and taking with your compaſſes the length of the other *y*, ſet one foot of them in A, the other end of the line *x*, and with the other ſweep the arc FG, which will cut the other in C; laſtly, join CA and CB, and the triangle CAB is that required.

12. To make a triangle, having one of its legs of any number of equal parts (ſuppoſe 160,) and one of the angles at that leg 50 degrees, and the other 44 degrees.

Rule. Draw an indefinite line ED, (fig. 20.) then take off the line of equal parts with your compaſſes, 160 of them, and ſet them on the indefinite line, as BC; then (by prob. 9.) draw BA, making the angle ABC of 50 degrees, and (by the ſame) draw from C the line AC, making the angle ACB of 44 degrees; which two lines will meet one another in A, and the triangle ABC is that required. See TRIGONOMETRY.

13. Upon a given line AB (fig. 21.) to make a ſquare.

Rule. Upon the extremity A of the given line AB, raiſe a perpendicular AC (by prob. 4.); then take AC equal to AB, and with that extent, ſetting one foot of the compaſſes in C, ſweep with the other foot the arc GH; then with the ſame extent, and one foot in B, with the other ſweep the arc EF, which will meet the former in ſome point D; laſtly, join C and D, D and B, and the figure ABDC will be the ſquare required.

14. On a given line AB (fig. 22.) to draw a rhomb that ſhall have one of its angles equal to any number of degrees, ſuppoſe 60 degrees.

Rule. From the point A of the given line AB, draw the line AC, making the angle CAB of 60 degrees, (by prob. 9.) then take AC equal to AB, and with that extent, fixing one foot of the compaſſes in

B, with the other deſcribe the arc GH; and at the ſame extent, fixing one foot of the compaſſes in C, with the other deſcribe the arc EF cutting the former in D; laſtly, join CD and DB, and the figure ACDB is that required.

15. Given two lines *x* and *z*, of theſe two to make a rectangle.

Rule. Draw a line, as AB, (fig. 23. 23.) equal in length to one of the given lines *x*; and on the extremity A of that line, raiſe a perpendicular AC, on which take AC equal to the other line *z*; then take with your compaſſes the length of the line AB, and at that extent, fixing one foot of them in C, with the other ſweep the arc EF; and alſo taking with your compaſſes the extent of the line AC, fix one foot of them in B, and with the other ſweep the arc GH, which will meet the former in D; laſtly, join CD and BD, and the figure ABDC will be that required.

16. Two lines *x* and *z* being given, of theſe to form a rhomboides that ſhall have one of its angles any number of degrees, ſuppoſe 50.

Rule. Draw a line AB (fig. 24. 24.) equal in length to one of the lines, as *x*; then draw the line AC, making with the former the angle BAC equal to the propoſed, ſuppoſe 50 degrees, and on that line take AC equal to the given line *z*; then with your compaſſes take the length of AB, and fixing one foot in C, ſweep the arc EF; alſo, taking the length of AC, and ſetting one foot in B, with the other ſweep the arc GH, which will cut the former in D; then join CD and DB, ſo the figure ACDB will be that required.

PART II.

THE APPLICATION OF THE FOREGOING PRINCIPLES TO THE MENSURATION OF SURFACES, SOLIDS, *&c.*

CHAP. I. *Of the Menſuration of Lines and Angles.*

A Line, or length, to be meaſured, whether it be diſtance, height, or depth, is meaſured by a line leſs than it. With us the leaſt meaſure of length is an inch: not that we meaſure no line leſs than it, but becauſe we do not uſe the name of any meaſure below that of an inch; expreſſing leſſer meaſures by the fractions of an inch: and in this treatiſe we uſe decimal fractions as the eaſieſt. Twelve inches make a foot; three feet and an inch make the Scots ell; ſix ells make a fall; forty falls make a furlong; eight furlongs make a mile: ſo that the Scots miles is 1184 paces, accounting every pace to be five feet. Theſe things are according to the ſtatutes of Scotland; notwithſtanding which, the glaziers uſe a foot of only eight inches; and other artiſts for the moſt part uſe an Engliſh foot, on account of the ſeveral ſcales marked on the Engliſh foot-meaſure for their uſe. But the Engliſh foot is ſomewhat leſs than the Scots; ſo that 185 of theſe make 186 of thoſe.

Lines, to the extremities and any intermediate point of which you have eaſy acceſs, are meaſured by applying to them the common meaſure a number of times. But lines, to which you cannot have ſuch acceſs, are meaſured by methods taken from geometry; the chief whereof we ſhall here endeavour to explain. The firſt is by the help of the geometrical ſquare.

“ As for the Engliſh meaſures, the yard is 3 feet, or 36 inches. A pole is ſixteen feet and a half, or five yards and a half. The chain, commonly called *Gunter's chain*, is four poles, or 22 yards, that is, 66 feet. An Engliſh ſtatute-mile is fourſcore chains, or 1760 yards, that is, 5280 feet.

“ The chain (which is now much in uſe, becauſe it is very convenient for ſurveying) is divided into 100 links, each of which is $7\frac{92}{100}$ of an inch: whence it is eaſy to reduce any number of thoſe links to feet, or any number of feet to links.

“ A chain that may have the ſame advantages in ſurveying in Scotland, as Gunter's chain has in England, ought to be in length 74 feet, or 24 Scots ells, if no regard is had to the difference of the Scots and Engliſh foot above-mentioned. But, if regard is had to that difference, the Scots chain ought to conſiſt of $74\frac{2}{5}$ Engliſh feet, or 74 feet 4 inches and $\frac{4}{5}$ of an inch. This chain being divided into 100 links, each of thoſe links is 8 inches and $\frac{928}{1000}$ of an inch. In the following table, the moſt noted meaſures are expreſſed in Engliſh inches and decimals of an inch.”

	Engliſh Inch.	*Dec.*
The Engliſh foot, is - -	12	000
The Paris foot, - - -	12	788
The Rhindland foot, meaſured by Mr Picart,	12	362
The Scots foot, - - -	12	065
The Amſterdam foot, by Snellies and Picart,	11	172
The Dantzick foot, by Hevelius, -	11	297
The Daniſh foot, by Mr Picart, -	12	465
The Swediſh foot, by the ſame, -	11	692
The Bruſſels foot, by the ſame, -	10	828
The Lyons foot, by Mr Auzout, -	13	458
The Bononian foot, by Mr Caſſini, -	14	938
The Milan foot, by Mr Auzout, -	15	631
The Roman palm uſed by merchants, according to the ſame, - - -	9	791
The Roman palm uſed by architects,	8	779
The palm of Naples, according to Mr Auzout,	10	314
The Engliſh yard, - -	36	000
The Engliſh ell, - - -	45	000
The Scots ell, - - -	37	200
The Paris aune uſed by mercers, according to Mr Picart, - -	46	786
The Paris aune uſed by drapers, according to the ſame, - -	46	680
The Lyons aune, by Mr Auzout, -	46	570
The Geneva aune, - -	44	760
The Amſterdam ell, - -	26	800
The Daniſh ell, by Mr Picart, -	24	930

3. From a given point D, (fig. 11.) to let fall a perpendicular on a given line AB.

Rule. Set one foot of the compaſſes in the point D, and extend the other to any diſtance greater than the leaſt diſtance between the given point and the line, and with that extent ſweep the arc AEB, cutting the line in the two points A and B, then (by the laſt prob.) biſect the line AB in the point C; laſtly join C and D, and that line CD is the perpendicular required.

4. (Fig. 12.) Upon the end B of a given right line BA, to raiſe a perpendicular.

Rule. Take any extent in your compaſſes, and with one foot in B fix the other in any point C without the given line; then with one point of the compaſſes in C, deſcribe with the other the circle EBD, and thro' E and C draw the diameter ECD meeting the circle in D; join D and B, and the right line DB is that required; for EBD is a right angle (by *cor*. 4. of 63.)

5. (Fig. 13.) To draw one line parallel to another given line AB, that ſhall be diſtant from one another by any given diſtance D.

Rule. Extend your compaſſes to the given diſtance D; then ſetting one foot of them in any point of the given line (ſuppoſe A,) with the other ſweep the arc FCG; again, at the ſame extent, and one foot in any other point of the given line B, ſweep the arc HDK, and draw the line CD touching them, and that will be parallel to the given line AB, and diſtant from it by the line D as was required.

6. (Fig. 14.) To divide a given line AB into any number of equal parts, ſuppoſe 7.

Rule. From the point A draw any line AD, making an angle with the line AB, then through the point B, draw a line BC parallel to AD; and from A, with any ſmall opening of the compaſſes, ſet off a number of equal parts (on the line AD,) leſs by one than the propoſed number (here 6.); then from B ſet off the ſame number of the ſame parts (on the line BC); laſtly, join 6 and 1, 2 and 5, 3 and 4, 4 and 3, 5 and 2, 6 and 1, and theſe lines will cut the given line as required.

7. (Fig. 15.) To quarter a given circle, or to divide it into four equal parts.

Rule. Through the centre C of the given circle, draw a diameter AB, then upon the point C raiſe a perpendicular DCE to the line AB; and theſe two diameters AB and DE ſhall quarter the circle.

8. (Fig. 16.) Through three given points A, B, and D, to draw a circle. *Note*, The three points muſt not lie in the ſame ſtreight line.)

Rule. Join A and B, alſo B and D, with the ſtreight lines AB BD; then (by prob. 2.) biſect AB with the line EC, alſo BD with the line FC, which two lines will cut one another in ſome point C; that is the centre of the circle required: then fixing one point of your compaſſes in D, and ſtretching the other to A, deſcribe the circle ABDG, which will paſs through the three points given. The reaſon of this is plain from cor. 1. of art. 64.

9. (Fig. 17.) From the point A of the given line AB, to draw another line (ſuppoſe AC) that ſhall make with AB an angle of any number of degrees, ſuppoſe 45.

Rule. Let the given line AB be produced, then take off your ſcale the length of the chord of 60 degrees, which is equal to the radius of the circle the ſcale was made for (by art. 75.); and ſetting one foot in A, with the other ſweep off the arc BC; then with your compaſſes take from your ſcale the chord of 45 degrees, and ſet off that diſtance from B to C. Laſtly, join A and C, and the line AC is that required. For the angle CAB, which is meaſured by the arc BC, is an angle of 45 degrees, as was required.

10. An angle BAC (fig. 18.) being given, to find how many degrees it contains.

Rule. With your compaſſes take the length of your chord of 60 from your ſcale. Then, ſetting one foot of them in A, with the other ſweep the arc BC, which is the arc comprehended between the two legs AB, AC produced if needful. Laſtly, take with your compaſſes the diſtance BC, and applying it to your line of chords on the ſcale, you will find how many degrees the arc BC contains, and conſequently the degrees of the angle BAC which was required.

11. Three lines x, y, and z being given, (fig. 19.) to form a triangle of them; but any two of theſe lines taken together muſt always be greater than the third.

Rule. Make any one of them, as x, the baſe; then with your compaſſes take another of them, as z, and ſetting one foot in one end of the line x, as B, with the other ſweep the arc DE; and taking with your compaſſes the length of the other y, ſet one foot of them in A, the other end of the line x, and with the other ſweep the arc FG, which will cut the other in C; laſtly, join CA and CB, and the triangle CAB is that required.

12. To make a triangle, having one of its legs of any number of equal parts (ſuppoſe 160,) and one of the angles at that leg 50 degrees, and the other 44 degrees.

Rule. Draw an indefinite line ED, (fig. 20.) then take off the line of equal parts with your compaſſes, 160 of them, and ſet them on the indefinite line, as BC; then (by prob. 9.) draw BA, making the angle ABC of 50 degrees, and (by the ſame) draw from C the line AC, making the angle ACB of 44 degrees; which two lines will meet one another in A, and the triangle ABC is that required. See TRIGONOMETRY.

13. Upon a given line AB (fig. 21.) to make a ſquare.

Rule. Upon the extremity A of the given line AB, raiſe a perpendicular AC (by prob. 4.); then take AC equal to AB, and with that extent, ſetting one foot of the compaſſes in C, ſweep with the other foot the arc GH; then with the ſame extent, and one foot in B, with the other ſweep the arc EF, which will meet the former in ſome point D; laſtly, join C and D, D and B, and the figure ABDC will be the ſquare required.

14. On a given line AB (fig. 22.) to draw a rhomb that ſhall have one of its angles equal to any number of degrees, ſuppoſe 60 degrees.

Rule. From the point A of the given line AB, draw the line AC, making the angle CAB of 60 degrees, (by prob. 9.) then take AC equal to AB, and with that extent, fixing one foot of the compaſſes in

B, with the other deſcribe the arc GH; and at the ſame extent, fixing one foot of the compaſſes in C, with the other deſcribe the arc EF cutting the former in D; laſtly, join CD and DB, and the figure ACDB is that required.

15. Given two lines x and z, of theſe two to make a rectangle.

Rule. Draw a line, as AB, (fig. 23. 23.) equal in length to one of the given lines x; and on the extremity A of that line, raiſe a perpendicular AC, on which take AC equal to the other line z; then take with your compaſſes the length of the line AB, and at that extent, fixing one foot of them in C, with the other ſweep the arc EF; and alſo taking with your compaſſes the extent of the line AC, fix one foot of them in B, and with the other ſweep the arc GH, which will meet the former in D; laſtly, join CD and BD, and the figure ABDC will be that required.

16. Two lines x and z being given, of theſe to form a rhomboides that ſhall have one of its angles any number of degrees, ſuppoſe 50.

Rule. Draw a line AB (fig. 24. 24.) equal in length to one of the lines, as x; then draw the line AC, making with the former the angle BAC equal to the propoſed, ſuppoſe 50 degrees, and on that line take AC equal to the given line z; then with your compaſſes take the length of AB, and fixing one foot in C, ſweep the arc EF; alſo, taking the length of AC, and ſetting one foot in B, with the other ſweep the arc GH, which will cut the former in D; then join CD and DB, ſo the figure ACDB will be that required.

PART II.

THE APPLICATION OF THE FOREGOING PRINCIPLES TO THE MENSURATION OF SURFACES, SOLIDS, *&c.*

Chap. I. *Of the Menſuration of Lines and Angles.*

A Line, or length, to be meaſured, whether it be diſtance, height, or depth, is meaſured by a line leſs than it. With us the leaſt meaſure of length is an inch: not that we meaſure no line leſs than it, but becauſe we do not uſe the name of any meaſure below that of an inch; expreſſing leſſer meaſures by the fractions of an inch: and in this treatiſe we uſe decimal fractions as the eaſieſt. Twelve inches make a foot; three feet and an inch make the Scots ell; ſix ells make a fall; forty falls make a furlong; eight furlongs make a mile: ſo that the Scots miles is 1184 paces, accounting every pace to be five feet. Theſe things are according to the ſtatutes of Scotland; notwithſtanding which, the glaziers uſe a foot of only eight inches; and other artiſts for the moſt part uſe an Engliſh foot, on account of the ſeveral ſcales marked on the Engliſh foot-meaſure for their uſe. But the Engliſh foot is ſomewhat leſs than the Scots; ſo that 185 of theſe make 186 of thoſe.

Lines, to the extremities and any intermediate point of which you have eaſy acceſs, are meaſured by applying to them the common meaſure a number of times. But lines, to which you cannot have ſuch acceſs, are meaſured by methods taken from geometry; the chief whereof we ſhall here endeavour to explain. The firſt is by the help of the geometrical ſquare.

"As for the Engliſh meaſures, the yard is 3 feet, or 36 inches. A pole is ſixteen feet and a half, or five yards and a half. The chain, commonly called *Gunter's chain*, is four poles, or 22 yards, that is, 66 feet. An Engliſh ſtatute-mile is fourſcore chains, or 1760 yards, that is, 5280 feet.

"The chain (which is now much in uſe, becauſe it is very convenient for ſurveying) is divided into 100 links, each of which is $7\frac{92}{100}$ of an inch: whence it is eaſy to reduce any number of thoſe links to feet, or any number of feet to links.

"A chain that may have the ſame advantages in ſurveying in Scotland, as Gunter's chain has in England, ought to be in length 74 feet, or 24 Scots ells, if no regard is had to the difference of the Scots and Engliſh foot above-mentioned. But, if regard is had to that difference, the Scots chain ought to conſiſt of $74\frac{2}{5}$ Engliſh feet, or 74 feet 4 inches and $\frac{4}{5}$ of an inch. This chain being divided into 100 links, each of thoſe links is 8 inches and $\frac{928}{1000}$ of an inch. In the following table, the moſt noted meaſures are expreſſed in Engliſh inches and decimals of an inch."

	Engliſh Inch.	*Dec.*
The Engliſh foot, is - -	12	000
The Paris foot, - - -	12	788
The Rhindland foot, meaſured by Mr Picart,	12	362
The Scots foot, - - - -	12	065
The Amſterdam foot, by Snellies and Picart,	11	172
The Dantzick foot, by Hevelius, -	11	297
The Daniſh foot, by Mr Picart, -	12	465
The Swediſh foot, by the ſame, -	11	692
The Bruſſels foot, by the ſame, -	10	828
The Lyons foot, by Mr Auzout, -	13	458
The Bononian foot, by Mr Caſſini, -	14	938
The Milan foot, by Mr Auzout, -	15	631
The Roman palm uſed by merchants, according to the ſame, - -	9	791
The Roman palm uſed by architects,	8	779
The palm of Naples, according to Mr Auzout,	10	314
The Engliſh yard, - -	36	000
The Engliſh ell, - -	45	000
The Scots ell, - -	37	200
The Paris aune uſed by mercers, according to Mr Picart, - -	46	786
The Paris aune uſed by drapers, according to the ſame, - -	46	680
The Lyons aune, by Mr Auzout, -	46	570
The Geneva aune, - -	44	760
The Amſterdam ell, - -	26	800
The Daniſh ell, by Mr Picart, -	24	930

	English Inch.	Dec.
The Swediſh ell, - -	23	380
The Norway ell, - -	24	510
The Brabant or Antwerp ell, -	27	170
The Bruſſels ell, - -	27	260
The Burges ell, - -	27	550
The brace of Bononia, according to Auzout,	25	200
The brace uſed by architects in Rome,	30	730
The brace uſed in Rome by merchants,	34	270
The Florence brace uſed by merchants, according to Picart, - -	22	910
The Florence geographical brace,	21	570
The vara of Seville, - -	33	127
The vara of Madrid, - -	39	166
The vara of Portugal, -	44	031
The cavedo of Portugal, -	27	354
The ancient Roman foot, -	11	632
The Perſian ariſh, according to Mr Græves,	38	364
The ſhorter pike of Conſtantinople, according to the ſame, -	25	576
Another pike of Conſtantinople, according to Meſſ. Mallet and De la Porte, -	27	920

PROPOSITION I.

Prob. *To deſcribe the ſtructure of the geometrical ſquare.*—The geometrical ſquare is made of any ſolid matter, as braſs or wood, or of any four plain rulers joined together at right angles, (as in fig. 1.) where A is the centre, from which hangs a thread with a ſmall weight at the end, ſo as to be directed always to the centre. Each of the ſides BE and DE is divided into an hundred equal parts, or (if the ſides be long enough to admit of it) into a thouſand parts; C and F at two ſights, fixed on the ſide AD. There is moreover an index GH, which, when there is occaſion, is joined to the centre A, in ſuch manner as that it can move round, and remain in any given ſituation. On this index are two ſights perpendicular to the right line going from the centre of the inſtrument: theſe are K and L. The ſide DE of the inſtrument is called the upright ſide; E the reclining ſide.

Geometry Plates, n° III.

PROPOSITION II.

Fig. 2. *To meaſure an acceſſible height,* AB, *by the help of a geometrical ſquare, its diſtance being known.*—Let BR be an horizontal plane, on which there ſtands perpendicularly any line AB: let BD, the given diſtance of the obſervator from the height, be 96 feet; let the height of the obſervator's eye be ſuppoſed 6 feet: and let the inſtrument, held by a ſteady hand, or rather leaning on a ſupport, be directed towards the ſummit A, ſo that one eye (the other being ſhut) may ſee it clearly through the ſights; the perpendicular or plumb-line meanwhile hanging free, and touching the ſurface of the inſtrument: let now the perpendicular be ſuppoſed to cut off on the right ſide KN 80 equal parts. It is clear that LKN, ACK, are ſimilar triangles; for the angles LKN, ACK are right angles, and therefore equal; moreover LN and AC are parallel, as being both perpendicular to the horizon; conſequently, (by art. 60. cor. 1. Part I.) the angles KLN, KAC, are equal; wherefore, (by art. 60. cor. 2. of Part I.) the angles LNK, and AKC, are likewiſe equal: ſo that in the triangles NKL, KAC, (by art. 72. of Part I.) as NK : KL :: KC (*i. e.* BD) : CA; that is, as 80 to 100, ſo is 96 feet to CA. Therefore, by the rule of three, CA will be found to be 120 feet; and CB, which is 6 feet, being added, the whole height is 126 feet.

But if the diſtance of the obſervator from the height, as BE, be ſuch, that when the inſtrument is directed as formerly toward the ſummit A, the perpendicular falls on the angle P, oppoſite to H, the centre of the inſtrument, and BE or CG be given of 120 feet; CA will alſo be 120 feet. For in the triangles HGP, ACG, equiangular, as in the preceding caſe, as PG : GH :: GC : CA. But PG is equal to GH; therefore GC is likewiſe equal to CA: that is, CA will be 120 feet, and the whole height 126 feet as before.

Let the diſtance BF be 300 feet, and the perpendicular or plumb-line cut off 40 equal parts from the reclining ſide: Now, in this caſe, the angle, QAC, QZI, are equal, and the angles QZI, ZIS, are equal; therefore the angle ZIS is equal to the angle QAC. But the angles ZSI QCA are equal, being right angles; therefore, in the equiangular triangles ACQ, SZI, it will be, as ZS : SI :: CQ : CA; that is, as 100 to 40, ſo is 300 to CA. Wherefore, by the rule of three, CA will be found to be of 102 feet. And, by adding the height of the obſervator, the whole BA will be 126 feet. Note, that the height is greater than the diſtance, when the perpendicular cuts the right ſide, and leſs if it cut the reclined ſide: and that the height and diſtance are equal, if the perpendicular fall on the oppoſite angle.

SCHOLIUM.

If the height of a tower, to be meaſured as above, end in a point, (as in fig. 3.) the diſtance of the obſervator oppoſite to it, is not CD, but is to be accounted from the perpendicular to the point A; that is, to CD muſt be added the half of the thickneſs of the tower, *viz.* BD: which muſt likewiſe be underſtood in the following propoſitions, when the caſe is ſimilar.

PROPOSITION III.

Fig. 4. *From the height of a tower* AB *given, to find a diſtance on the horizontal plane* BC, *by the geometrical ſquare*—Let the inſtrument be ſo placed, as that the mark C in the oppoſite plane may be ſeen through the ſights; and let it be obſerved how many parts are cut off by the perpendicular. Now, by what hath been already demonſtrated, the triangles AEF, ABC, are ſimilar; therefore, it will be as EF, to AE, ſo AB (compoſed of the height of the tower BG, and of the height of the centre of the inſtrument A, above the tower BG) to the diſtance BC. Wherefore, if, by the rule of three, you ſay, as EF to AE, ſo is AB to BC, it will be the diſtance ſought.

PROPOSITION IV.

Fig. 5. *To meaſure any diſtance at land or ſea, by the geometrical ſquare.*—In this operation, the index is to be applied to the inſtrument, as was ſhown in the deſcription; and, by the help of a ſupport, the inſtrument is to be placed horizontally at the point A; then let it be turned till the remote point F, whoſe diſtance is to be meaſured, be ſeen through the fixed ſights; and bring the index to be parallel with the other ſide of the inſtrument, obſerve by the ſights upon it any acceſſible mark B, at a ſenſible diſtance: then carrying the inſtrument to the point B, let the immoveable

moveable ſights be directed to the firſt ſtation A, and the ſights of the index to the point F. If the index cut the right ſide of the ſquare, as in K, in the two triangles BRK, and BAF, which are æquiangular, it will be as BR to RK, ſo BA (the diſtance of the ſtations to be meaſured with a chain) to AF; and the diſtance AF ſought will be found by the rule of three. But if the index cut the reclined ſide of the ſquare in any point L, where the diſtance of a more remote point is ſought; in the triangles BLS, BAG, the ſide LS ſhall be to SB, as BA to AG, the diſtance ſought; which accordingly will be found by the rule of three.

PROPOSITION V.

Fig. 6. *To meaſure an acceſſible height by means of a plain mirror.*—Let AB be the height to be meaſured; let the mirror be placed at C, in the horizontal plane BD, at a known diſtance BC; let the obſerver go back to D, till he ſee the image of the ſummit in the mirror, at a certain point of it, which he muſt diligently mark; and let DE be the height of the obſervator's eye. The triangles ABC and EDC are equiangular; for the angles at D and B are right angles; and ACB, ECD, are equal, being the angles of incidence and reflexion of the ray AC, as is demonſtrated in optics; wherefore the remaining angles at A and E are alſo equal: therefore it will be, as CD to DE, ſo CB to BA; that is, as the diſtance of the obſervator from the point of the mirror in the right line betwixt the obſervator and the height, is to the height of the obſervator's eye, ſo is the diſtance of the tower from that point of the mirror, to the height of the tower ſought; which therefore will be found by the rule of three.

Note 1. The obſervation will be more exact, if, at the point D, a ſtaff be placed in the ground perpendicularly, over the top of which the obſervator may ſee a point of the glaſs exactly in a line betwixt him and the tower.

Note 2. In place of a mirror may be uſed the ſurface of water contained in a veſſel, which naturally becomes parallel to the horizon.

PROPOSITION VI.

Fig. 7. *To meaſure an acceſſible height* AB *by means of two ſtaffs.*—Let there be placed perpendicularly in the ground a longer ſtaff DE, likewiſe a ſhorter one FG, ſo as the obſervator may ſee A, the top of the height to be meaſured, over the ends D F of the two ſtaffs; let FH and DC, parallel to the horizon, meet DE and AB in H and C; then the triangles FHD, DCA, ſhall be equiangular; for the angles at C and H are right ones; likewiſe the angle A is equal to the angle FDH; wherefore the remaining angles DFH, and ADC, are alſo equal: wherefore, as FH, the diſtance of the ſtaffs, to HD, the exceſs of the longer ſtaff above the ſhorter; ſo is DC, the diſtance of the longer ſtaff from the tower, to CA, the exceſs of the height of the tower above the longer ſtaff. And thence CA will be found by the rule of three.

To which if the length DE be added, you will have the whole height of the tower BA.

SCHOLIUM.

Fig. 8. Many other methods may be occaſionally contrived for meaſuring an acceſſible height. For example, from the given length of the ſhadow BD, to find out the height AB, thus: Let there be erected a ſtaff CE perpendicularly, producing the ſhadow EF: The triangles ABD, CEF, are equiangular; for the angles at B and E are right; and the angles ADB and CFE are equal, each being equal to the angle of the ſun's elevation above the horizon: Therefore, as EF, the ſhadow of the ſtaff, to EC, the ſtaff itſelf; ſo BD, the ſhadow of the tower, to BA, the height of the tower. Though the plane on which the ſhadow of the tower falls be not parallel to the horizon, if the ſtaff be erected in the ſame plane, the rule will be the ſame.

PROPOSITION VII.

To meaſure an inacceſſible height by means of two ſtaffs.—Hitherto we have ſuppoſed the height to be acceſſible, or that we can come at the lower end of it; now if, becauſe of ſome impediment, we cannot get to a tower, or if the point whoſe height is to be found out be the ſummit of a hill, ſo that the perpendicular be hid within the hill; if, for want of better inſtruments, ſuch an inacceſſible height is to be meaſured by means of two ſtaffs, let the firſt obſervation be made with the ſtaffs DE and FG, (as in prop. 6.); then the obſervator is to go off in a direct line from the height and firſt ſtation, till he come to the ſecond ſtation; where (fig. 11.) he is to place the longer ſtaff perpendicularly at RN, and the ſhorter ſtaff at KO, ſo that the ſummit A may be ſeen along their tops; that is, ſo that the points KNA may be in the ſame right line. Through the point N, let there be drawn the right line NP parallel to FA: Wherefore in the triangles KNP, KAF, the angles KNP, KAF are equal, alſo the angle AKF is common to both; conſequently the remaining angle KPN is equal to the remaining angle KFA. And therefore, PN : FA :: KP : KF. But the triangles PNL, FAS are ſimilar; therefore, PN : FA :: NL : SA. Therefore, (by the 11. 5. Eucl.) KP : KF :: N L : SA. Thence, alternately, it will be, as KP (the exceſs of the greater diſtance of the ſhort ſtaff from the long one above its leſſer diſtance from it) to NL, the exceſs of the longer ſtaff above the ſhorter; ſo KF, the diſtance of the two ſtations of the ſhorter ſtaff to SA, the exceſs of the height ſought above the height of the ſhorter ſtaff. Wherefore SA will be found by the rule of three. To which let the height of the ſhorter ſtaff be added, and the ſum will give the whole inacceſſible height BA.

Note 1. In the ſame manner may an inacceſſible height be found by a geometrical ſquare, or by a plain ſpeculum. But we ſhall leave the rules to be found out by the ſtudent, for his own exerciſe.

Note 2. That by the height of the ſtaff we underſtand its height above the ground in which it is fixed.

Note 3. Hence depends the method of uſing other inſtruments invented by geometricians; for example, of the geometrical croſs: and if all things be juſtly weighed, a like rule will ſerve for it as here. But we incline to touch only upon what is moſt material.

PROPOSITION VIII.

Fig. 9. *To meaſure the diſtance* AB, *to one of whoſe extremities we have acceſs, by the help of four ſtaffs.*—Let there be a ſtaff fixed at the point A; then going back at ſome ſenſible diſtance in the ſame right line, let another be fixed in C, ſo as that both the points A

and B be covered and hid by the ſtaff C: likewiſe going off in a perpendicular from the right line CB, at the point A, (the method of doing which ſhall be ſhown in the following *ſcholium*), let there be placed another ſtaff at H; and in the right line CKG (perpendicular to the ſame CB, at the point B), and at the point of it K, ſuch that the points K, H, and B may be in the ſame right line, let there be fixed a fourth ſtaff. Let there be drawn, or let there be ſuppoſed to be drawn, a right line GH parallel to CA. The triangles KGH, HAB, will be equiangular; for the angles HAB KGH are right angles. Alſo the angles ABH, KHG are equal; wherefore, as KG (the exceſs of CK above AH) to GH, or to CA, the diſtance betwixt the firſt and ſecond ſtaff; ſo is AH, the diſtance betwixt the firſt and third ſtaff, to AB the diſtance ſought.

SCHOLIUM.

Fig. 10. To draw on a plane a right line AE perpendicular to CH, from a given point A; take the right lines AB, AD, on each ſide equal; and in the points B and D, let there be fixed ſtakes, to which let there be tied two equal ropes BE, DE, or one having a mark in the middle, and holding in your hand their extremities joined, (or the mark in the middle, if it be but one), draw out the ropes on the ground; and then, where the two ropes meet, or at the mark, when by it the rope is fully ſtretched, let there be placed a third ſtake at E; the right line AE will be perpendicular to CH in the point A (prob. I. of Part I.). In a manner not unlike to this, may any problems that are reſolved by the ſquare and compaſſes, be done by ropes and a cord turned round as a radius.

PROPOSITION IX.

FIG. 12. *To meaſure the diſtance* AB, *one of whoſe extremities is acceſſible.*—From the point A, let the right line AC of a known length be made perpendicular to AB, (by the preceding *ſcholium*): likewiſe draw the right line CD perpendicular to CB, meeting the right line AB in D: then as DA : AC :: AC : AB. Wherefore, when DA and AC are given, AB will be found by the rule of three.

SCHOLIUM.

All the preceding operations depend on the equality of ſome angles of triangles, and on the ſimilarity of the triangles ariſing from that equality. And on the ſame principles depend innumerable other operations which a geometrician will find out of himſelf, as is very obvious. However, ſome of theſe operations require ſuch exactneſs in the work, and without it are ſo liable to errors, that, *cæteris paribus*, the following operations, which are performed by a trigonometrical calculation, are to be preferred; yet could we not omit thoſe above, being moſt eaſy in practice, and moſt clear and evident to thoſe who have only the firſt elements of geometry. But if you are provided with inſtruments, the following operations are more to be relied upon. We do not inſiſt on the eaſieſt caſes to thoſe who are ſkilled in plain trigonometry, which is indeed neceſſary to any one who would apply himſelf to practice. See TRIGONOMETRY.

PROPOSITION X.

FIG. 13. *To deſcribe the conſtruction and uſe of the geometrical quadrant.*—The geometrical quadrant is the fourth part of a circle divided into 90 degrees, to which two ſights are adapted, with a perpendicular or plumb-line hanging from the centre. The general uſe of it is for inveſtigating angles in a vertical plane, comprehended under right lines going from the centre of the inſtrument, one of which is horizontal, and the other is directed to ſome viſible point. This inſtrument is made of any ſolid matter, as wood, copper, *&c.*

PROPOSITION XI.

FIG. 14. *To deſcribe and make uſe of the graphometer.*—The graphometer is a ſemicircle made of any hard matter, of wood, for example, or braſs, divided into 180 degrees; ſo fixed on a *fulcrum*, by means of a braſs ball and ſocket, that it eaſily turns abont, and retains any ſituation; two ſights are fixed on its diameter. At the centre there is commonly a magnetical needle in a box. There is likewiſe a moveable ruler, which turns round the centre, and retains any ſituation given it. The uſe of it is to obſerve any angle, whoſe vertex is at the centre of the inſtrument in any plane, (though it is moſt commonly horizontal, or nearly ſo), and to find how many degrees it contains.

PROPOSITION XII.

FIG. 15. and 16. *To deſcribe the manner in which angles are meaſured by a quadrant or graphometer.*—Let there be an angle in a vertical plane, comprehended between a line parallel to the horizon HK, and the right line RA, coming from any remarkable point of a tower or hill, or from the ſun, moon, or a ſtar. Suppoſe that this angle RAH is to be meaſured by the quadrant: let the inſtrument be placed in the vertical plane, ſo as that the centre A may be in the angular point: and let the ſights be directed towards the object at R, (by the help of the ray coming from it, if it be the ſun or moon, or by the help of the viſual ray, if it is any thing elſe), the degrees and minutes in the arc BC cut off by the perpendicular, will meaſure the angle RAH required. For, from the make of the quadrant, BAD is a right angle; therefore BAR is likewiſe right, being equal to it. But, becauſe HK is horizontal, and AC perpendicular, HAC will be a right angle; and therefore equal alſo to BAR. From thoſe angles ſubtract the part HAB that is common to both; and there will remain the angle BAC equal to the angle RAH. But the arc BC is the meaſure of the angle BAC; conſequently, it is likewiſe the meaſure of the angle RAH.

Note, That the remaining arc on the quadrant DC is the meaſure of the angle RAZ, comprehended between the foreſaid right line RA and AZ which points to the zenith.

Let it now be required to meaſure the angle ACB (fig. 16.) in any plane, comprehended between the right lines AC and BC, drawn from two points A and B, to the place of ſtation C. Let the graphometer be placed at C, ſupported by its *fulcrum* (as was ſhown above); and let the immoveable ſights on the ſide of the inſtrument DE be directed towards the point A; and likewiſe (while the inſtrument remains immoveable) let the ſights of the ruler FG (which is moveable about the centre C) be directed to the point B. It is evident that the moveable ruler cuts off an arc DH, which is the meaſure of the angle ACB ſought.

Moreover, by the ſame method, the inclination of CE, or of FG, may be obſerved with the meridian line, which is pointed out by the magnetic needle incloſed in the box, and is moveable about the centre of the inſtrument, and the meaſure of this inclination or angle found in degrees.

PROPOSITION XIII.

Fig. 17. *To meaſure an acceſſible height by the geometrical quadrant.*—By the 12th prop. of this Part, let the angle C be found by means of the quadrant. Then in the triangle ABC, right-angled at B, (BC being ſuppoſed the horizontal diſtance of the obſervator from the tower), having the angle at C, and the ſide BC, the required height BA will be found by the 3d caſe of plain trigonometry. See Trigonometry.

PROPOSITION XIV.

Fig. 18. *To meaſure an inacceſſible height by the geometrical quadrant.*—Let the angle ACB be obſerved with the quadrant (by the 12th prop. of this Part); then let the obſerver go from C to the ſecond ſtation D, in the right line BCD (provided BCD be a horizontal plane); and after meaſuring this diſtance CD, take the angle ADC likewiſe with the quadrant. Then, in the triangle ACD, there is given the angle ADC, with the angle ACD; becauſ ACB was given before: therefore (by art. 59. of Part I.) the remaining angle CAD is given likewiſe. But the ſide CD is likewiſe given, being the diſtance of the ſtation C and D; therefore (by the firſt caſe of oblique-angled triangles in trigonometry) the ſide AC will be found. Wherefore, in the right-angled triangle ABC, all the angles and the hypothenuſe AC are given; conſequently, by the fourth caſe of trigonometry, the height ſought AB will be found; as alſo (if you pleaſe) the diſtance of the ſtation C, from AB the perpendicular within the hill or inacceſſible height.

PROPOSITION XV.

Fig. 19. *From the top of a given height, to meaſure the diſtance* BC.—Let the angle BAC be obſerved by the 12th prop. of this; wherefore in the triangle ABC, right-angled at B, there is given by obſervation the angle at A; whence (by the 59th art. of Part I.) there will alſo be given the angle BCA: moreover the ſide AB (being the height of the tower) is ſuppoſed to be given. Wherefore, by the 3d caſe of trigonometry, BC, the diſtance ſought, will be found.

PROPOSITION XVI.

Fig. 20. *To meaſure the diſtance of two places* A *and* B, *of which one is acceſſible, by the graphometer.*—Let there be erected at two points A and C, ſufficiently diſtant, two viſible ſigns; then (by the 12th prop. of this Part) let the two angles BAC, BCA, be taken by the graphometer. Let the diſtance of the ſtations A and C be meaſured with a chain. Then the third angle B being known, and the ſide AC being likewiſe known; therefore, by the firſt caſe of trigonometry, the diſtance required, AB will be found.

PROPOSITION XVII.

Fig. 21. *To meaſure by the graphometer, the diſtance of two places, neither of which is acceſſible.*—Let two ſtations C and D be choſen, from each of which the places may be ſeen whoſe diſtance is ſought; let the angles ACD, ACB, BCD, and likewiſe the angles BDC, BDA, CDA, be meaſured by the graphometer; let the diſtance of the ſtations C and D be meaſured by a chain, or (if it be neceſſary) by the preceding practice. Now, in the triangle ACD, there are given two angles ACD and ADC; therefore, the third CAD is likewiſe given; moreover the ſide CD is given; therefore, by the firſt caſe of trigonometry, the ſide AD will be found. After the ſame manner, in the triangle BCD, from all the angles and one ſide CD given, the ſide BD is found. Wherefore, in the triangle ADB, from the given ſides DA and DB, and the angle ADB contained by them, the ſide AB (the diſtance ſought) is found by the 4th caſe of trigonometry of oblique-angled triangles.

PROPOSITION XVIII.

Fig. 22. *It is required by the graphometer and quadrant, to meaſure an acceſſible height* AB, *placed ſo on a ſteep, that one can neither go near it in an horizontal plane, nor recede from it, as we ſuppoſed in the ſolution of the 14th prop.*—Let there be choſen any ſituation as C, and another D; where let ſome mark be erected: let the angles ACD and ADC be found by the graphometer; then the third angle DAC will be known. Let the ſide CD, the diſtance of the ſtations, be meaſured with a chain, and thence (by trigon.) the ſide AC will be found. Again, in the triangle ACB, right-angled at B, having found by the quadrant the angle ACB, the other angle CAB is known likewiſe: but the ſide AC in the triangle ADC is already known; therefore the height required AB will be found by the 4th caſe of right-angled triangles. If the height of the tower is wanted, the angle BCF will be found by the quadrant; which being taken from the angle ACB already known, the angle ACF will remain: but the angle FAC was known before; therefore the remaining angle AFC will be known. But the ſide AC was alſo known before; therefore, in the triangle AFC, all the angles and one of the ſides AC being known, AF, the height of the tower above the hill, will be found by trigonometry.

SCHOLIUM.

It were eaſy to add many other methods of meaſuring heights and diſtances; but, if what is above be underſtood, it will be eaſy (eſpecially for one that is verſed in the elements) to contrive methods for this purpoſe, according to the occaſion: ſo that there is no need of adding any more of this ſort. We ſhall ſubjoin here a method by which the diameter of the earth may be found out.

PROPOSITION XIX.

Geometry Plate, nº IV.

Fig. 1. *To find the diameter of the earth from one obſervation.*—Let there be choſen a high hill AB, near the ſea-ſhore, and let the obſervator on the top of it, with an exact quadrant divided into minutes and ſeconds by tranſverſe diviſions, and fitted with a teleſcope in place of the common ſights, meaſure the angle ABE contained under the right line AB, which goes to the centre, and the right line BE drawn to the ſea, a tangent to the globe at E; let there be drawn from A perpendicular to BD, the line AF meeting BE in F. Now in the right-angled triangle BAF all the angles are given, alſo the ſide AB, the height of the hill; which is to be found by ſome of the foregoing methods, as exactly as poſſible; and (by trigonometry) the ſides BF and AF are found. But, by cor. 36th 3.

3. Eucl. AF is equal to FE; therefore BE will be known. Moreover, by 36th 3. Eucl. the rectangle under BA and BD is equal to the ſquare of BE. And thence by 17th 6. Eucl. as AB : BE : : BE : BD. Therefore, ſince AB and BE are already given, BD will be found by 11th 6. Eucl. or by the rule of three; and ſubtracting BA, there will remain AD the diameter of the earth ſought.

SCHOLIUM.

Many other methods might be propoſed for meaſuring the diameter of the earth. The moſt exact is that propoſed by Mr Picart of the academy of ſciences at Paris.

“According to Mr Picart, a degree of the meridian at the latitude of 49° 21', was 57,060 French toiſes, each of which contains ſix feet of the ſame meaſure: from which it follows, that, if the earth be an exact ſphere, the circumference of a great circle of it will be 123,249,600 Paris feet, and the ſemidiameter of the earth 19,615,800 feet: but the French mathematicians, who of late have examined Mr Picart's operations, aſſure us, that the degree in that latitude is 57,183 toiſes. They meaſured a degree in Lapland, in the latitude of 66° 20', and found it of 57,438 toiſes. By comparing theſe degrees, as well as by the obſervations on pendulums, and the theory of gravity, it appears that the earth is an oblate ſpheroid; and (ſuppoſing thoſe degrees to be accurately meaſured) the axis or diameter that paſſes through the poles will be to the diameter of the equator, as 177 to 178, or the earth will be 22 miles higher at the equator than at the poles. A degree has likewiſe been meaſured at the equator, and found to be conſiderably leſs than at the latitude of Paris; which confirms the oblate figure of the earth. But an account of this laſt menſuration has not been publiſhed as yet. If the earth was of an uniform denſity from the ſurface to the centre, then, according to the theory of gravity, the meridian would be an exact ellipſis, and the axis would be to the diameter of the equator as 230 to 231; and the difference of the ſemidiameter of the equator and ſemiaxis about 17 miles.”

In what follows, a figure is often to be laid down on paper, like to another figure given; and becauſe this likeneſs conſiſts in the equality of their angles, and in the ſides having the ſame proportion to each other (by the definitions of the 6th of Eucl.) we are now to ſhew what methods practical geometricians uſe for making on paper an angle equal to a given angle, and how they conſtitute the ſides in the ſame proportion. For this purpoſe they make uſe of a protractor, (or, when it is wanting, a line of chords), and of a line of equal parts.

PROPOSITION XX.

FIG. 2. 3. 4. 5. and 6. *To deſcribe the conſtruction and uſe of the protractor, of the line of chords, and of the line of equal parts.* The protractor is a ſmall ſemicircle of braſs, or ſuch ſolid matter. The ſemicircumference is divided into 180 degrees. The uſe of it is, to draw angles on any plane, as on paper, or to examine the extent of angles already laid down. For this laſt purpoſe, let the ſmall point in the centre of the protractor be placed above the angular point, and let the ſide AB coincide with one of the ſides that contain the angle propoſed; the number of degrees cut off by the other ſide, computing on the protractor from B, will ſhow the quantity of the angle that is to be meaſured.

But if an angle is to be made of a given quantity on a given line, and at a given point of that line, let AB coincide with the given line, and let the centre A of the inſtrument be applied to that point. Then let there be a mark made at the given number of degrees; and a right line drawn from that mark to the given point, will conſtitute an angle with the given right line of the quantity required; as is manifeſt.

This is the moſt natural and eaſy method, either for examining the extent of an angle on paper, or for deſcribing on paper an angle of a given quantity.

But when there is ſcarcity of inſtruments, or becauſe a line of chords is more eaſily carried about, (being deſcribed on a ruler on which there are many other lines beſides), practical geometricians frequently make uſe of it. It is made thus: let the quadrant of a circle be divided into 90 degrees; (as in fig. 4.) The line AB is the chord of 90 degrees; the chord of every arc of the quadrant is transferred to this line AB, which is always marked with the number of degrees in the correſponding arc.

Note, that the chord of 60 degrees is equal to the radius, by corol. 15. 4th Eucl. If now a given angle EDF is to be meaſured by the line of chords from the centre D, with the diſtance DG, (the chord of 60 degrees), deſcribe the arch GF; and let the points G and F be marked where this arch interſects the ſides of the angle. Then if the diſtance GF, applied on the line of chords from A to B, gives (for example) 25 degrees, this ſhall be the meaſure of the angle propoſed.

When an obtuſe angle is to be meaſured with this line, let its complement to a ſemicircle be meaſured, and thence it will be known. It were eaſy to transfer to the diameter of a circle the chords of all arches to the extent of a ſemicircle; but ſuch are rarely found marked upon rules.

But now, if an angle of a given quantity, ſuppoſe of 50 degrees, is to be made at a given point M of the right line KL (fig. 6.) From the centre M, and the diſtance MN, equal to the chord of 60 degrees, deſcribe the arc QN. Take off an arc NR, whoſe chord is equal to that of 50 degrees on the line of chords; join the points M and R; and it is plain that MR ſhall contain an angle of 50 degrees with the line KL propoſed.

But ſometimes we cannot produce the ſides, till they be of the length of a chord of 60 degrees on our ſcale; in which caſe it is fit to work by a circle of proportions (that is a ſector), by which an arc may be made of a given number of degrees to any radius.

The quantities of angles are likewiſe determined by other lines uſually marked upon rules, as the lines of ſines, tangents, and ſecants; but, as theſe methods are not ſo eaſy or ſo proper in this place, we omit them.

To delineate figures ſimilar or like to others given, beſides the equality of the angles, the ſame proportion is to be preſerved among the ſides of the figure that is to be delineated, as is among the ſides of the figures given. For which purpoſe, on the rules uſed by artiſts, there is a line divided into equal parts, more or leſs in number, and greater or leſſer in quantity, according to the pleaſure of the maker.

A foot is divided into inches; and an inch, by means of tranſverſe lines, into 100 equal parts; ſo that with this ſcale, any number of inches, below 12, with any part of an inch, can be taken by the compaſſes, providing ſuch part be greater than the one 100th part of an inch. And this exactneſs is very neceſſary in delineating the plans of houſes, and in other caſes.

PROPOSITION XXI.

FIG. 7. *To lay down on paper, by the protractor or line of chords, and line of equal parts, a right-lined figure like to one given, providing the angles and ſides of the figure given be known by obſervation or menſuration.* For example, ſuppoſe that it is known that in a quadrangular figure, one ſide is of 235 feet, that the angle contained by it and the ſecond ſide is of 84°, the ſecond ſide of 288 feet, the angle contained by it and the third ſide of 72°, and that the third ſide is 294 feet. Theſe things being given, a figure is to be drawn on paper like to this quadrangular figure. On your paper at a proper point A, let a right line be drawn, upon which take 235 equal parts, as AB. The part repreſenting a foot is taken greater or leſſer, according as you would have your figure greater or leſs. In the adjoining figure, the 100th part of an inch is taken for a foot. And accordingly an inch divided into 100 parts, and annexed to the figure, is called a ſcale of 100 feet. Let there be made at the point B (by the preceding propoſition) an angle ABC of 85°, and let BC be taken of 288 parts like to the former. Then let the angle BCD be made of 72°, and the ſide CD of 294 equal parts. Then let the ſide AD be drawn; and it will compleat the figure like to the given. The meaſures of the angle A and D can be known by the protractor or line of chords, and the ſide AD by the line of equal parts; which will exactly anſwer to the correſponding angles and to the ſide of the primary figure.

After the very ſame manner, from the ſides and angles given, which bound any right-lined figure, a figure like to it may be drawn, and the reſt of its ſides and angles be known.

COROLLARY.

Hence any trigonometrical problem in right-lined triangles, may be reſolved by delineating the triangle from what is given concerning it, as in this propoſition. The unknown ſides are examined by a line of equal parts, and the angles by a protractor or line of chords.

PROPOSITION XXII.

The diameter of a circle being given, to find its circumference nearly.—The periphery of any polygon inſcribed in the circle is leſs than the circumference, and the periphery of any polygon deſcribed about a circle is greater than the circumference. Whence Archimedes firſt diſcoved that the diameter was in proportion to the circumference, as 7 to 22 nearly; which ſerves for common uſe. But the moderns have computed the proportion of the diameter to the circumference to greater exactneſs. Suppoſing the diameter 100, the periphery will be more than 314, but leſs than 315. The diameter is more nearly to the circumference, as 113 to 355. But Ludolphus van Cuelen exceeded the labours of all; for by immenſe ſtudy he found, that, ſuppoſing the diameter
100,000,000,000,000,000,000,000,000,000,000,
the periphery will be leſs than
314,159,265,358,979,323,846,264,338,327,951,
but greater than
314,159,265,358,979,323,846,264,338,327,950;
whence it will be eaſy, any part of the circumference being given in degrees and minutes, to aſſign it in parts of the diameter.

Of Surveying and Meaſuring of LAND.

HITHERTO we have treated of the meaſuring of angles and ſides, whence it is abundantly eaſy to lay down a field, a plane, or an entire country: for to this nothing is requſite but the protraction of triangles, and of other plain figures, after having meaſured their ſides and angles. But as this is eſteemed an important part of practical geometry, we ſhall ſubjoin here an account of it with all poſſible brevity; ſuggeſting withal, that a ſurveyor will improve himſelf more by one day's practice, than by a great deal of reading.

PROPOSITION XXIII.

To explain what ſurveying is, and what inſtruments Surveyors uſe.—Firſt, it is neceſſary that the ſurveyor view the field that is to be meaſured, and inveſtigate its ſides and angles, by means of an iron chain (having a particular mark at each foot of length, or at any number of feet, as may be moſt convenient for reducing lines or ſurfaces to the received meaſures), and the graphometer deſcred above. Secondly, It is neceſſary to delineate the field *in plano*, or to form a map of it; that is, to lay down on paper a figure ſimilar to the field; which is done by the protractor (or line of chords) and of the line of equal parts. Thirdly, It is neceſſary to find out the area of the field ſo ſurveyed and repreſented by a map. Of this laſt we are to treat below.

The ſides and angles of ſmall fields are ſurveyed by the help of a plain table: which is generally of an oblong rectangular figure, and ſupported by a *fulcrum*, ſo as to turn every way by means of a ball and ſocket. It has a moveable frame, which ſurrounds the board, and ſerves to keep a clean paper put on the board cloſe and tight to it. The ſides of the frame facing the paper are divided into equal parts every way. The board hath beſides a box with a magnetic needle, and moreover a large index with two ſights. On the edge of the frame of the board are marked degrees and minutes, ſo as to ſupply the room of a graphometer.

PROPOSITION XXIV.

FIG. 8. *To delineate a field by the help of a plain-table, from one ſtation whence all its angles may be ſeen and their diſtances meaſured by a chain.*—Let the field that is to be laid down be ABCDE. At any convenient place F, let the plain-table be erected; cover it with clean paper, in which let ſome point near the middle repreſent the ſtation. Then applying at this place the index with the ſights, direct it ſo as that through the ſights ſome mark may be ſeen at one of the angles, ſuppoſe A; and from the point F, repreſenting the ſtation, draw a faint right line along the ſide of the index: then, by the help of the chain, let FA the diſtance of the ſtation from the foreſaid angle be meaſured. Then taking what part you think convenient for a foot or pace from the line of equal parts, ſet off on the faint line the parts correſponding to the line FA that was meaſured; and let there be a mark made repreſenting the angle of the field A. Keeping the table immoveable, the ſame is to be done with the reſt of the angles; then right lines joining thoſe marks ſhall include a figure like to the field, as is evident from 5, 6. Eucl.

COROLLARY.

The ſame thing is done in like manner by the graphometer: for having obſerved in each of the triangles, AFB, BFC, CFD, *&c.* the angle at the ſtation F, and having meaſured the lines from the ſtation to the angles of the field, let ſimiliar triangles be protracted on paper (by the 21. prop. of this) having their common vertex in the point of ſtation. All the lines, excepting thoſe which repreſent the ſides of the field, are to be drawn faint or obſcure.

Note 1. When a ſurveyor wants to lay down a field let him place diſtinctly in a regiſter all the obſervations of the angles, and the meaſures of the ſides, until, at time and place convenient, he draw out the figure on paper.

Note 2. The obſervations made by the help of the graphometer are to be examined: for all the angles about the point F ought to be equal to four right ones. (by cor. 2. art. 30. of Part I.)

PROPOSITION XXV.

Fig. 9. *To lay down a field by means of two ſtations, from each of which all the angles can be ſeen, by meaſuring only the diſtance of the ſtations.*—Let the inſtrument be placed at the ſtation F: and having choſen a point repreſenting it upon the paper which is laid upon the plain table, let the index be applied at this point, ſo as to be moveable about it. Then let it be directed ſucceſſively to the ſeveral angles of the field: and when any angle is ſeen through the ſights, draw an obſcure line along the ſide of the index. Let the index, with the ſights, be directed after the ſame manner to the ſtation G: on the obſcure line drawn along its ſide, pointing to A, ſet off from the ſcale of equal parts a line correſponding to the meaſured diſtance of the ſtations, and this will determine the point G. Then remove the inſtrument to the ſtation G, and applying the index to the line repreſenting the diſtance of the ſtations, place the inſtrument ſo that the firſt ſtation may be ſeen through the ſights. Then the inſtrument remaining immoveable, let the index be applied at the point repreſenting the ſecond ſtation G, and be ſucceſſively directed by means of its ſights, to all the angles of the field, drawing (as before) obſcure lines: and the interſection of the two obſcure lines that were drawn to the ſame angle from the two ſtations will always repreſent that angle on the plan. Care muſt be taken that thoſe lines be not miſtaken for one another. Lines joining thoſe interſections will form a figure on the paper like to the field.

SCHOLIUM.

It will not be difficult to do the ſame by the graphometer, if you keep a diſtinct account of your obſervations of the angles made by the line joining the ſtations, and the lines drawn from the ſtations to the reſpective angles of the field. And this is the moſt common manner of laying down whole countries. The tops of two mountains are taken for two ſtations, and their diſtance is either meaſured by ſome of the methods mentioned above, or is taken according to common repute. The ſights are ſucceſſively directed towards cities, churches, villages, forts, lakes, turnings of rivers, woods, &c.

Note, The diſtance of the ſtations ought to be great enough, with reſpect to the field that is to be meaſured; ſuch ought to be choſen as are not in a line with any angle of the field. And care ought to be taken likewiſe that the angles, for example, FAG, FDG, &c. be neither very acute, nor very obtuſe. Such angles are to be avoided as much as poſſible; and this admonition is found very uſeful in practice.

PROPOSITION XXVI.

Fig. 10. *To lay down any field, however irregular its figure may be, by the help of the graphometer.*—Let ABCEDHG be ſuch a field. Let its angles (in going round it) be obſerved with a graphometer (by the 12. of this) and noted down; let its ſides be meaſured with a chain; and (by what was ſaid on the 21. of this) let a figure like to the given field be protracted on paper. If any mountain is in the circumference, the horizontal line hid under it is to be taken for a ſide, which may be found by two or three obſervations according to ſome of the methods deſcribed above; and its place on the map is to be diſtinguiſhed by a ſhade, that it may be known a mountain is there.

If not only the circumference of the field is to be laid down on the plan, but alſo its contents, as villages, gardens, churches, public roads, we muſt proceed in this manner.

Let there be (for example) a church F, to be laid down in the plan. Let the angles ABF BAF be obſerved and protracted on paper in their proper places, the interſection of the two ſides BF and AF will give the place of the church on the paper: or, more exactly, the lines BF AF being meaſured, let circles be deſcribed from the centres B and A, with parts from the ſcale correſponding to the diſtances BF and AF, and the place of the church will be at their interſection.

Note 1. While the angles obſerved by the graphometer are taken down, you muſt be careful to diſtinguiſh the external angles, as E and G, that they may be rightly protracted afterwards on paper.

Note 2. Our obſervations of the angles may be examined by computing if all the internal angles make twice as many right angles, four excepted, as there are ſides of the figure: (for this is demonſtrated by 32. 1. Eucl.) But in place of any external angle DEC, its complement to a circle is to be taken.

PROPOSITION XXVII.

Fig. 11. *To lay down a plain field without inſtruments.*—If a ſmall field is to be meaſured, and a map of it to be made, and you are not provided with inſtruments; let it be ſuppoſed to be divided into triangles, by right-lines, as in the figure; and after meaſuring the three ſides of any of the triangles, for example of ABC, let its ſides be laid down from a convenient ſcale on paper, (by the 22. of this.) Again, let the other two ſides BD CD of the triangle CBD be meaſured and protracted on the paper by the ſame

ſcale as before. In the ſame manner proceed with the reſt of the triangles of which the field is compoſed, and the map of the field will be perfected; for the three ſides of a triangle determine the triangle; whence each triangle on the paper is ſimilar to its correſpondent triangle in the field, and is ſimilarly ſituated; conſequently the whole figure is like to the whole field.

SCHOLIUM.

If the field be ſmall, and all its angles may be ſeen from one ſtation, it may be very well laid down by the plain-table, (by the 24. of this.) If the field be larger, and have the requiſite conditions, and great exactneſs is not expected, it likewiſe may be plotted by means of the plain-table, or by the graphometer, (according to the 25. of this;) but in fields that are irregular and mountainous, when an exact map is required, we are to make uſe of the graphometer, (as in the 26. of this,) but rarely of the plain-table.

Having protracted the bounding lines, the particular parts contained within them may be laid down by the proper operations for this purpoſe, (delivered in the 26th propoſition; and the method deſcribed in the 27th propoſition may be ſometimes of ſervice;) for we may truſt more to the meaſuring of ſides, than to the obſerving of angles. We are not to compute four-ſided and many ſided figures till they are reſolved into triangles: for the ſides do not determine thoſe figures.

In the laying down of cities, or the like, we may make uſe of any of the methods deſcribed above that may be moſt convenient.

The map being finiſhed, it is transferred on clean paper, by putting the firſt ſketch above it, and marking the angles by the point of a ſmall needle. Theſe points being joined by right lines, and the whole illuminated by colours proper to each part, and the figure of the mariner's compaſs being added to diſtinguiſh the north and ſouth, with a ſcale on the margin, the map or plan will be finiſhed and neat.

We have thus briefly and plainly treated of ſurveying, and ſhown by what inſtruments it is performed; having avoided thoſe methods which depend on the magnetic needle, not only becauſe its direction may vary in different places of a field (the contrary of this at leaſt doth not appear,) but becauſe the quantity of an angle obſerved by it cannot be exactly known; for an error of two or three degrees can ſcarcely be avoided in taking angles by it.

As for the remaining part of ſurveying, whereby the area of a field already laid down on paper is found in acres, roods, or any other ſuperficial meaſures; this we leave to the following ſection, which treats of the menſuration of ſurfaces.

“ Beſides the inſtruments deſcribed above, a ſurveyor ought to be provided with an off-ſet ſtaff equal in length to 10 links of the chain, and divided into 10 equal parts. He ought likewiſe to have 10 arrows or ſmall ſtraight ſticks near two feet long, ſhod with iron ferrils. When the chain is firſt opened, it ought to be examined by the off-ſet ſtaff. In meaſuring any line, the leader of the chain is to have the 10 arrows at firſt ſetting out. When the chain is ſtretched in the line, and the near end touches the place from which you meaſure, the leader ſticks one of the 10 arrows in the ground, at the far end of the chain. Then the leader leaving the arrow, proceeds with the chain another length; and the chain being ſtretched in the line, ſo that the near end touches the firſt arrow, the leader ſticks down another arrow at his end of the chain. The line is preſerved ſtraight, if the arrows be always ſet ſo as to be in a right line with the place you meaſure from, and that to which you are going. In this manner they proceed till the leader have no more arrows. At the eleventh chain, the arrows are to be carried to him again, and he is to ſtick one of them into the ground, at the end of the chain. And the ſame is to be done at the 21. 31. 41. &c. chains, if there are ſo many in a right line to be meaſured. In this manner you can hardly commit an error in numbering the chains, unleſs of 10 chains at once.

“ The off-ſet ſtaff ſerves for meaſuring readily the diſtances of any things proper to be repreſented in your plan, from the ſtation-line while you go along. Theſe diſtances ought to be entered into your field-book, with the correſponding diſtances from the laſt ſtation, and proper remarks, that you may be enabled to plot them juſtly, and be in no danger of miſtaking one for another when you extend your plan. The field-book may be conveniently divided into five columns. In the middle column the angles at the ſeveral ſtations taken by the theodolite are to be entered, with the diſtances from the ſtations. The diſtances taken by the off-ſet ſtaff, on either ſide of the ſtation-line, are to be entered into columns on either ſide of the middle column, according to their poſition with reſpect to that line. The names and characters of the objects, with proper remarks, may be entered in columns on either ſide of theſe laſt.

“ Becauſe, in the place of the graphometer deſcribed by our author, ſurveyors now make uſe of the theodolite, we ſhall ſubjoin a deſcription of Mr Siſſon's lateſt improved theodolite from Mr Gardner's practical ſurveying improved. See a figure of it in the IVth Plate.

“ In this inſtrument, the three ſtaffs, by braſs ferrils at top, ſcrew into bell-metal joints, that are moveable between braſs pillars, fixed in a ſtrong braſs plate; in which, round the centre, is fixed a ſocket with a ball moveable in it, and upon which the four ſcrews preſs, that ſet the limb horizontal: Next above is another ſuch plate, through which the ſaid ſcrews paſs, and on which, round the centre, is fixed a fruſtum of a cone of bell-metal, whoſe axis (being connected with the centre of the bell) is always perpendicular to the limb, by means of a conical braſs ferril fitted to it, whereon is fixed the compaſs-box; and on it the limb, which is a ſtrong bell-metal ring, whereon are moveable three braſs indexes; in whoſe plate are fixed four braſs pillars, that, joining at top, hold the centre pin of the bell-metal double ſextant, whoſe double index is fixed on the centre of the ſame plate: Within the double ſextant is fixed the ſpirit-level, “and over it the teleſcope.

“The compaſs-box is graved with two diamonds for north and ſouth, and with 20 degrees on both ſides of each, that the needle may be ſet to the variation, and its error alſo known.

“The limb has two *fleurs de luce* againſt the diamonds in the box, inſtead of 180 each, and is curiouſly divided into whole degrees, and numbered to the left hand at every 10 to twice 180, having three indexes diſtant 120, (with Nonius's diviſions on each for the decimals of a degree,) that are moved by a pinion fixed below one of them, without moving the limb; and in another is a ſcrew and ſpring under, to fix it to any part of the limb. It has alſo diviſions numbered, for taking the quarter girt in inches of round timber at the middle height, when ſtanding 10 feet horizontally diſtant from its centre; which at 20 muſt be doubled, and at 30 tripled; to which a ſhorter index is uſed, having Nonius's diviſions for the decimals of an inch; but an abatement muſt be made for the bark, if not taken off.

“The double ſextant is divided on one ſide from under its centre (when the ſpirit-tube and teleſcope are level) to above 60 degrees each way, and numbered at 10, 20, *&c.* and the double index (through which it is moveable) ſhews on the ſame ſide the degree and decimal of any altitude or depreſſion to that extent by Nonius's diviſions: On the other ſide are diviſions numbered, for taking the upright height of timber, *&c.* in feet, when diſtant 10 feet; which at 20 muſt be doubled, and at 30 tripled; and alſo the quantities for reducing hypothenuſal lines to horizontal. It is moveable by a pinion fixed in the double index.

“The teleſcope is a little ſhorter than the diameter of the limb, that a fall may not hurt it; yet it will magnify as much, and ſhew a diſtant object as perfect, as moſt of triple its length. In its focus are very fine croſs wires, whoſe interſection is in the plane of the double ſextant; and this was a whole circle, and turned in a lathe to a true plane, and is fixed at right angles to the limb; ſo that, whenever the limb is ſet horizontal, (which is readily done by making the ſpirit-tube level over two ſcrews, and the like over the other two,) the double ſextant and teleſcope are moveable in a vertical plane; and then every angle taken on the limb (though the teleſcope be never ſo much elevated or depreſſed) will be an angle in the plane of the horizon. And this is abſolutely neceſſary in plotting a horizontal plane.

“If the lands to be plotted are hilly, and not in any one plane, the lines meaſured cannot be truly laid down on paper, without being reduced to one plane, which muſt be the horizontal, becauſe angles are taken in that plane.—

“In viewing your objects, if they have much altitude or depreſſion, either write down the degree and decimal ſhewn on the double ſextant, or the links ſhewn on the back ſide; which laſt ſubtracted from every chain in the ſtation-line, leaves the length in the horizontal plane. But if the degree is taken, the following table will ſhew the quantity.

A Table of the links to be ſubtracted out of every chain in hypothenuſal lines of ſeveral degrees altitude, or depreſſion, for reducing them to horizontal.

Degrees.	*Links.*	*Degrees.*	*Links.*	*Degrees.*	*Links.*
4,05	¼	14,07	3	23,074	8
5,73	½	16,26	4	24,495	9
7,02	¾	18,195	5	25,84	10
8,11	1	19,95	6	27,13	11
11,48	2	21,565	7	28,36	12

“Let the firſt ſtation line really meaſure 1107 links, and the angle of altitude or depreſſion be 19°, 95; looking in the table you will find againſt 19°, 95, is 6 links. Now 6 times 11 is 66, which ſubtracted from 1107, leaves 1041, the true length to be laid down in the plan.

“It is uſeful in ſurveying, to take the angles, which the bounding lines form, with the magnetic needle, in order to check the angles of the figure, and to plot them conveniently afterwards.”

Of the Surfaces of Bodies.

THE ſmalleſt ſuperficial meaſure with us is a ſquare inch; 144 of which make a ſquare foot. Wrights make uſe of theſe in the meaſuring of deals and planks; but the ſquare foot which the glaziers uſe in meaſuring of glaſs, conſiſts only of 64 ſquare inches. The other meaſures are, firſt, the ell ſquare; ſecondly, the fall, containing 36 ſquare ells; thirdly, the rood, containing 40 falls; fourthly, the acre, containing 4 roods. Slaters, maſons, and pavers, uſe the ell ſquare and the fall; ſurveyors of land uſe the ſquare ell, the fall, the rood, and the acre.

The ſuperficial meaſures of the Engliſh are, firſt, the ſquare foot; ſecondly, the ſquare yard, containing 9 ſquare feet, for their yard contains only 3 feet; thirdly, the pole, containing 30¼ ſquare yards; fourthly, the rood, containing 40 poles; fifthly, the acre, containing 4 roods. And hence it is eaſy to reduce our ſuperficial meaſures to the Engliſh, or theirs to ours.

“In order to find the content of a field, it is moſt convenient to meaſure the lines by the chains deſcribed above, p. 9. that of 22 yards for computing the Engliſh acres, and that of 24 Scots ells for the acres of Scotland. The chain is divided into 100 links, and the ſquare of the chain is 10,000 ſquare links; 10 ſquares of the chain, or 100,000 ſquare links, give an acre. Therefore, if the area be expreſſed by ſquare links, divide by 100,000, or cut off five decimal places, and the quotient ſhall give the area in acres and decimals of an acre. Write the entire acres apart; but multiply the decimals of an acre by 4, and the product ſhall give the remainder of the area in roods and decimals of a rood. Let the entire roods be noted apart after the acres; then multiply the decimals of a rood by 40, and the product ſhall give the remainder of the area in falls or poles. Let the entire falls or poles be then writ after the roods, and multiply the decimals of a fall by 36, if the area is required in the meaſures of Scotland; but multiply the decimals of a pole by 30¼, if the area is required in the meaſures of England, and the product ſhall give the remainder of the area in ſquare ells in the former caſe, but in ſquare yards in the latter. If, in the former caſe, you would reduce the decimals of the ſquare ell to ſquare feet, multiply them by 9.50694; but, in the latter caſe, the decimals of the Engliſh ſquare yard are reduced to ſquare feet, by multiplying them by 9.

"Suppoſe, for example, that the area appears to contain 12.65842 ſquare links of the chain of 24 ells; and that this area is to be expreſſed in acres, roods, falls, *&c.* of the meaſures of Scotland. Divide the ſquare links by 100,000, and the quotient 12.65842 ſhows the area to contain 12 acres $\frac{65842}{100000}$ of an acre. Multiply the decimal part by 4, and the product 2.63368 gives the remainder in roods and decimals of a rood. Thoſe decimals of the rood being multiplied by 40, the product gives 25.3472 falls. Multiply the decimals of the fall by 36, and the product gives 12.4992 ſquare ells. The decimals of the ſquare ell multiplied by 9.50994 give 4.7458 ſquare feet. Therefore the area propoſed amounts to 12 acres, 2 roods, 25 falls, 12 ſquare ells, and $4\frac{7458}{10000}$ ſquare feet.

"But if the area contains the ſame number of ſquare links of Gunter's chain, and is to be expreſſed by Engliſh meaſures, the acres and roods are computed in the ſame manner as in the former caſe. The poles are computed as the falls. But the decimals of the pole, *viz.* $\frac{3472}{10000}$, are to be multiplied by $30\frac{1}{4}$ (or 30.25), and the product gives 10.5028 ſquare yards. The decimals of the ſquare yard, multiplied by 9, give 4.5252 ſquare feet; therefore, in this caſe, the area is in Engliſh meaſure 12 acres, 2 roods, 25 poles, 10 ſquare yards, and $4\frac{5252}{10000}$ ſquare feet.

"The Scots acre is to the Engliſh acre, by ſtatute, as 100,000 to 78,694, if we have regard to the difference betwixt the Scots and Engliſh foot above mentioned. But it is cuſtomary in ſome parts of England to have 18,21, *&c.* feet to a pole, and 160 ſuch poles to an acre; whereas, by the ſtatute, $16\frac{1}{2}$ feet make a pole. In ſuch caſes the acre is greater in the duplicate ratio of the number of feet to a pole.

"They who meaſure land in Scotland by an ell of 37 Engliſh inches, make the acre leſs than the true Scots acre by $593\frac{6}{10}$ ſquare Engliſh feet, or by about $\frac{1}{93}$ of the acre.

"An huſband-land contains 6 acres of ſock and ſythe-land, that is, of land that may be tilled with a plough, and mown with a ſythe; 13 acres of arable land make an oxgang or oxengate; four oxengate make a pound-land of old extent (by a decree of the Exchequer, March 11. 1585), and is called *librata terræ*. A forty-ſhilling land of old extent contains eight oxgang, or 104 acres.

"The arpent, about Paris, contains 32400 ſquare Paris feet, and is equal to $2\frac{2}{3}$ Scots roods, or $3\frac{37}{100}$ Engliſh roods.

"The *actus quadratus*, according to Varro, Collumella, *&c.* was a ſquare of 120 Roman feet. The *jugerum* was the double of this. It is to the Scots acre as 10,000 to 20,456, and to the Engliſh acre as 10,000 to 16,097. It was divided (like the *as*) into 12 *unciæ*, and the *uncia* into 24 *ſcrupula*."—This, with the three preceding paragraphs, are taken from an ingenious manuſcript, written by Sir Robert Stewart profeſſor of natural philoſophy. The greateſt part of the table in p. 9, 10. was taken from it likewiſe.

PROPOSITION XXVIII.

FIG. 12. *To find out the area of a rectangular parallelogram* ABCD.—Let the ſide AB, for example, be 5 feet long, and BC (which conſtitutes with BA a right angle at B) be 17 feet. Let 17 be multiplied by 5, and the product 85 will be the number of ſquare feet in the area of the figure ABCD. But if the parallelogram propoſed is not rectangular as BEFC, its baſe BC multiplied into its perpendicular height AB (not into its ſide BE) will give its area. This is evident from art. 68. of Part I.

PROPOSITION XXIX.

FIG. 13. *To find the area of a given triangle.*—Let the triangle BAC be given, whoſe baſe BC is ſuppoſed 9 feet long: let the perpendicular AD be drawn from the angle A oppoſite to the baſe, and let us ſuppoſe AD to be 4 feet. Let the half of the perpendicular be multiplied into the baſe, or the half of the baſe into the perpendicular, or take the half of the product of the whole baſe into the perpendicular, the product gives 18 ſquare feet for the area of the given triangle.

But if only the ſides are given, the perpendicular is found either by protracting the triangle, or by 12th and 13th 2. Eucl. or by trigonometry. But how the area of a triangle may be found from the given ſides only, ſhall be ſhewn in the 31st propoſition.

PROPOSITION XXX.

FIG. 14. *To find the area of any rectilineal figure.*—If the figure be irregular, let it be reſolved into triangles; and drawing perpendiculars to the baſes in each of them, let the area of each triangle be found by the preceding propoſition, and the ſum of theſe areas will give the area of the figure.

SCHOLIUM 1.

In meaſuring boards, planks, and glaſs, their ſides are to be meaſured by a foot-rule divided into 100 equal parts; and after multiplying the ſides, the decimal fractions are eaſily reduced to leſſer denominations. The menſuration of theſe is eaſy, when they are rectangular parallelograms.

SCHOLIUM 2.

If a field is to be meaſured, let it firſt be plotted on paper, by ſome of the methods above deſcribed, and let the figure ſo laid down be divided into triangles, as was ſhown in the preceding propoſition.

The baſe of any triangle, or the perpendicular upon the baſe, or the diſtance of any two points of the field, is meaſured by applying it to the ſcale according to which the map is drawn.

SCHOLIUM 3.

But if the field given be not in a horizontal plane, but uneven and mountainous, the ſcale gives the horizontal line between any two points, but not their diſtance meaſured on the uneven ſurface of the field. And indeed it would appear, that the horizontal plane is to be accounted the area of an uneven and hilly country. For if ſuch ground is laid out for building on, or for planting with trees, or bearing corn, ſince theſe ſtand perpendicular to the horizon, it is plain, that a mountainous country cannot be conſidered as of greater extent for thoſe uſes than the horizontal plane; nay, perhaps, for nouriſhing of plants, the horizontal plane may be preferable.

If, however, the area of a figure, as it lies regularly on the ſurface of the earth, is to be meaſured, this may be eaſily done by reſolving it into triangles as it lies. The ſum of their areas will be the area ſought; which exceeds the area of the horizontal figure more or leſs, according as the field is more or leſs uneven.

PROPOSITION XXXI.

FIG. 13. *The ſides of a triangle being given, to find the area, without finding the perpendicular.*—Let all the ſides of the triangle be collected into one ſum; from the half of which let the ſides be ſeparately ſubtracted, that three differences may be found betwixt the foreſaid half ſum and each ſide; then let theſe three differences and the half ſum be multiplied into one another, and the ſquare root of the product will give the area of the triangle. For example, let the ſides be 10, 17, 21; the half of their ſum is 24; the three differences betwixt this half ſum and the three ſides, are 14, 7, and 3. The firſt being multiplied by the ſecond, and their product by the third, we have 294 for the product of the differences; which multiplied by the foreſaid half ſum 24, gives 7056; the ſquare root of which 84 is the area of the triangle. The demonſtration of this, for the ſake of brevity, we omit. It is to be found in ſeveral treatiſes, particularly in Clavius's Practical Geometry.

PROPOSITION XXXII.

FIG. 15. *The area of the ordinate figure* ABEFGH *in equal to the product of the half circumference of the polygon, multiplied into the perpendicular drawn from the centre of the circumſcribed circle to the ſide of the polygon.*—For the ordinate figure can be reſolved into as many equal triangles, as there are ſides of the figure; and ſince each triangle is equal to the product of half the baſe into the perpendicular, it is evident that the ſum of all the triangles together, that is the polygon, is equal to the product of half the ſum of the baſes (that is the half of the circumference of the polygon) into the common perpendicular height of the triangles drawn from the centre C to one of the ſides; for example, to AB.

PROPOSITION XXXIII.

FIG. 16. *The area of a circle is found by multiplying the half of the periphery into the radius, or the half of the radius into the periphery.*—For a circle is not different from an ordinate or regular polygon of an infinite number of ſides, and the common height of the triangles into which the polygon or circle may be ſuppoſed to be divided is the radius of the circle.

Were it worth while, it were eaſy to demonſtrate accurately this propoſition, by means of the inſcribed and circumſcribed figures, as is done in the 5th prop. of the treatiſe of Archimedes concerning the dimenſions of the circle.

COROLLARY.

Hence alſo it appears, that the area of the ſector ABCD is produced by multiplying the half of the arc into the radius, and likewiſe that the area of the ſegment of the circle ADC is found by ſubtracting from the area of the ſector the area of the triangle ABC.

PROPOSITION XXXIV.

FIG. 17. *The circle is to the ſquare of the diameter, as* 11 *to* 14 *nearly.*—For if the diameter AB be ſuppoſed to be 7, the circumference AHBK will be almoſt 22 (by the 22d prop. of this Part), and the area of the ſquare DC will be 49; and, by the preceding prop. the area of the circle will be $38\frac{1}{2}$: therefore the ſquare DC will be to the inſcribed circle as 49 to $38\frac{1}{2}$, or as 98 to 77, that is, as 14 to 11. *Q. E. D.*

If greater exactneſs is required, you may proceed to any degree of accuracy: for the ſquare DC is to the inſcribed circle, as 1 to $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\frac{1}{13}$, *&c. in infinitum.*

"This ſeries will be of no ſervice for computing the "area of the circle accurately, without ſome further "artifice, becauſe it converges at too ſlow a rate. "The area of the circle will be found exactly enough "for moſt purpoſes, by multiplying the ſquare of the "diameter by 7854, and dividing by 10,000, or cut"ting off four decimal places from the product; for "the area of the circle is to the circumſcribed ſquare "nearly as 7854 to 10,000."

PROPOSITION. XXXV.

FIG. 18. *To find the area of a given ellipſe.*—Let ABCD be an ellipſe, whoſe greater diameter is BD, and the leſſer AC, biſecting the greater perpendicularly in E. Let a mean proportional HF be found (by 13th 6. Eucl.) between AC and BD, and (by the 33d of this) find the area of the circle deſcribed on the diameter HF. This area is equal to the area of the ellipſe ABCD. For becauſe, as BD to AC, ſo the ſquare of BD to the ſquare of HF, (by 2. cor. 20th 6. Eucl.): but (by the 2d 12. Eucl.) as the ſquare of BD to the ſquare of HF, ſo is the circle of the diameter BD to the circle of the diameter HF: therefore as BD to AC, ſo is the circle of the diameter BD to the circle of the diameter HF. And (by the 5th prop. of Archimedes of ſpheroids) as the greater diameter BD to the leſſer AC, ſo is the circle of the diameter BD to the ellipſe ABCD. Conſequently (by the 11th 5. Eucl.) the circle of the diameter BD will have the ſame proportion to the circle of the diameter HF, and to the ellipſe ABCD. Therefore, (by 9th 5. Eucl.) the area of the circle of the diameter HF will be equal to the area of the ellipſe ABCD. *Q. E. D.*

SCHOLIUM.

From this and the two preceding propoſitions, a method is derived of finding the area of an ellipſe. There are two ways: 1st, Say, as one is to the leſſer diameter, ſo is the greater diameter to a fourth number, (which is found by the rule of three.) Then again ſay, as 14 to 11, ſo is the fourth number found to the area ſought. But the ſecond way is ſhorter. Multiply the leſſer diameter into the greater, and the product by 11; then divide the whole product by 14, and the quotient will be the area ſought of the ellipſe. For example, Let the greater diameter be 10, and the leſſer 7; by multiplying 10 by 7, the product is 70; and multiplying that by 11, it is 770; and dividing 770 by 14, the quotient will be 55, which is the area of the ellipſe ſought.

"The area of the ellipſe will be found more accu"rately, by multiplying the product of the two dia"meters by 7854."

We ſhall add no more about other plain ſurfaces, whether rectilinear or curvilinear, which ſeldom occur in practice; but ſhall ſubjoin ſome propoſitions about meaſuring the ſurfaces of ſolids.

PROPOSITION XXXVI.

To meaſure the ſurface of any priſm.—By the 14th definition of the 11th Eucl. a priſm is contained by planes, of which two oppoſite ſides (commonly called the baſes) are plain rectilineal figures; which are either regular and ordinate, and meaſured by prop. 32. of this; or however irregular, and then they are meaſured by the 28th prop. The other ſides are parallelograms, which are meaſured by prop. 28th; and the whole ſuperficies of the priſm conſiſts of the ſum of thoſe taken altogether.

PROPOSITION XXXVII.

To meaſure the ſuperficies of any pyramid.—Since its baſis is a rectilineal figure, and the reſt of the planes terminating in the top of the pyramid are triangles; theſe meaſured ſeparately, and added together, give the ſurface of the pyramid required.

PROPOSITION XXXVIII.

To meaſure the ſuperficies of any regular body.—Theſe bodies are called *regular*, which are bounded by equilateral and equiangular figures. The ſuperficies of the tetraedon conſiſts of four equal and equiangular triangles; the ſuperficies of the hexaedron, or cube, of ~~ſix equal ſquares~~; an octedron, of eight equal equilateral triangles; a dodecaedron, of twelve equal and ordinate pentagons; and the ſuperficies of an icoſiædron of twenty equal and equilateral triangles. Therefore it will be eaſy to meaſure theſe ſurfaces from what has been already ſhown.

In the ſame manner we may meaſure the ſuperficies of a ſolid contained by any planes.

PROPOSITION XXXIX.

Fig. 19. *To meaſure the ſuperficies of a cylinder.*—Becauſe a cylinder differs very little from a priſm, whoſe oppoſite planes (or baſes) are ordinate figures of an infinite number of ſides, it appears that the ſuperficies of a cylinder, without the baſes, is equal to an infinite number of parallelograms; the common altitude of all which is the ſame with the height of the cylinder, and the baſes of them all differ very little from the periphery of the circle which is the baſe of the cylinder. Therefore this periphery multiplied into the common height, gives the ſuperficies of the cylinder, excluding the baſes; which are to be meaſured ſeparately by the 33d propoſition.

This propoſition concerning the meaſure of the ſurface of the cylinder (excluding its baſis) is evident from this, that when it is conceived to be ſpread out, it becomes a parallelogram, whoſe baſe is the periphery of the circle of the baſe of the cylinder ſtretched into a right line, and whoſe height is the ſame with the height of the cylinder.

PROPOSITION XL.

Fig. 20. *To meaſure the ſurface of a right cone.*—The ſurface of a right cone is very little different from the ſurface of a right pyramid, having an ordinate polygon for its baſe of an infinite number of ſides; the ſurface of which (excluding the baſe) is equal to the ſum of the triangles. The ſum of the baſes of theſe triangles is equal to the periphery of the circle of the baſe, and the common height of the triangles is the ſide of the cone AB; wherefore the ſum of theſe triangles is equal to the product of the ſum of the baſes (*i. e.* the periphery of the baſe of the cone) multiplied into the half of the common height, or it is equal to the product of the periphery of the baſe.

If the area of the baſe is likewiſe wanted, it is to be found ſeparately by the 33d prop. If the ſurface of a cone is ſuppoſed to be ſpread out on a plane, it will become a ſector of a circle, whoſe radius is the ſide of the cone; and the arc terminating, the ſector is made from the periphery of the baſe. Whence, by corol. 33d prop. of this, its dimenſion may be found.

COROLLARY.

Hence it will be eaſy to meaſure the ſurface of a *fruſtum* of a cone cut by a plane parallel to the baſe.

PROPOSITION XLI.

Fig. 21. *To meaſure the ſurface of a given ſphere.*—Let there be a ſphere, whoſe centre is A, and let the area of its convex ſurface be required. Archimedes demonſtrates (37th prop. 1. book of the ſphere and cylinder) that its ſurface is equal to the area of four great circles of the ſphere; that is, let the area of the great circle be multiplied by 4, and the product will give the area of the ſphere; or, (by the 20th 6. and 2d 12. of Eucl.) the area of the ſphere given is equal to the area of a circle whoſe radius is the right line BC, the diameter of the ſphere. Therefore having meaſured (by 33d prop.) the circle deſcribed with the radius BC, this will give the ſurface of the ſphere.

PROPOSITION XLII.

Fig. 22. *To meaſure the ſurface of a ſegment of a ſphere.*—Let there be a ſegment cut off by the plane ED. Archimedes demonſtrates (49, and 50. 1. *De ſphæra*) that the ſurface of this ſegment, excluding the circular baſe, is equal to the area of a circle whoſe radius is the right line BE drawn from the vertex B of the ſegment to the periphery of the circle DE. Therefore, (by the 33d prop.) it is eaſily meaſured.

COROLLARY 1.

Hence that part of the ſurface of a ſphere that lieth between two parallel planes is eaſily meaſured, by ſubtracting the ſurface of the leſſer ſegment from the ſurface of the greater ſegment.

COROLLARY 2.

Hence likewiſe it follows, that the ſurface of a cylinder, deſcribed about a ſphere (excluding the baſis) is equal to the ſurface of the ſphere, and the parts of the one to the parts of the other, intercepted between planes parallel to the baſis of the cylinder.

Of ſolid Figures and their Menſuration, comprehending likewiſe the Principles of Gauging Veſſels of all Figures.

As in the former part of this treatiſe we took an inch for the ſmalleſt meaſure in length, and an inch ſquare for the ſmalleſt ſuperficial meaſure; ſo now, in treating of the menſuration of ſolids, we take a cubical inch for the ſmalleſt ſolid meaſure. Of theſe 109 make a Scots pint; other liquid meaſures depend on this, as is generally known.

In dry meaſures, the firlot, by ſtatute, contains $19\frac{1}{2}$ pints; and on this depend the other dry meaſures: therefore, if the content of any ſolid be given in cubical inches, it will be eaſy to reduce the ſame to the common liquid or dry meaſures, and converſely to reduce theſe to ſolid inches. The liquid and dry meaſures, in uſe among other nations, are known from their writers.

" As to the Engliſh liquid meaſures, by act of parliament 1706, any round veſſel commonly called a *cylinder*, having an even bottom, being ſeven inches in diameter throughout, and ſix inches deep from the top of the inſide to the bottom, (which veſſel will be found by computation to contain $230\frac{907}{1000}$ cubical inches,) or any veſſel containing 231 cubical inches, and no more, is deemed to be a lawful wine-gallon. An Engliſh pint therefore contains $28\frac{7}{8}$ cubical inches; 2 pints make a quart; 4 quarts a gallon; 18 gallons a roundlet; 3 roundlets and an half, or 63 gallons, make a hogſhead; the half of a hogſhead is a barrel; 1 hogſhead and a third, or 84 gallons, make a puncheon; 1 puncheon and a half, or 2 hogſheads, or 126 gallons, make a pipe or butt; the third part of a pipe, or 42 gallons, make a tierce; 2 pipes, or 3 puncheons, or 4 hogſheads, make a ton of wine. Though the Engliſh wine gallon is now fixed at 231 cubical inches, the ſtandard kept in Guildhall being meaſured, before many perſons of diſtinction, May 25. 1688, it was found to contain only 224 ſuch inches.

" In the Engliſh beer-meaſure, a gallon contains 282 cubical inches; conſequently $35\frac{1}{4}$ cubical inches make a pint, 2 pints make a quart, 4 quarts make a gallon, 9 gallons a firkin, 4 firkins a barrel. In ale, 8 gallons make a firkin, and 32 gallons make a barrel. By an act of the firſt of William and Mary, 34 gallons is the barrel, both for beer and ale, in all places, except within the weekly bills of mortality.

" In Scotland it is known that 4 gills make a mutchkin, 2 mutchkins make a chopin; a pint is two chopins; a quart is two pints; and a gallon is four quarts, or eight pints. The accounts of the cubical inches contained in the Scots pint vary conſiderably from each other. According to our author, it contains 109 cubical inches. But the ſtandard-jugs kept by the dean of guild of Edinburgh (one of which has the year 1555, with the arms of Scotland, and the town of Edinburgh, marked upon it) having been carefully meaſured ſeveral times, and by different perſons, the Scots pint, according to thoſe ſtandards, was found to contain about $103\frac{4}{10}$ cubic inches. The pewterers jugs (by which the veſſels in common uſe are made) are ſaid to contain ſometimes betwixt 105 and 106 cubic inches. A caſk that was meaſured by the brewers of Edinburgh, before the commiſſioners of exciſe in 1707, was found to contain $46\frac{7}{8}$ Scots pints; the ſame veſſel contained $18\frac{1}{16}$ Engliſh ale-gallons. Suppoſing this menſurating to be juſt, the Scots pint will be to the Engliſh ale-gallon as 289 to 750; and if the Engliſh ale-gallon be ſuppoſed to contain 282 cubical inches, the Scots pint will contain 108.664 cubical inches. But it is ſuſpected, on ſeveral grounds, that the experiment was not made with ſufficient care and exactneſs.

" The commiſſioners appointed by authority of parliament to ſettle the meaſures and weights, in their act of Feb. 19. 1618, relate, That having cauſed fill the Linlithgow firlot with water, they found that it contained $21\frac{1}{4}$ pints of the juſt Stirling jug and meaſure. They likewiſe ordain that this ſhall be the juſt and only firlot; and add, *That the wideneſs and breadneſs of the which firlot, under and above even over within the buirds, ſhall contain nineteen inches and the ſixth part of an inch, and the deepneſs ſeven inches and a third part of an inch.* According to this act (ſuppoſing their experiment and computation to have been accurate) the pint contained only 99.56 cubical inches; for the content of ſuch a veſſel as is deſcribed in the act, is 2115.85, and this divided by $21\frac{1}{4}$ gives 99.56. But, by the weight of water ſaid to fill this firlot in the ſame act, the meaſure of the pint agrees nearly with the Edinburgh ſtandard above mentioned.

" As for the Engliſh meaſures of corn, the Wincheſter gallon contains $272\frac{1}{4}$ cubical inches; 2 gallons make a peck; 4 pecks, or 8 gallons (that is, 2178 cubical inches) make a buſhel; and a quarter is 8 buſhels.

" Our author ſays, that $19\frac{1}{2}$ Scots pints make a firlot. But this does not appear to be agreeable to the ſtatute above-mentioned, nor to the ſtandard-jugs. It may be conjectured that the proportion aſſigned by him has been deduced from ſome experiment of how many pints, according to common uſe, were contained in the firlot. For if we ſuppoſe thoſe pints to have been each of 108.664 cubical inches, according to the experiment made in the 1707 before the commiſſioners of exciſe, deſcribed above; then $19\frac{1}{2}$ ſuch pints will amount to 2118.94, cubical inches; which agrees nearly with 2115.85, the meaſure of the firlot by ſtatute above-mentioned. But it is probable, that in this he followed the act 1587, where it is ordained, That the wheat-firlot ſhall contain 19 pints and two joucattes. A wheat-firlot marked with the Linlithgow ſtamps being meaſured, was found to contain about 2211 cubical inches. By the ſtatute of 1618 the barley-firlot was to contain 31 pints of the juſt Stirling-jug.

" A Paris pint is 48 cubical Paris inches, and is nearly equal to an Enliſh wine-quart. The *Boiſſeau* contains 644.68099 Paris cubical inches, or 780.36 Engliſh cubical inches.

" The Roman *amphora* was a cubical Roman foot, the *congius* was the eighth part of the *amphora*, the *ſextarius* was one ſixth of the *congius*. They divided the *ſextarius* like the *as* or *libra*. Of dry meaſures, the *medimnus* was equal to two amphoras, that is, about $1\frac{11}{25}$ Engliſh legal buſhels; and the *modius* was the third part of the *amphora*."

PROPOSITION XLIII.

To find the ſolid content of a given priſm.—By the 29th prop. let the area of the baſe of the priſm be meaſured, and be multiplied by the height of the priſm, the product will give the ſolid content of the priſm.

PROPOSITION XLIV.

To find the ſolid content of a given pyramid.—The area of the baſe being found, (by the 30th prop.) let it be multiplied by the third part of the height of the pyramid, or the third part of the baſe by the height, the product will give the ſolid content, by 17th 12. Eucl.

COROLLARY.

If the ſolid content of a *fruſtum* of a pyramid is required, firſt let the ſolid content of the entire pyramid be found; from which ſubtract the ſolid content of the part that is wanting, and the ſolid content of the broken pyramid will remain.

PROPOSITION XLV.

To find the content of a given cylinder.—The area of the baſe being found by prop. 33. if it be a circle, and by prop. 35. if it be an ellipſe, (for in both caſes it is a cylinder), multiply it by the height of the cylinder, and the ſolid content of the cylinder will be produced.

COROLLARY.

Fig. 23. And in this manner may be meaſured the ſolid content of veſſels and caſks not much different from a cylinder, as ABCD. If towards the middle EF it be ſomewhat groſſer, the area of the circle of the baſe being found (by 33d prop.) and added to the area of the middle circle EF, and the half of their ſum (that is, an arithmetical mean between the area of the baſe and the area of the middle circle) taken for the baſe of the veſſel, and multiplied into its height, the ſolid content of the given veſſel will be produced.

Note, That the length of the veſſel, as well as the diameters of the baſe, and of the circle EF, ought to be taken within the ſtaves; for it is the ſolid content within the ſtaves that is ſought.

PROPOSITION XLVI.

To find the ſolid content of a given cone.—Let the area of the baſe (found by prop. 33.) be multiplied into $\frac{1}{3}$ of the height, the product will give the ſolid content of the cone; for by the 10th 12. Eucl. a cone is the third part of a cylinder that has the ſame baſe and height.

PROPOSITION XLVII.

Fig. 24. 25. *To find the ſolid content of a* fruſtum *of a cone cut by a plane parallel to the plane of the baſe.*—Firſt, let the height of the entire cone be found, and thence (by the preceding prop.) its ſolid content; from which ſubtract the ſolid content of the cone cut off at the top, there will remain the ſolid content of the *fruſtum* of the cone.

How the content of the entire cone may be found, appears thus: Let ABCD be the *fruſtum* of the cone (either right or ſcalenous, as in the figures 2. and 3.) let the cone ECD be ſuppoſed to be completed; let AG be drawn parallel to DE, and let AH and EF be perpendicular on CD; it will be (by 2d 6. Eucl.) as as CG : CA : : CD : CE; but (by art. 72. of Part. I.) as CA : AH : : CE : EF; conſequently (by 22d 5. Eucl.) as CG : AH : : CD : EF; that is, as the exceſs of the diameter of the leſſer baſe is to the height of the *fruſtum*, ſo is the diameter of the greater baſe to the height of the entire cone.

COROLLARY.

Fig. 26. Some caſks whoſe ſtaves are remarkably bended about the middle, and ſtrait towards the ends, may be taken for two portions of cones, without any conſiderable error: Thus ABEF is a *fruſtum* of a right cone, to whoſe baſe EF, on the other ſide, there is another ſimilar *fruſtum* of a cone joined, EDCF. The vertices of theſe cones, if they be ſuppoſed to be completed, will be found at G and H. Whence, (by the preceding propoſition) the ſolid content of ſuch veſſels may be found.

PROPOSITION XLVIII.

Fig. 27. A cylinder circumſcribed about a ſphere, that is, having its baſe equal to a great circle of the ſphere, and its height equal to the diameter of the ſphere, is to the ſphere as 3 to 2.

Let ABEC be the quadrant of a circle, and ABDC the circumſcribed ſquare; and likewiſe the triangle ADC; by the revolution of the figure about the right line AC, as axis, a hemiſphere will be generated by the quadrant, a cylinder of the ſame baſe and height by the ſquare, and a cone by the triangle. Let theſe three be cut any how by the plane HF, parallel to the baſe AB; the ſection in the cylinder will be a circle whoſe radius is FH, in the hemiſphere a circle of the radius EF, and in the cone a circle of the radius GF.

By (art. 69. of Part I.) EA*q*, or HF*q*=EF*q* and FA*q* taken together, (but AF*q*=FG*q*, becauſe AC=CD); therefore the circle of the radius FH is equal to a circle of the radius EF, together with a circle of the radius GF; and ſince this is true every where, all the circles together deſcribed by the reſpective *radii* HF (that is, the cylinder) are equal to all the circles deſcribed by the reſpective *radii* EF and FG (that is, to the hemiſphere and the cone taken together;) but, (by the 10th 12. Eucl.) the cone generated by the triangle DAC is one third part of the cylinder generated by the ſquare BC. Whence it follows, that the hemiſphere generated by the rotation of the quadrant ABEC is equal to the remaining two third parts of the cylinder, and that the whole ſphere is $\frac{2}{3}$ of the double cylinder circumſcribed about it.

This is that celebrated 39th prop. 1. book of Archimedes of the ſphere and cylinder; in which he determines the proportion of the cylinder to the ſphere inſcribed to be that of 3 to 2.

COROLLARY.

Hence it follows, that the ſphere is equal to a cone whoſe height is equal to the ſemidiameter of the ſphere, having for its baſe a circle equal to the ſuperficies of the ſphere, or to four great circles of the ſphere, or to a circle whoſe radius is equal to the diameter of the ſphere, (by prop. 41. of this.) And indeed a ſphere differs very little from the ſum of an infinite number of cones that have their baſes in the ſurface of the ſphere, and their common vertex in the centre of the ſphere; ſo that the ſuperficies of the ſphere, (of whoſe dimenſion ſee prop. 41. of this) multiplied into the third part of the ſemidiameter, gives the ſolid content of the ſphere.

PROPOSITION XLIX.

Fig. 28. *To find the ſolid content of a ſector of the ſphere.*—A ſpherical ſector ABC (as appears by the corollary of the preceding prop.) is very little different from an infinite number of cones, having their baſes in the ſuperficies of the ſphere BEC, and their common vertex in the centre. Wherefore the ſpherical ſuperficies BEC being found, (by prop. 42. of this,) and multiplied into the third part of AB the radius of the ſphere, the product will give the ſolid content of the ſector ABC.

COROLLARY.

It is evident how to find the ſolidity of a ſpherical ſegment leſs than a hemiſphere, by ſubtracting the cone ABC from the ſector already found. But if the ſpherical ſegment be greater than a hemiſphere, the cone correſponding muſt be added to the ſector, to make the ſegment.

PROPOSITION L.

FIG. 29. *To find the ſolidity of the ſpheroid, and of its ſegments cut by planes perpendicular to the axis.*—In prop. 44. of this, it is ſhewn, that every where EH : EG :: CF : CD; but circles are as the ſquares deſcribed upon their rays, that is, the circle of the radius EH is to the circle of the radius EG, as CF*q* to CD*q*. And ſince it is ſo every where, all the circles deſcribed with the reſpective rays EH, (that is, the ſpheroid made by the rotation of the ſemi-ellipſis AFB around the axis AB,) will be to all the circles deſcribed by the reſpective *radii* EG, (that is, the ſphere deſcribed by the rotation of the ſemicircle ADB on the axis AB,) as FC*q* to CD*q*; that is, as the ſpheroid to the ſphere on the ſame axis, ſo is the ſquare of the other axis of the generating ellipſe to the ſquare of the axis of the ſphere.

And this holds, whether the ſpheroid be found by a revolution around the greater or leſſer axis.

COROLLARY 1.

Hence it appears, that the half of the ſpheroid, formed by the rotation of the ſpace AHFC around the axis AC, is double of the cone generated by the triangle AFC about the ſame axis; which is the 32d prop. of Archimedes of conoids and ſpheroids.

COROLLARY 2.

Hence, likewiſe, is evident the meaſure of ſegments of the ſpheroid cut by planes perpendicular to the axis. For the ſegment of the ſpheroid made by the rotation of the ſpace ANHE, round the axis AE, is to the ſegment of the ſphere having the ſame axis AC, and made by the rotation of the ſegment of the circle AMGE, as CF*q* to CD*q*.

But if the meaſure of this ſolid be wanted with leſs labour, by the 34th prop. of Archimedes of conoids and ſpheroids, it will be as BE to AC+EB; ſo is the cone generated by the rotation of the triangle AHE round the axis AE, to the ſegment of the ſphere made by the rotation of the ſpace ANHE round the ſame axis AE; which could eaſily be demonſtrated by the method of indiviſibles.

COROLLARY 3.

Hence it is eaſy to find the ſolid content of the ſegment of a ſphere or ſpheroid intercepted between two parallel planes, perpendicular to the axis. This agrees as well to the oblate as to the oblong ſpheroid; as is obvious.

COROLLARY 4.

FIG. 30. If a caſk is to be valued as the middle piece of an oblong ſpheroid, cut by the two planes DC and FG, at right angles to the axis: firſt, let the ſolid content of the half ſperoid ABCED be meaſured by the preceding prop. from which let the ſolidity of the ſegment DEC be ſubtracted, and there will remain the ſegment ABCD; and this doubled will give the capacity of the caſk required.

The following method is generally made uſe of for finding the ſolid content of ſuch veſſels. The double area of the greateſt circle, that is, of that which is deſcribed by the diameter AB at the middle of the caſk, is added to the area of the circle at the end, that is, of the circle DC or FG (for they are uſually equal), and the third part of this ſum is taken for a mean baſe of the caſk; which therefore multiplied into the length of the caſk OP, gives the content of the veſſel required.

Sometimes veſſels have other figures, different from thoſe we have mentioned; the eaſy methods of meaſuring which may be learned from thoſe who practiſe this art. What hath already been delivered, is ſufficient for our purpoſe.

PROPOSITION LI.

FIG. 31. and 32. *To find how much is contained in a veſſel that is in part empty, whoſe axis is parallel to the horizon.*—Let AGBH be the great circle in the middle of the caſk, whoſe ſegment GBH is filled with liquor, the ſegment GAH being empty; the ſegment GBH is known, if the depth EB be known, and EH a mean proportional between the ſegments of the diameter AB and EB; which are found by a rod or ruler put into the veſſel at the orifice. Let the baſis of the caſk, at a medium, be found, which ſuppoſe to be the circle CKDL; and let the ſegment KCL be ſimilar to the ſegment GAH (which is either found by the rule of three, becauſe as the circle AGBH is to the circle CKDL, ſo is the ſegment GAH to the ſegment KCL; or is found from the tables of ſegments made by authors); and the product of this ſegment multiplied by the length of the caſk will give the liquid content remaining in the caſk.

PROPOSITION LII.

To find the ſolid content of a regular and ordinate body.—A tetraedon being a pyramid, the ſolid content is found by the 44th prop. The hexaedron, or cube, being a kind of priſm, it is meaſured by the 43d prop. An octaedron conſiſts of two pyramids of the ſame ſquare baſe and of equal heights; conſequently its meaſure is found by the 44th prop. A dodecaedron conſiſts of 12 pyramids having equal equilateral and equiangular pentagonal baſes; and ſo one of theſe being meaſured (by the 44th prop. of this) and multiplied by 12, the product will be equal to the ſolid content of the dodecaedron. The icoſiaedron conſiſts of 20 equal pyramids having triangular baſes; the ſolid content of one of which being found (by the 44th prop.) and multiplied by 20, gives the whole ſolid. The baſes and heights of theſe pyramids, if you want to proceed more exactly, may be found by trigonometry. See TRIGONOMETRY.

PROPOSITION LIII.

To find the ſolid content of a body however irregular.—Let the given body be immerſed into a veſſel of water, having the figure of a paralelopipedon or priſm, and let it be noted how much the water is raiſed upon the immerſion of the body. For it is plain, that the ſpace which the water fills, after the immerſion of the body, exceeds the ſpace filled before its immerſion, by a ſpace equal to the ſolid content of the body, however irregular. But when this exceſs is of the figure of a parallelopipedon or priſm, it is eaſily meaſured by the 43d prop. of this, *viz.* by multiplying the area of the baſe, or mouth of the veſſel, into the difference of the elevations of the water before and after immerſion: Whence is found the ſolid content of the body given.

In the ſame way the ſolid content of a part of a body may be found, by immerſing that part only in water.

There is no neceſſity to inſiſt here on diminiſhing or enlarging ſolid bodies in a given proportion. It will be eaſy to deduce theſe things from the 11th and 12th books of Euclid.

“ The following rules are ſubjoined for the ready computation of the contents of veſſels, and of any ſolids in the meaſures in uſe in Great Britain.

“ I. To find the content of a cylindric veſſel in Engliſh wine gallons, the diameter of the baſe and altitude of the veſſel being given in inches and decimals of an inch.

“ Square the number of inches in the diameter of the veſſel; multiply this ſquare by the number of inches in the height: then multiply the product by the decimal fraction .0034; and this laſt product ſhall give the content in wine-gallons and decimals of ſuch a gallon. To expreſs the rule arithmetically; let D repreſent the number of inches and decimals of an inch in the diameter of the veſſel, and H the inches and decimals of an inch in the height of the veſſel; then the content in wine-gallons ſhall be $DDH\times\frac{34}{10000}$, or DDH×.0034. *Ex.* Let the diameter D=51.2 inches, the height H=62.3 inches, then the content ſhall be 51.2 × 51.2 × 62.3 × .0034 = 555.27.332 wine-gallons. This rule follows from prop. 33. and 45. For, by the former, the area of the baſe of the veſſel is in ſquare inches DD×.7854; and by the latter, the content of the veſſel in ſolid inches is DDH×.7854; which divided by 231 (the number of cubical inches in a wine-gallon) gives DDH×.0034, the content in wine-gallons. But though the charges in the exciſe are made (by ſtatute) on the ſuppoſition that the wine-gallon contains 231 cubical inches; yet it is ſaid, that in ſale, 224 cubical inches, the content of the ſtandard meaſured at Guildhall (as was mentioned above), are allowed to be a wine-gallon.

“ II. Suppoſing the Engliſh ale-gallon to contain 282 cubical inches, the content of a cylindric veſſel is computed in ſuch gallons, by multiplying the ſquare of the diameter of a veſſel by its height as formerly, and their product by the decimal fraction .0,027,851: that is, the ſolid content in ale-gallons is DDH×.0,027,851.

“ III. Suppoſing the Scots pint to contain about 103.4 cubical inches, (which is the meaſure given by the ſtandards at Edinburgh, according to experiments mentioned above), the content of a cylindric veſſel is computed in Scots pints, by multiplying the ſquare of the diameter of the veſſel by its height, and the product of theſe by the decimal fraction .0076. Or the content of ſuch a veſſel in Scots pints is DDH×.0076.

“ Suppoſing the Wincheſter buſhel to contain 2187 cubical inches, the content of a cylindric veſſel is computed in thoſe buſhels by multiplying the ſquare of the diameter of the veſſel by the height, and the product by the decimal fraction .0,003,606. But the ſtandard buſhel having been meaſured by Mr Everard and others in 1696, it was found to contain only 2145.6 ſolid inches; and therefore it was enacted in the act for laying a duty upon malt, *That every round buſhel, with a plain and even bottom, being $18\frac{1}{2}$ inches diameter throughout, and* 8 *inches deep, ſhould be eſteemed a legal* Wincheſter *buſhel.* According to this act (ratified in the firſt year of queen Anne) the legal Wincheſter buſhel contains only 2150.42 ſolid inches. And the content of a cylindric veſſel is computed in ſuch buſhels, by multiplying the ſquare of the diameter by the height, and their product by the decimal fraction .0,003,625. Or the content of the veſſel in thoſe buſhels is DDH×.0,003,625.

“ V. Suppoſing the Scots wheat-firlot to contain $21\frac{1}{2}$ Scots pints, (as is appointed by the ſtatute 1618), and the pint to be conform to the Edinburgh ſtandards above mentioned, the content of a cylindric veſſel in ſuch firlots is computed by multiplying the ſquare of the diameter by the height, and their product by the decimal fraction .00,358. This firlot, in 1426, is appointed to contain 17 pints; in 1457, it was appointed to contain 18 pints; in 1587, it is $19\frac{1}{4}$ pints; in 1628, it is $21\frac{1}{4}$ pints: and though this laſt ſtatute appears to have been founded on wrong computations in ſeveral reſpects, yet this part of the act that relates to the number of pints in the firlot ſeems to be the leaſt exceptionable; and therefore we ſuppoſe the firlot to contain $21\frac{1}{4}$ pints of the Edinburgh ſtandard, or about 2197 cubical inches; which a little exceeds the Wincheſter buſhel, from which it may have been originally copied.

“ VI. Suppoſing the bear-firlot to contain 31 Scots pints, (according to the ſtatute 1618), and the pint conform to the Edinburgh ſtandards, the content of a cylindric veſſel in ſuch firlots is found by multiplying the ſquare of the diameter by the height, and this product by .000245.

“ When the ſection of the veſſel is not a circle, but an ellipſis, the product of the greateſt diameter by the leaſt, is to be ſubſtituted in thoſe rules for the ſquare of the diameter.

“ VII. To compute the content of a veſſel that may be conſidered as a *fruſtum* of a cone in any of thoſe meaſures.

“ Let A repreſent the number of inches in the diameter of the greater baſe, B the number of inches in the diameter of the leſſer baſe. Compute the ſquare of A, the product of A multiplied by B, and the ſquare of B, and collect theſe into a ſum. Then find the third part of this ſum, and ſubſtitute it in the preceding rules in the place of the ſquare of the diameter; and proceed in all other reſpects as before. Thus, for example, the content in wine-gallons in $\overline{AA \times AB \times BB} \times \frac{1}{3} \times H \times .0034$.

“ Or, to the ſquare of half the ſum of the diameters A and B, add one third part of the ſquare of half their difference, and ſubſtitute this ſum in the preceding rules for the ſquare of the diameter of the veſſel; for the ſquare of $\frac{1}{2}A \times \frac{1}{2}B$ added to $\frac{1}{3}$ of the ſquare of $\frac{1}{2}A - \frac{1}{2}B$, gives $\frac{1}{3}AA \times \frac{1}{3}AB \times \frac{1}{3}BB$.

“ VIII. When a veſſel is a *fruſtum* of a parabolic conoid, meaſure the diameter of the ſection at the

“ middle of the height of the *fruſtum;* and the content will be preciſely the ſame as of a cylinder of this diameter, of the ſame height with the veſſel.

“ IX. When a veſſel is a *fruſtum* of a ſphere, if you meaſure the diameter of the ſection at the middle of the height of the *fruſtum,* then compute the content of a cylinder of this diameter of the ſame height with the veſſel, and from this ſubſtract $\frac{1}{3}$ of the content of a cylinder of the ſame height, on a baſe whoſe diameter is equal to its height; the remainder will give the content of the veſſel. That is, if D repreſent the diameter of the middle ſection, and H the height of the *fruſtum,* you are to ſubſtitute $DD - \frac{1}{3}HH$ for the ſquare of the diameter of the cylindric veſſel in the firſt ſix rules.

“ X. When the veſſel is a *fruſtum* of a ſpheroid, if the baſes are equal, the content is readily found by the rule in p. (24.) In other caſes, let the axis of the ſolid be to the conjugate axis as *n* to 1; let D be the diameter of the middle ſection of the *fruſtum,* H the height or length of the *fruſtum;* and ſubſtitute in the firſt ſix rules $DD - \frac{HH}{3nn}$ for the ſquare of the diameter of the veſſel.

“ XI. When the veſſel is an hyperbolic conoid, let the axis of the ſolid be to the conjugate axis as *n* to 1, D the diameter of the ſection at the middle of the *fruſtum,* H the height or length: compute $DD \times \frac{1}{3nn} \times HH$, and ſubſtitute this ſum for the ſquare of the diameter of the cylindric veſſel in the firſt ſix rules.

“ XII. In general, it is uſual to meaſure any round veſſel, by diſtinguiſhing it into ſeveral *fruſtums,* and taking the diameter of the ſection at the middle of each *fruſtum;* thence to compute the content of each, as if it was a cylinder of that mean diameter; and to give their ſum as the content of the veſſel. From the total content, computed in this manner, they ſubſtract ſucceſſively the numbers which expreſs the circular areas that correſpond to thoſe mean diameters, each as often as there are inches in the altitude of the *fruſtum* to which it belongs, beginning with the uppermoſt; and in this manner calculate a table for the veſſel, by which it readily appears how much liquor is at any time contained in it, by taking either the dry or wet inches; having regard to the inclination or drip of the veſſel, when it has any.

“ This method of computing the content of a *fruſtum* from the diameter of the ſection at the middle of its height, is exact in that caſe only when it is a portion of a parabolic conoid; but in ſuch veſſels as are in common uſe, the error is not conſiderable. When the veſſel is a portion of a cone or hyperbolic conoid, the content by this method is found leſs than the truth; but when it is a portion of a ſphere or ſpheroid, the content computed in this manner exceeds the truth. The difference or error is always the ſame, in the different parts of the ſame or of ſimilar veſſels, when the altitude of the *fruſtum* is given. And when the altitudes are different, the error is in the triplicate *ratio* of the altitude. If exactneſs be required, the error in meaſuring the *fruſtum* of a conical veſſel, in this manner, is $\frac{1}{4}$ of the content of a cone ſimilar to the veſſel, of an altitude equal to the height of the *fruſtum.* In a ſphere, it is $\frac{1}{3}$ of a cylinder of a diameter and height equal to the *fruſtum.* In the ſpheroid and hyperbolic conoid, it is the ſame as in a cone generated by the right-angled triangle, contained by the two ſemiaxes of the figure, revolving about that ſide which is the ſemiaxis of the *fruſtum.*

“ In the uſual method of computing a table for a veſſel, by ſubducting from the whole content the number that expreſſes the uppermoſt area, as often as there are inches in the uppermoſt *fruſtum,* and afterwards the numbers for the other areas ſucceſſively; it is obvious, that the contents aſſigned by the table, when a few of the uppermoſt inches are dry, are ſtated a little too high, if the veſſel ſtands on its leſſer baſe, but too low when it ſtands on its greater baſe; becauſe, when one inch is dry, for example, it is not the area at the middle of the uppermoſt *fruſtum,* but rather the area at the middle of the uppermoſt inch, that ought to be ſubducted from the total content, in order to find the content in this caſe.

“ XIII. To meaſure round timber: Let the mean circumference be found in feet and decimals of a foot; ſquare it; multiply this ſquare by the decimal .079,577, and the product by the length. Ex. Let the mean circumference of a tree be 10 3 feet, and the length 24 feet. Then 10 3 × 10 3 × 079,577 × 24=202.615, is the number of cubical feet in the tree. The foundation of this rule is, that when the cirumference of a circle is 1, the area is .0,795,774,715, and that the areas of circles are as the ſquares of their circumferences.

“ But the common way uſed by artificers for meaſuring round timber, differs much from this rule. They call one fourth part of the circumference the *girt,* which is by them reckoned the ſide of a ſquare, whoſe area is equal to the area of the ſection of the tree; therefore they ſquare the *girt,* and then multiply by the length of the tree. According to their method, the tree of the laſt example would be computed at 159.13 cubical feet only.

“ How ſquare timber is meaſured, will be eaſily underſtood from the preceding propoſitions. Fifty ſolid feet of hewn timber, and forty of rough timber, make a load.

“ XIV. To find the burden of a ſhip, or the number of tons it will carry, the following rule is commonly given. Multiply the length of the keel taken within board, by the breadth of the ſhip within board, taken from the midſhip beam from plank to plank, and the product by the depth of the hold, taken from the plank below the keelſon to the under part of the upper deck plank, and divide the product by 94, the quotient is the content of the tonnage required. This rule however cannot be accurate; nor can one rule be ſuppoſed to ſerve for the meaſuring exactly the burden of ſhips of all ſorts. Of this the reader will find more in the Memoirs of the Royal Academy of Sciences at Paris, for the year 1721.

“ Our author having ſaid nothing of weights, it may be of uſe to add briefly, that the Engliſh

" Troy-pound contains 12 ounces, the ounce 20 pen-
" ny-weight, and the penny-weight 24 grains; that
" the Averdupois pound contains 16 ounces, the ounce
" 16 drams, and that 112 pounds is uſually called the
" hundred weight. It is commonly ſuppoſed, that
" 14 pounds Averdupois are equal to 17 pounds
" Troy. According to Mr Everard's experiments,
" 1 pound Averdupois is equal to 14 ounces 12 pen-
" ny-weight and 16 grains Troy, that is, to 7000
" grains; and an Averdupois ounce is $437\frac{1}{2}$ grains.
" The Scots Troy-pound (which, by the ſtatute
" 1718, was to be the ſame with the French) is com-
" monly ſuppoſed equal to $15\frac{3}{4}$ ounces Engliſh Troy,
" or 7560 grains. By a mean of ſtandards kept by
" the dean of guild at Edinburgh, it is $7599\frac{3}{32}$ or
" 7600 grains. They who have meaſured the weights
" which were ſent from London, after the union of
" of the kingdoms, to be the ſtandards by which the
" weights in Scotland ſhould be made, have found
" the Engliſh Averdupois pound (from a medium of
" the ſeveral weights) to weigh 7000 grains, the ſame
" as Mr Everard; according to which, the Scots, Pa-
" ris, or Amſterdam pound, will be to the pound
" Averdupois as 38 to 35. The Scots Troy-ſtone
" contains 16 pounds, the pound 2 marks or 16
" ounces, an ounce 16 drops, a drop 36 grains.
" Twenty Scots ounces make a Tron-pound; but be-
" cauſe it is uſual to allow one to the ſcore, the Tron-
" pound is commonly 21 ounces. Sir John Skene,
" however, makes the Tron-ſtone to contain only
" $19\frac{1}{2}$ pounds."

George.

GEORGE I. II. and III. kings of Great Britain.—George I. the ſon of Erneſt Auguſtus, duke of Brunſwick Lunenburgh, and elector of Hanover; ſucceeded to the throne of Great Britain in 1714, in virtue of an act of parliament, paſſed in the latter part of the reign of king William III. limiting the ſucceſſion of the crown, after the demiſe of that monarch, and queen Anne (without iſſue), to the princeſs Sophia of Hanover, and the heirs of her body, being Proteſtants.—George II. the only ſon of the former, ſucceeded him in 1727, and enjoyed a long rein of glory; dying amidſt the moſt rapid and extenſive conqueſts in the 77th year of his age. He was ſucceeded by his grandſon George III. our preſent ſovereign. For particulars, ſee Britain, n° 369,—458.

George, or *Knights of St* George, has been the denomination of ſeveral military orders, whereof that of the garter is one of the moſt illuſtrious. See Garter.

King George's *Iſlands*, are two iſlands in the South Sea, lying in W. Long. 144. 56. S. Lat. 14. 28. They were firſt diſcovered by commodore Byron in 1765, and have ſince been viſited by Captain Cook in 1774. Commodore Byron's people had an encounter with the inhabitants, which proved fatal to ſome of the natives; but Captain Cook was more fortunate. A lieutenant and two boats well armed were ſent on ſhore by Captain Cook; and landed without oppoſition. As ſoon as the gentlemen landed, the iſlanders embraced them by touching noſes, a mode of civility uſed in New Zealand, which is 900 leagues diſtant, and the only place beſides this where the cuſtom has been obſerved to prevail. Notwithſtanding this ceremony, however, very little real friendſhip ſeemed to take place on the part of the iſlanders. They crowded about the boats as the people were ſtepping into them, and ſeemed in doubt whether they ſhould detain them or let them go; at laſt, however, not thinking themſelves ſufficiently ſtrong, they ſeemed contented with their departure, and aſſiſted them in puſhing off their boats; but ſome of the moſt turbulent threw ſtones into the water which fell very near them, and all ſeemed to glory that they had as it were driven them off. The Britiſh, however, brought off five dogs of a white colour with fine long hair, with which the iſland ſeemed to be plentifully ſupplied. Theſe they purchaſed with ſmall nails, and ſome ripe bananas which had been brought from the Marqueſas. On this iſland Mr Foreſter found a kind of ſcurvy-graſs, which the natives informed him they were wont to bruiſe and mix with ſhell-fiſh; after which, they threw it into the ſea whenever they perceived a ſhoal of fiſh. This preparation intoxicates them for ſome time; and thus they are caught on the ſurface of the water without any other trouble than that of taking them out. The name of this plant among the natives is *e now*. The largeſt iſland, which they call *Tiookea*, is ſomething of an oval ſhape, and about ten leagues in circuit; the other iſland, which lies two leagues to the weſtward of Tiookea, is four leagues long from northeaſt to ſouthweſt, and from five to three miles long. The ſoil of both is extremely ſcanty; the foundation conſiſts of coral, very little elevated above the ſurface of the water.

St George *del Mina*, the capital of the Dutch ſettlements, on the gold-coaſts of Guinea, ſituated ſeven or eight miles weſt of Cape-coaſt caſtle, the capital of the Britiſh ſettlements there. W. Long. 5° and N. Lat. 5°.

St George, a fort and town of Aſia, in the peninſula on this ſide the Ganges, and on the coaſt of Coromandel, belonging to the Engliſh; it is otherwiſe called *Madraſs*, and by the natives *Chili-patam*. It fronts the ſea, and has a ſalt-water river on its back ſide, which hinders the freſh-water ſprings from coming near the town, ſo that they have no good water within a mile of them. In the rainy ſeaſons it is incommoded by inundations; and from April to September it is ſo ſcorching hot, that if the ſea-breezes did not cool the air, there would be no living there. There are two towns, one of which is called the *White Town*, which is walled round, and has ſeveral bulwarks and baſtions to defend it: it is 400 paces long and 150 broad, and is divided into regular ſtreets. Here are two churches, one for the Proteſtants, and the other for the Papiſts; as alſo a good hoſpital, a town-hall, and a priſon for debtors. They are a corporation, and have a mayor and aldermen, with other proper officers. The *Black Town* is inhabited by Gentoos, Mahometans, and Portugueſe and Armenian Chriſtians, and each religion have their temples and churches. This, as well as the White Town, is ruled by the Engliſh governor and his council. The diamond-mines are but a week's journey from this place, which renders them pretty plentiful, but there are no large ones ſince that great diamond was procured by governor Pitt. This colony produces very little of its own growth or manufacture for foreign markets, and the trade is in the hands of the Armenians and Gentoos. The chief things the Britiſh deal in, beſides diamonds, are calicoes, chintz, muſlins, and the like. This colony may conſiſt of 80,000 inhabitants in the towns and villages, and there are generally 400 or 500 Europeans. Their rice is brought by ſea to Gangam and Orixa, their wheat from Surat and Bengal, and their fire-wood from the iſlands of Diu: ſo that an enemy, with a ſuperior force at ſea, may eaſily diſtreſs them. The houſes of the White Town are built with brick, and have lofty rooms and flat roofs; but the Black Town conſiſts chiefly of thatched cottages. The military power is lodged in the governor and council, who are alſo the laſt reſort in civil cauſes. The company have two chaplains, who officiate by turns, and have each 100l. a-year, beſides the advantages of trade. They never attempt to make proſelytes, but leave that to the Popiſh miſſionaries. The ſalaries of the company's writers are very ſmall: but, if they have any fortune of their own, they may make it up by trade; which muſt generally be the caſe, for they commonly grow rich. It was taken by the French in 1746, who reſtored it at the peace of Aix la Chapelle.

St GEORGE's, the largeſt of the Bermuda or Summer iſlands. W. Long. 65. 10. N. Lat. 32. 30.

Croſs of St GEORGE, a red one in a field argent, which makes part of the Britiſh ſtandard.

GEORGIA, a country of Aſia, ſubject to the Turks. It is bounded on the north by Circaſſia, on the eaſt by Dagheſtan and Shirvan, on the ſouth by Armenia, and on the weſt by the Euxine or Black Sea; comprehending the greateſt part of the ancient Colchis, Iberia, and Albania. About the etymon of the name of this country, authors are not agreed. The moſt probable opinion is, that it is a corruption ſoftening of *Kurgia*, from the river Kur; whence alſo it is ſuppoſed that the inhabitants are called by the Perſians indifferently *Georgi*, *Gurgi*, and *Kurgi;* and the country *Kurgiſtan* and *Gurgiſtan:* It is divided by a ridge of mountains into eaſtern and weſtern; the former of which is again ſubdivided into the kingdoms of Caket, Carduel or Carthuel, and Goguetia; and the latter into the provinces of Abcaſſia, Mireta, or Imaretta, and Guriel. Another diviſion is into Georgia Proper, Abcaſſia, and Mingrelia.

"Georgia (ſays Sir John Chardin) is as fertile a country as can be ſeen; the bread is as good here as in any part of the world; the fruit of an exquiſite flavour, and of different ſorts; no place in Europe yields better pears and apples, and no place in Aſia better pomegranates. The country abounds with cattle, veniſon, and wild-fowl, of all ſorts; the river Kuris is well ſtocked with fiſh; and the wine is ſo rich, that the king of Perſia has always ſome of it for his own table. The inhabitants are robuſt, valiant, and of a jovial temper; great lovers of wine, and eſteemed very truſty and faithful; endowed with good natural parts, but, for want of education, very vicious. The women are generally ſo fair and comely, that the wives and concubines of the king of Perſia and his court are for the moſt part Georgian women. Nature has adorned them with graces no where elſe to be met with; it is impoſſible to ſee them without loving them; they are of a good ſize, clean-limbed, and well-ſhaped." Another traveller, however, of no mean character, thus expreſſes himſelf with reſpect to the women: "As to the Georgian women, they did not at all ſurprize us; for we expected to find them perfect beauties. They are, indeed, no way diſagreeable; and may be counted beauties, if compared with the Curdes. They have an air of health that is pleaſing enough; but, after all, they are neither ſo handſome nor ſo well ſhaped as is reported. Thoſe who live in the towns have nothing extraordinary, more than the others; ſo that I may, I think, venture to contradict the accounts that have been given of them by moſt travellers."

Georgia abounds with woods and mountains, intermixed with a great number of beautiful plains.

The only rivers of note in this country are the Cyrus, Cyrnus, Corus, or Kur, and the Aragus. The firſt ſprings from the Moſchian mountains, which ſeparate Colchis from Armenia, waters the country now called *Mokan*, and, after receiving into its channel the Aragus and Araxes, falls by one mouth into the Caſpian ſea. This river is navigable the greateſt part of its courſe. The Aragus ſprings from the mountains that ſeparate Iberia from Colchis, and falls into the Cyrus.

Iberia, or Georgia, is tributary or ſubject either to the Porte or the king of Perſia, and known to the Perſians by the name of Gurgiſtan, that is, "the land of the Georgians;" for *tan* is an ancient Celtic word, ſignifying a country, and ſtill in uſe among the eaſtern nations, as appears from the modern names of Curdeſtan, Indoſtan, &c. that is, the country of the Curdes, of the Indians, &c.

The whole country of Georgia is but thinly inhabited, and has but very few cities in proportion to its extent and fertility; which is doubtleſs in a great meaſure owing to the barbarous and unnatural traffic carried on here in boys and girls, parents ſelling their children, maſters their ſervants, and lords their vaſſals and tenants. Every one, in ſhort, trades in the males and females he is maſter of, and diſpoſes of them to the Turks and Perſians, who employ them in their armies and ſeraglios, as ſlaves, mutes, eunuchs, ſoldiers, ſtateſmen, and concubines, according to their capacities, and the favour they have obtained with their maſters.

This country formerly abounded with great cities, as appears not only from its hiſtory, but from the ruins of many of them ſtill viſible, which ſhew that they muſt have been very large, opulent, and magnificienely built. Theſe were all deſtroyed by the inundations of northern barbarians from mount Caucaſus, as the Alans, Huns, Suevi, and ſome others, ſo much noted in hiſtory for their ſtrength, courage, and conqueſts.

The air of Georgia is ſerene, dry, and healthful; but very cold in winter, and hot in ſummer.

The fine weather commonly begins about May, and laſts till November. But the lands want a good deal of watering to make them produce a plentiful crop; when they yield all ſorts of grain, fruit, and pulſe, in abundance, which ſell at ſo cheap a rate that the people want for nothing. The cattle, both ſmall and great, are fat and good, and in great numbers; but the common

GEOMETRY No. I. Plate CXXXVI.

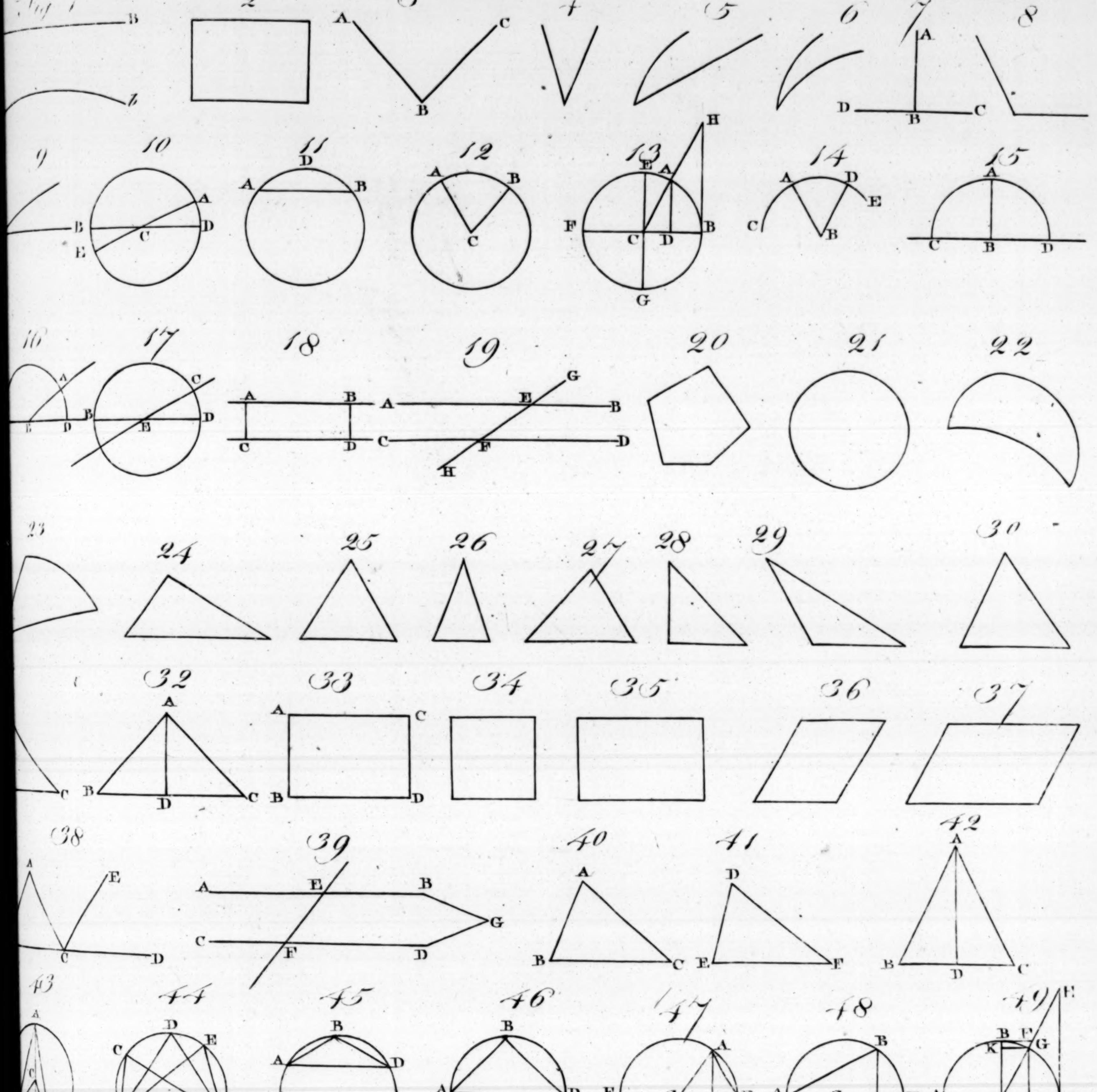
Fig. 1
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E
A
G
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B
K
C
H
L
M
53
A Line of Tangents
10
20
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40
50
60
B
E
C
D
A
10
20
30
40
50
60
70
Line of Sines
Line of Chords
A Line of Secants

S.I.B. Sculp

3 MA 55

GEOMETRY No. II. Plate CXXXVII

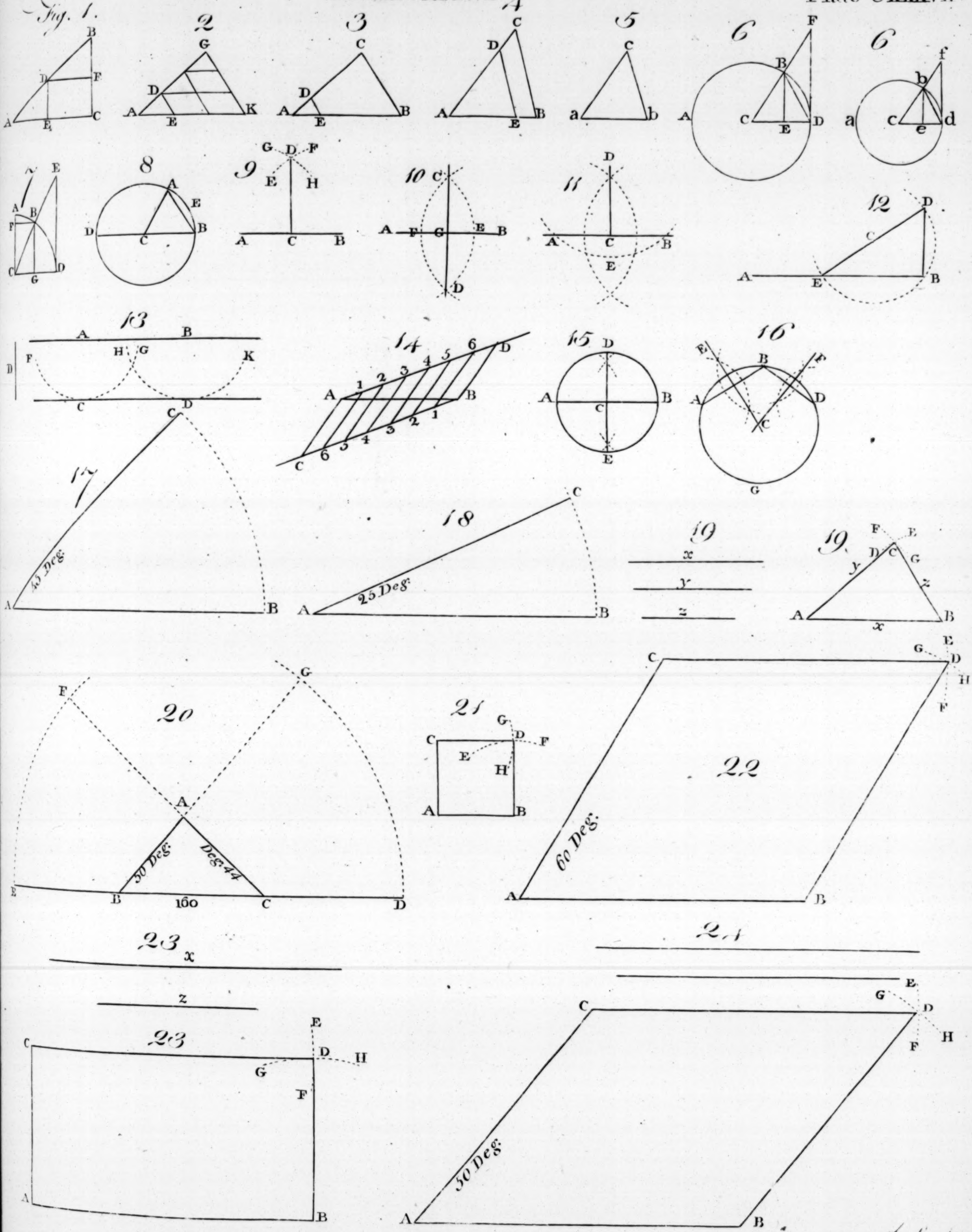

Fig. 1
A B C D E F
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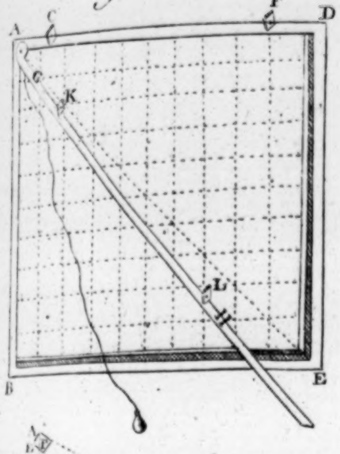
A D E G K
3
A B C D E
4
A B C D E
5
a b C
6
A B C D E F
6
a b c d e f
7
A B C D E F G
8
A B C D E
9
A B C D E F G H
10
A B C D E F G
11
A B C D E
12
A B C D E
13
A B C D F G H K
14
A B C D 1 2 3 4 5 6
15
A B C D E
16
A B C D E F G
17
A B C D 45 Deg
18
A B C 25 Deg
19
x y z
19
A B C D E F G x y z
20
A B C D E F G 50 Deg Deg 44 160
21
A B C D E F G H
22
A B C D E F G H 60 Deg
23
x z
23
A B C D E F G H
24
A B C D E F G H 50 Deg

3 MA 55

GEOMETRY N.o III. Plate CXXXVIII.

Fig. 1.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B
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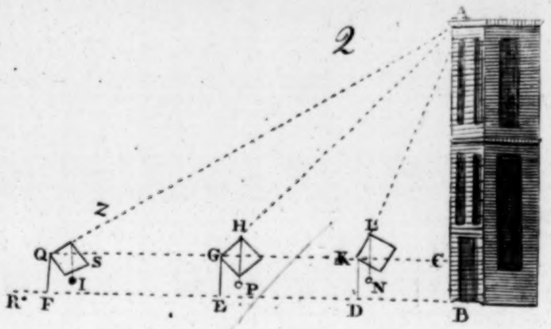
2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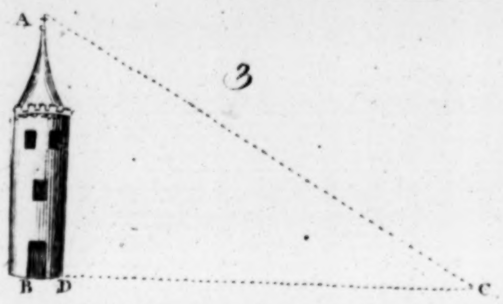

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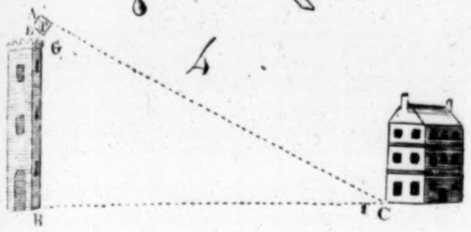

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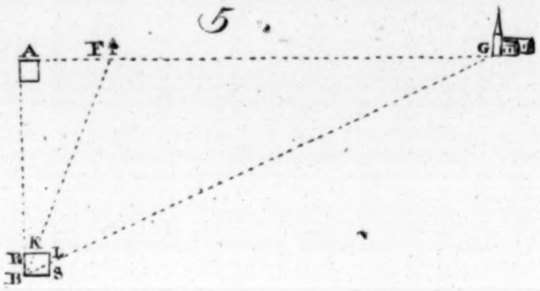

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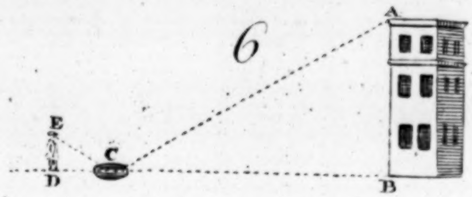

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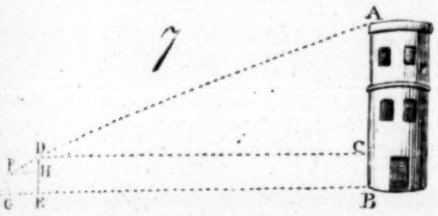

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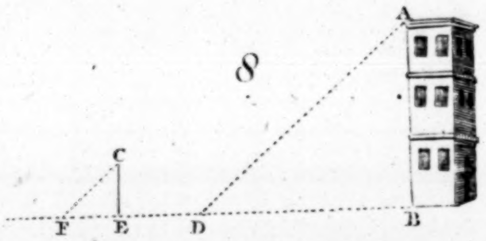

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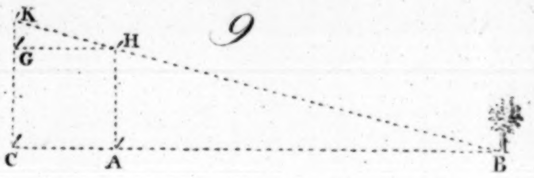

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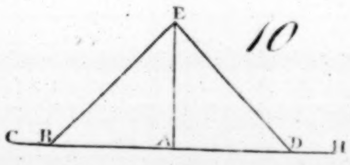

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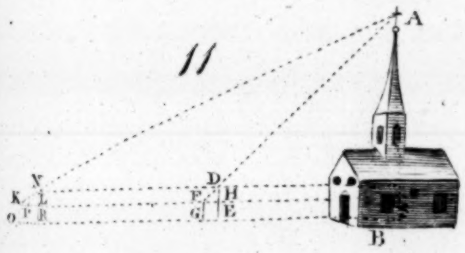
A
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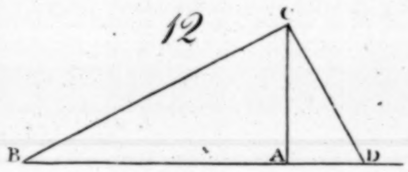
12



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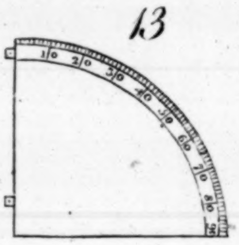
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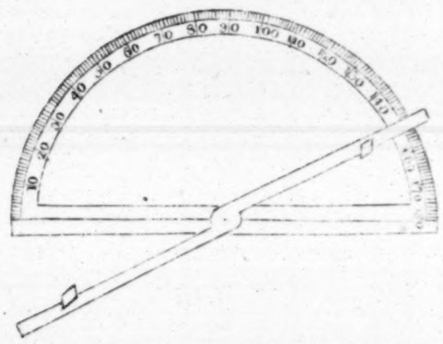
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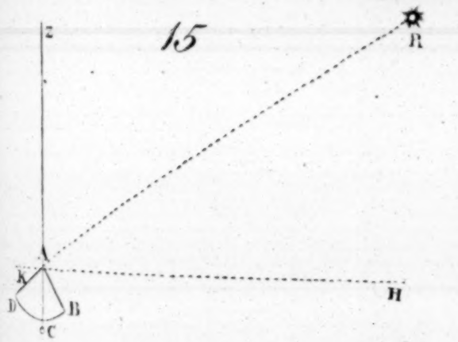

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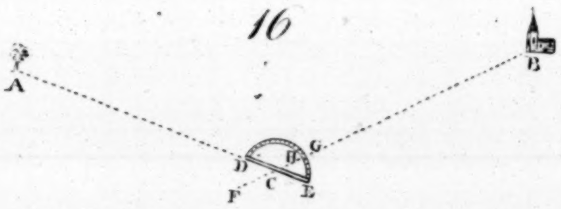

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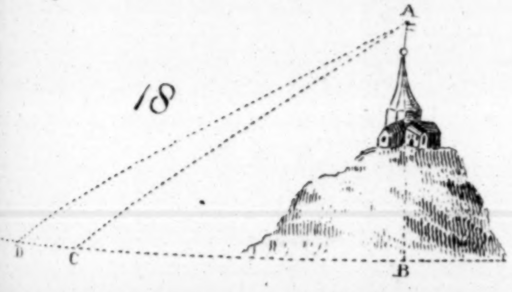

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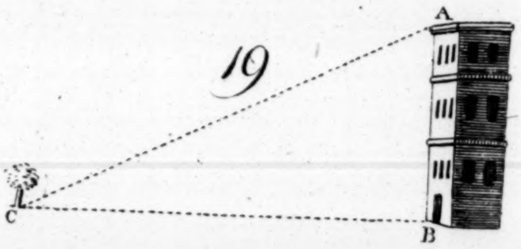

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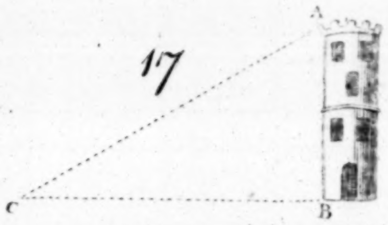

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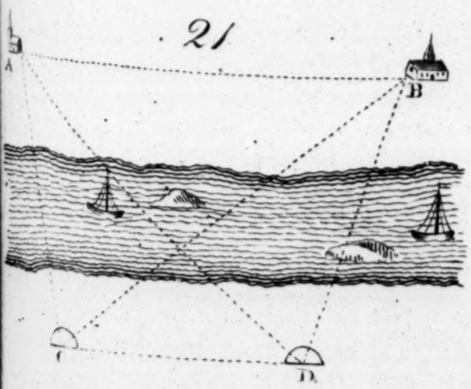

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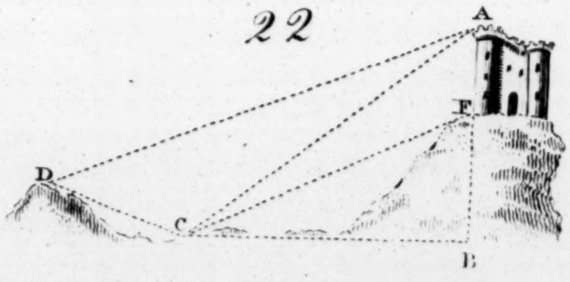

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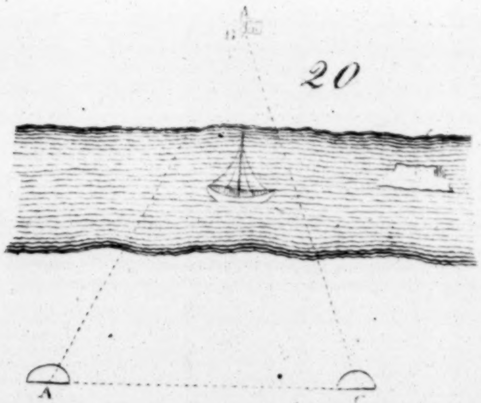


A.B.H. Sculp.

3 MA 55

GEOMETRY No. IV Plate CXXXIX

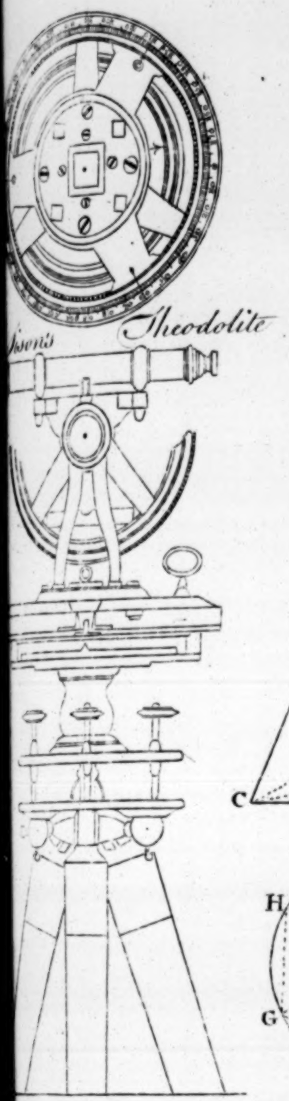
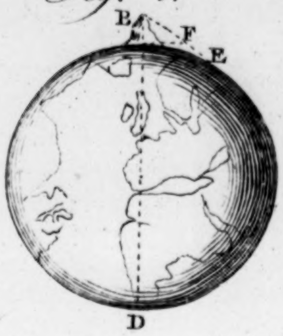

isson's Theodolite

Fig. 1.



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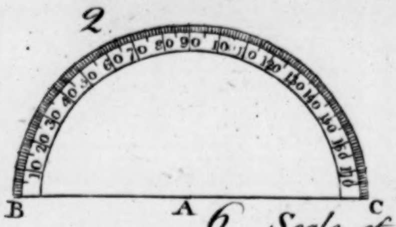
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170
B
A
C

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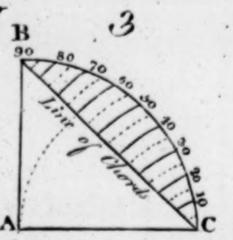
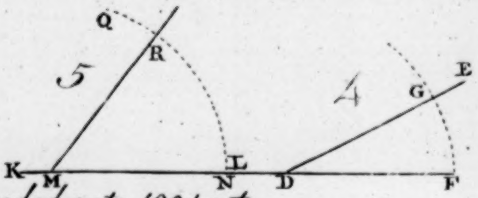

B
90 80 70 60 50 40 30 20 10
Line of Chords
A
C


Q
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L
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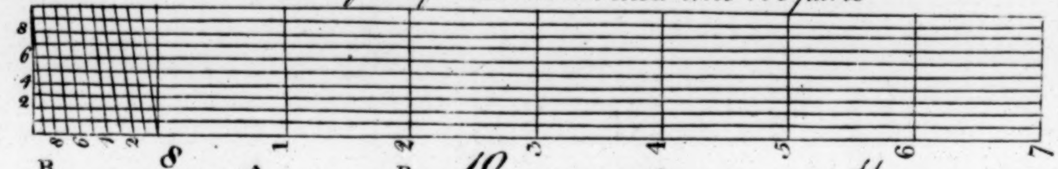
F

6 Scale of half an Inch divided into 100 parts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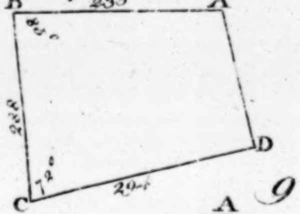
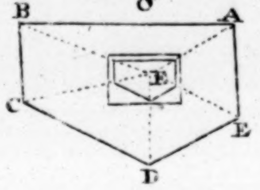

B
233
A
88°
218
72°
294
C
D

8



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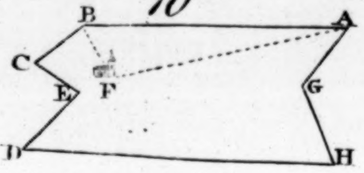

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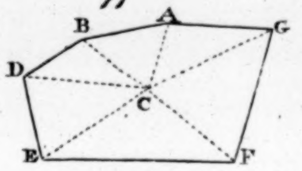

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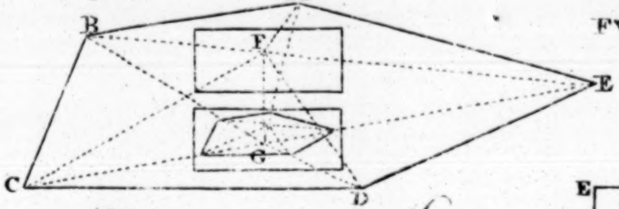

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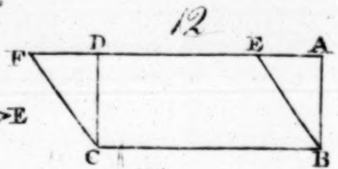

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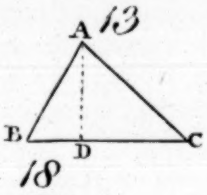

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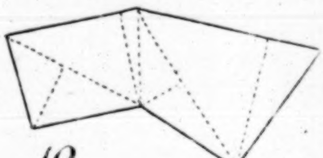

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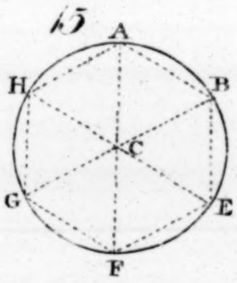

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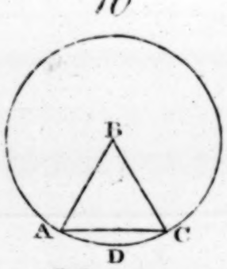

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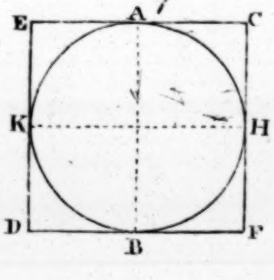

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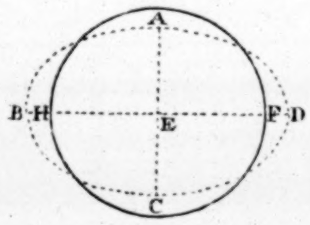

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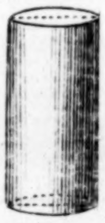

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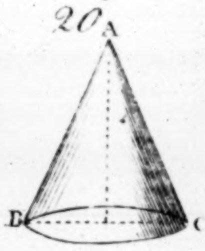

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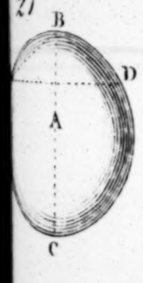

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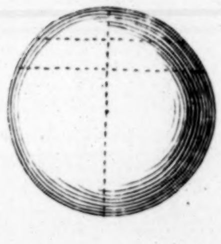

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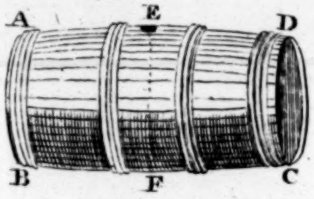

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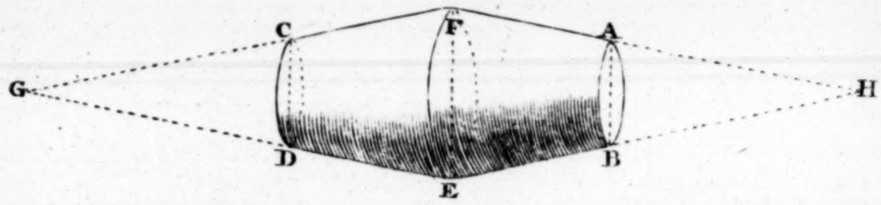

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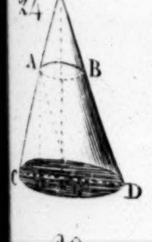

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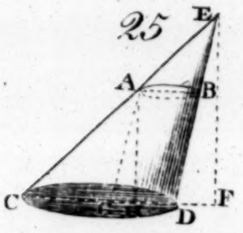

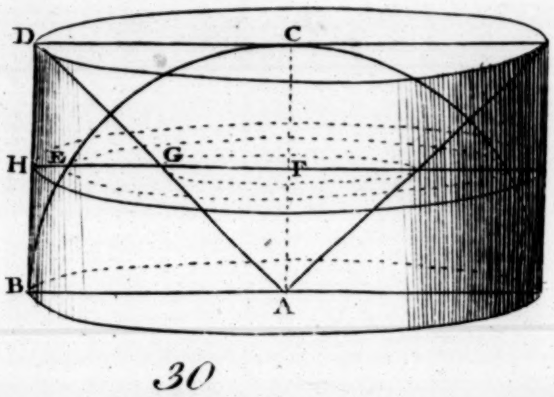

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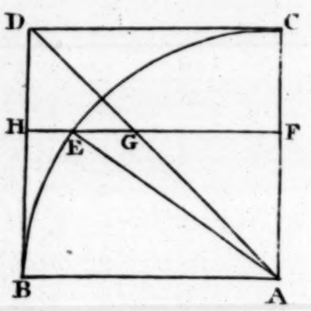

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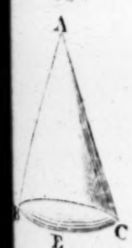

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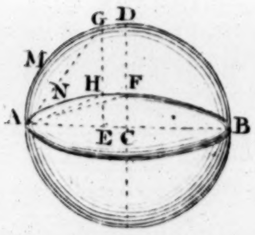
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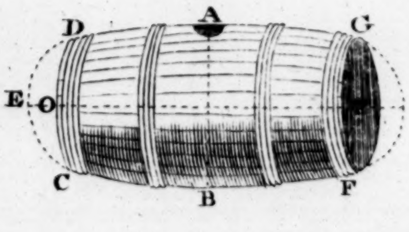

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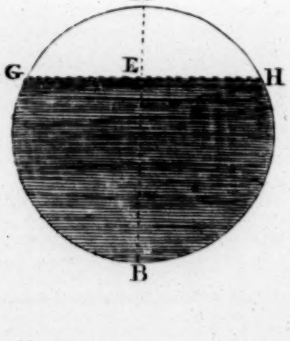

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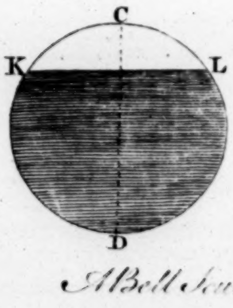

A Bell Sculpt.

3 MA 53

rgia.

mon people live moſtly on ſwine's fleſh, which is every where excellent, and, by their own account, wholeſome and of eaſy digeſtion. The river Kur, as well as the Caſpian ſea, which lies eaſt of Georgia, ſupplies it with plenty and variety of fiſh.

The mountains of Caucaſus, that lie partly in this country, are known at preſent to the inhabitants by the names of *Cochas* and *Cochias*, which are, without doubt, a corruption of the ancient. The Arabs call them the *Mountains of Raſ*.

The inhabitants are civil enough to ſtrangers, allowing them to live and trade as they pleaſe, and to profeſs what religion they have a mind: hence people of various nations are ſeen here, as Turks, Armenians, Perſians, Jews, Greeks, Indians, Tartars, Ruſſians, and other Europeans. But the Armenians are the moſt numerous; and, by carrying on the greateſt part of the trade, are alſo the richeſt; for which reaſon the Georgians hate and deſpiſe them, regarding them in much the ſame light as the Europeans do the Jews. The Georgians wear four caps on their heads, and a kind of long veſt, open before, but which may be buttoned at pleaſure; their breeches and under-garments are like thoſe of the Perſians, as is the entire dreſs of the women.

Their houſes, eſpecially thoſe of the better ſort, are alſo after the model of thoſe of Perſia, as well as all their public buildings: and they may afford to have them built after the beſt manner, having not only ſtone, wood, plaſter, lime, and all other materials, in the greateſt plenty and cheapneſs; but alſo can have the moſt laborious work done by their own vaſſals, over whom they have ſuch an abſolute power, that they can keep them employed whole months together, without allowing them either wages or food.

Iberia, or Georgia, according to Joſephus, was firſt peopled by Tubal, the brother of Gomer and Magog. His opinion is confirmed by the Septuagint; for Meſhech and Tubal are by theſe interpreters rendered *Moſchi* and *Iberians*. We know little of the hiſtory of the country till the reign of Mithridates, when their king, named *Artocis*, ſiding with that prince againſt Lucullus, and afterwards againſt Pompey, was defeated by the latter, with great ſlaughter; but afterwards obtained a peace, upon delivering up his ſons as hoſtages. Little notice is taken of the ſucceeding kings by the ancient hiſtorians. They were probably tributary to the Romans till that empire was overturned, when this, with the other countries in Aſia bordering on it, fell ſucceſſively under the power of the Saracens and Turks. A certain prince of Georgia, named *Heraclius*, has lately made a great noiſe, and a conſiderable progreſs in his endeavours to ſhake off the Turkiſh yoke, having, according to advices from the eaſt, ſeveral times defeated the Ottoman troops: but it ſeems either his former good fortune forſook him, or an accommodation took place; for all the intelligence from that part of the world, for ſome time paſt, hath been entirely ſilent with regard to him.

The capital of the country is TEFLIS; for an account of which, ſee that article.

Georgia.

GEORGIA, one of the provinces of the Britiſh empire in America, lying betweeen South Carolina and Florida. It extends 120 miles upon the ſea-coaſt, and 300 miles from thence to the Apalachian mountains, and its boundaries to the north and ſouth are the rivers Savannah and Alatamaha. The Britiſh miniſtry had been long deſirous of erecting a colony on this tract of country, that was conſidered as dependent upon Carolina. One of thoſe inſtances of benevolence, which liberty, the ſource of every patriotic virtue, renders more frequent in Britain than in any other other country, ſerved to determine the views of government with regard to this place. A rich and humane citizen, at his death, left the whole of his eſtate to ſet at liberty ſuch inſolvent debtors as were detained in priſon by their creditors. Prudential reaſons of policy concurred in the performance of this will dictated by humanity; and the government gave orders, that ſuch unhappy priſoners as were releaſed, ſhould be tranſplanted into that deſert country, which was now intended to be peopled. It was named *Georgia*, in honour of the reigning ſovereign.

The parliament added 9,843 l. 15 s. to the eſtate left by the will of a citizen; and a voluntary ſubſcription produced a much more conſiderable ſum. General Oglethorpe was fixed upon to direct theſe public finances, and to carry into execution ſo excellent a project. He choſe to conduct, himſelf, the firſt coloniſts that were ſent to Georgia; where he arrived in January 1733, and fixed his people on a ſpot ten miles diſtant from the ſea, in an agreeable and fertile plain on the banks of the Savannah. This riſing ſettlement was called *Savannah*, from the name of the river; and inconſiderable as it was in its infant ſtate, was, however, to become the capital of a flouriſhing colony. It conſiſted at firſt of no more than 100 perſons; but before the end of the year the number was increaſed to 618, of whom 127 had emigrated at their own expence. Three hundred men, and 113 women, 102 lads, and 83 girls, formed the beginning of this new population, and the hopes of a numerous poſterity.

Raynal's Hiſt.

This ſettlement was increaſed in 1735 by the arrival of ſome Scotch Highlanders. Their national courage induced them to accept an eſtabliſhment offered them upon the borders of the Alatamaha, to defend the colony, if neceſſary, againſt the attacks of the neighbouring Spaniards. Here they built the towns of Darien and Frederica, and ſeveral of their countrymen came over to ſettle among them.

In the ſame year, a great number of Proteſtants driven out of Saltzburg by a fanatical prieſt, embarked for Georgia to enjoy peace and liberty of conſcience. At firſt they ſettled on a ſpot juſt above that of the infant colony; but they afterwards choſe to be at a greater diſtance, and to go as far down as the mouth of the Savannah, where they built a town called *Ebenezer*.

Some Switzers followed the example of theſe wiſe Saltzburghers, though they had not, like them, been perſecuted. They alſo ſettled on the banks of the Savannah; but at the diſtance of 34 miles from the Germans. Their colony conſiſting of 100 habitations, was named *Puriſburgh*, from Pury their founder; who having been at the expence of their ſettlement, was deſervedly choſen their chief, in teſtimony of their gratitude to him.

In theſe four or five colonies, ſome men were found more inclined to trade than agriculture. Theſe, therefore,

fore, ſeparated from the reſt in order to build the city Auguſta, 236 miles diſtant from the ocean. The goodneſs of the ſoil, though excellent in itſelf, was not the motive of their fixing upon this ſituation; but they were induced to it by the facility it afforded them of carrying on the peltry trade with the ſavages. Their project was ſo ſucceſsful, that, as early as the year 1739, 600 people were employed in this commerce. The ſale of theſe ſkins was carried on with the greater facility from the circumſtance of the Savannah admitting the largeſt ſhips to ſail upon it as far as the walls of Auguſta.

The mother-country ought, one would imagine, to have formed great expectations from a colony, where ſhe had ſent near 5000 men, and laid out 64,968 l. excluſive of the voluntary contributions that had been raiſed by zealous patriots. But to her great ſurpriſe ſhe received information in 1741, that there remained ſcarce a ſixth part of that numerous colony ſent to Georgia; who being now totally diſcouraged, ſeemed only deſirous to fix in a more favourable ſituation. The reaſons of theſe calamities were inquired into and diſcovered.

This colony, even in its infancy, brought with it the ſeeds of its decay. The government, together with the property of Georgia had been ceded to individuals. The firſt uſe that the proprietors of Georgia made of the unlimited power they were inveſted with was to eſtabliſh a ſyſtem of legiſlation, that made them entirely maſters not only of the police, juſtice, and finances, of the country, but even of the lives and eſtates of its inhabitants. Every ſpecies of right was withdrawn from the people, who are the original poſſeſſors of them all. Obedience was required of the people, though contrary to their intereſt and knowledge; and it was conſidered here, as in other countries, as their duty and their fate.

As great inconveniences had been found to ariſe in other colonies from large poſſeſſions, it was thought proper in Georgia to allow each family only 50 acres of land; which they were not permitted to mortgage, or even to diſpoſe of by will to their female iſſue. This laſt regulation of making only the male iſſue capable of inheritance, was ſoon aboliſhed; but there ſtill remained too many obſtacles to excite a ſpirit of emulation. It ſeldom happens, that a man reſolves to leave his country but upon the proſpect of ſome great advantage that works ſtrongly upon his imagination. All limits, therefore, preſcribed to his induſtry, are ſo many checks which prevent him from engaging in any project. The boundaries aſſigned to every plantation muſt neceſſarily have produced this bad effect. Several other errors ſtill affected the original plan of this country, and prevented its increaſe.

The taxes impoſed upon the moſt fertile of the Britiſh colonies, are very inconſiderable; and even theſe are not levied till the ſettlements have acquired ſome degree of vigour and proſperity. From its infant ſtate, Georgia had been ſubjected to the fines of a feudal government, with which it had been as it were fettered. The revenues raiſed by this kind of ſervice increaſed prodigiouſly, in proportion as the colony extended itſelf. The founders of it, blinded by a ſpirit of avidity, did not perceive that the ſmalleſt duty impoſed upon the trade of a populous and flouriſhing province, would much ſooner enrich them than the largeſt fines laid upon a barren and uncultivated country.

To this ſpecies of oppreſſion was added another, which, however incredible it may appear, might ariſe from a ſpirit of benevolence. The planters in Georgia were not allowed the uſe of ſlaves. Carolina and ſome other colonies having been eſtabliſhed without their aſſiſtance, it was thought that a country deſtined to be the bulwark of thoſe Amrican poſſeſſions ought not to be peopled by a ſet of ſlaves, who could not be in the leaſt intereſted in the defence of their oppreſſors. But it was not at the ſame time foreſeen, that coloniſts, who were leſs favoured than their neighbours by the mother-country, who were ſituated in a country leſs ſuſceptible of tillage, and in a hotter climate, would want ſtrength and ſpirit to undertake a cultivation that required greater encouragement.

The indolence which ſo many obſtacles gave riſe to, found a further excuſe in another prohibition that had been impoſed. The diſturbances produced by the uſe of ſpirituous liquors over all the continent of North America, induced the founders of Georgia to forbid the importation of rum. This prohibition, though well intended, deprived the coloniſts of the only liquor that could correct the bad qualities of the waters of the country, which were generally unwholeſome; and of the only means they had to reſtore the waſte of ſtrength and ſpirits that muſt be the conſequence of inceſſant labour. Beſides this, it prevented their commerce with the Antilles; as they could not go thither to barter their wood, corn, and cattle, that ought to have been their moſt valuable commodities, in return for the rum of thoſe iſlands.

The mother-country at length perceived how much theſe defects in the political regulations and inſtitutions had prevented the increaſe of the colony, and freed them from the reſtraints they had before been clogged with. The government in Georgia was ſettled upon the ſame plan as that which had rendered Carolina ſo flouriſhing; and, inſtead of being dependent on a few individuals, became one of the national poſſeſſions.

GEORGIA *Southern*. See AMERICA, n° 20.

GEORGIC, a poetical compoſition upon the ſubject of huſbandry, containing rules therein, put into a pleaſing dreſs, and ſet off with all the beauties and embelliſhments of poetry. The word is borrowed from the Latin *georgicus*, and that of the Greek γεωργικος, of γη, *terra*, "earth," and εργαζομαι, *opero*, "I work, or labour," of εργον, *opus*, "work."

Heſiod and Virgil are the two greateſt maſters in this kind of poetry.

The moderns have produced nothing in this kind, except Rapin's book of Gardening; and the celebrated poem entitled Cyder, by Mr Philips, who, if he had enjoyed the advantage of Virgil's language, would have been ſecond to Virgil in a much nearer degree.

GERANITES, in natural hiſtory, an appellation given to ſuch of the ſemipellucid gems as are marked with a ſpot reſembling a crane's eye.

GERANIUM, crane's bill; a genus of the decandria order, belonging to the monodelphia claſs of plants. There are 57 ſpecies; the moſt remarkable of which are, 1. The Prateneſe, with a crowfoot leaf, and large blue flowers, a native of many parts of Britain, growing in moiſt meadows, but is often planted in gardens on account of the beauty of its flowers. Of this there are two varieties, with white, and variegated flowers. 2. The ſanguineum, a native of Germany and Switzerland, with deep-red or purple flowers from the ſide of the branches, one upon each foot-ſtalk. Of this there are ſeveral varieties, differing from one another chiefly in the figure of the ſtalks and leaves. 3. The phæum, a native of the Alps and Helvetian mountains, with blackiſh purple flowers, two upon each footſtalk. 4. The nodoſum, a native of France, with pale purple flowers, two upon each footſtalk. 5. The macnorrhizum, or ſweet-ſmelling geranium, a native of Germany and Switzerland, with beautiful purple flowers. 6. The ſtriatum, with white flowers, beautifully variegated with purple. 7. The zonale, a native of the Cape of Good Hope, with an hairy lady's-mantle leaf, red flowers, and a ſhrubby ſtalk branching ſix or eight feet high.

The firſt ſix ſpecies are hardy plants, with fibrous perennial roots, and annual ſtalks which riſe from the root in ſpring. The flowers come out in May, June, and July; and are extremely numerous, each conſiſting of five ſmall ſpreading petals. Theſe are ſucceeded by plenty of ſeed in Auguſt and September; which, if permitted to ſcatter, will raiſe an abundant crop of young plants. They may alſo be propagated by parting the roots. The laſt ſort is that moſt commonly cultivated in gardens; but being a native of a warm climate, will not bear the open air here in the winter-time. There is a variety of this ſpecies, which is particularly valued on account of its finely variegated leaves.

GERARD (John), a learned Lutheran divine, was profeſſor of divinity, and rector of the academy of Jena, the place of his birth. He wrote, 1. The harmony of the Eaſtern languages; 2. A treatiſe on the Coptic church; and other works which are eſteemed. He died in 1668.

GERARDE (John), a ſurgeon in London, and the greateſt botaniſt of his time, was many years chief gardener to Lord Burleigh; who was himſelf a great lover of plants, and had the beſt collection of any nobleman in the kingdom, among which were a great number of exotics introduced by Gerarde. In 1597 he publiſhed his *Herbal*, which was printed at the expence of J. Norton, who procured the figures from Francfort. In 1663, Thomas Johnſon, an apothecary, publiſhed an improved edition of Gerarde's book; which met with ſuch approbation by the Univerſity of Oxford, that they conferred on him the degree of doctor of phyſic; and it is ſtill much eſteemed. The deſcriptions in the herbal are plain and familiar; and both theſe authors have laboured more to make their readers underſtand the characters of the plants, than to inform them that they themſelves underſtood Greek and Latin.

GERBIER, (Sir Balthazar), a painter of Antwerp, born in the year 1592, diſtinguiſhed himſelf by painting ſmall figures in diſtemper. King Charles I. was ſo pleaſed with his performances, that he invited him to his court, where he obtained the eſteem of the Duke of Buckingham, and grew into great favour. He was not only knighted, but ſent to Bruſſels, where he long reſided as agent for the king of Great Britain.

GERM, among gardeners. See Gemma.

GERMAN, in genealogy, denotes *entire* or *whole*: thus, a brother-german is one both by the father's and mother's ſide; and couſins-german are the children of brothers or ſiſters.

German, or *Germanic*, alſo denotes any thing belonging to Germany; as the German empire, German flute, &c.

GERMANDER, in botany. See the article Teucrium.

GERMANICUS Cæsar, the ſon of Druſus, and paternal nephew to the emperor Tiberius, who adopted him; a renowned general, but ſtill more illuſtrious for his virtues. He took the title of *Germanicus* from his conqueſts in that country; and though he had the moderation to refuſe the empire offered to him by his army, Tiberius, jealous of his ſucceſs, and of the univerſal eſteem he acquired, cauſed him to be poiſoned, A. D. 29, aged 34. He was a protector of learning; and compoſed ſome Greek comedies and Latin poems, ſome of which are ſtill extant.

GERMANY, a very extenſive empire of Europe, but which, in different ages of the world, hath had very different limits. Its name, according to the moſt probable conjecture, is derived from the Celtic words *Ghar man*, ſignifying a warlike man, to which their other name, *Allman*, or *Aleman*, likewiſe alludes.

The ancient hiſtory of the Germans is altogether wrapped up in obſcurity; nor do we, for many ages, know any thing more of them, than what may be learned from the hiſtory of their wars with the Romans. The firſt time we find them mentioned by the Roman hiſtorians, is about the year 211 B. C. at which time Marcellus ſubdued Inſubria and Liguria, and defeated the Gæſatæ, a German nation, ſituated on the banks of the Rhine. From this time hiſtory is ſilent with regard to any of theſe northern nations, till the eruption of the Cimbri and Teutones, who inhabited the moſt northerly parts of Germany. The event of their enterpriſe is related under the articles Ambrones, Cimbri, and Teutones. We muſt not, however, imagine, becauſe theſe people happened to invade Italy at the ſame time, that therefore their countries were contiguous to one another. The Cimbri and Teutones only, dwelt beyond the Rhine; while the Ambrones inhabited the country between Switzerland and Provence. It is indeed very difficult to fix the limits of the country called *Germany* by the Romans. The ſouthern Germans were intermixed with the Gauls, and the northern ones with the Scythians; and thus the ancient hiſtory of the Germans includes that of the Dacians, Huns, Goths, &c. till the deſtruction of the weſtern Roman empire by them. Ancient Germany, therefore, we may reckon to have included the northern part of France, the Netherlands, Holland, *Germany* ſo called at preſent, Denmark, Pruſſia, Poland, Hungary, part of Turky in Europe, and Muſcovy.

1
Limits of ancient Germany.

The Romans divided Germany into two regions; Belgic or Lower Germany, which lay to the ſouthward of the Rhine; and Germany Proper, or High Germany. The firſt lay between the rivers Seine and the Rhine; and in this we find a number of different nations, the moſt remarkable of which were the following.

2
Nations inhabiting Lower Germany.

1. The Ubii, whoſe territory lay between the Rhine and the Moſa or Maeſe, and whoſe capital was the city of Cologne. 2. Next to them were the Tungri, ſuppoſed to be the ſame whom Cæſar calls *Eburones* and *Condruſi*; and whoſe metropolis, then called *Attuatica*, has ſince been named *Tongres*. 3. Higher up from them, and on the other ſide of the Moſelle, were the Treviri, whoſe capital was Auguſta Trevirorum, now *Triers*. 4. Next to them were the Tribocci, Nemetes, and Vangiones. The former dwelt in Alſace, and had Argentoratum, now *Straſburg*, for their capital: the others inhabited the cities of Worms, Spire, and Mentz. 5. The Mediomatrici were ſituated along the Moſelle, about the city of Metz in Lorrain; and above them were ſituated another German nation, named *Raurici*, *Rauraci*, or *Rauriaci*, and who inhabited that part of Helvetia, or Switzerland, about Baſil. To the weſtward and ſouthward of theſe were the Nervii, Sueſſones, Silvanectes, Leuci, Rhemi, Lingones, &c. who inhabited Belgic Gaul.

Between the heads of the Rhine and Danube were ſeated the ancient kingdom of Vindelicia, whoſe capital was called *Auguſta Vindelicorum*, now *Augſburg*. Below it on the banks of the Danube were the kingdoms of Noricum and Pannonia. The firſt of theſe was divided into Noricum *Ripenſe* and *Mediterraneum*. It contained a great part of the provinces of Auſtria, Styria, Carinthia, Tyrol, Bavaria, and ſome others of leſs note. The latter contained the kingdom of Hungary, divided into Upper and Lower; and extending from Illyricum to the Danube, and the mountains Cætii in the neighbourhood of *Vindebona*, now *Vienna*.

3
Nations inhabiting High Germany.

Upper or High Germany lay beyond the Rhine and the Danube. Between the Rhine and the Elbe were the following nations. 1. The Chauci, Upper and Lower; who were divided from each other by the river Viſurges, now the *Weſer*. Their country contained what is now called *Bremen*, *Lunenburg*, *Friezland*, and *Groninghen*. The upper Chauci had the Cheruſci, and the lower the Chamavi on the ſouth-eaſt, and the German Ocean on the north-weſt. 2. The Friſii, upper and lower, were divided from the lower Chauci by the river Amiſia, now the Ems; and from one another by an arm of the Rhine. Their country ſtill retains the name of Frieſland, and is divided into eaſt and weſt; but the latter is now diſmembered from Germany, and become one of the Seven United Provinces. 3. Beyond the Iſela, now the *Iſel*, which bounded the country of the Friſii, were ſituated the Bructeri, who inhabited that tract now called *Broekmorland*; and the Marſi, about the river Luppe. On the other ſide of that river were the *Uſipii* or *Uſipites*; but theſe were famed for often changing their territories, and therefore found in other places. 4. Next to theſe were the Juones, or inhabitants of Juliers, between the Maeſe and the Rhine. 5. The Catti, another ancient and warlike nation, inhabited Heſſe and Thuringia, from the Hartzian mountains to the Rhine and Weſer; among whom were comprehended the Mattiaci, whoſe capital is by ſome thought to be *Marpurg*, by others *Baden*. 6. Next to theſe were the Seducii, bordering upon Suabia; Nariſci, or the ancient inhabitants of Northgow, whoſe capital was Nuremberg; and the Marcomanni, whoſe country anciently reached from the Rhine to the head of the Danube, and to the Neckar. The Marcomanni afterwards went and ſettled in Bohemia and Moravia, under their general or king Maroboduus; and ſome of them in Gaul, whence they drove the Boii, who had ſeated themſelves there. 7. On the other ſide of the Danube, and between the Rhine and it, were the Hermunduri, who poſſeſſed the country now called *Miſnia* in Upper Saxony; though ſome make their territories to have extended much farther, and to have reached quite to, or even beyond, the kingdom of Bohemia, once the ſeat of the Boii, whence its name. 8. Beyond them, on the north of the Danube, was another ſeat of the Marcomanni along the river Albis, or Elbe. 9. Next to Bohemia were ſituated the Quadi, whoſe territories extended from the Danube to Moravia, and the northern part of Auſtria. Theſe are comprehended under the ancient name of *Suevi*; part of whom at length forced their way into Spain, and ſettled a kingdom there. 10. Eaſtward of the Quadi were ſituated the Baſtarnæ, and parted from them by the Granna, now *Gran*; a river that falls into the Danube, and by the Carpathian mountains, from them called *Alpes Baſtarnicæ*. The country of the Baſtarnæ indeed made part of the European Sarmatia, and ſo was without the limits of Germany properly ſo called; but we find theſe people ſo often in league with the German nations, and joining them for the deſtruction of the Romans, that we cannot but account them as one people.

Between thoſe nations already taken notice of, ſeated along the other ſide of the Danube and the Hercynian foreſt, were ſeveral others whoſe exact ſituation is uncertain, viz. the Martingi, Burii, Borades, Lygii, or Logiones, and ſome others, who are placed by our geographers along the foreſt above-mentioned, between the Danube and the Viſtula.

On this ſide the Hercynian foreſt, were the famed Rhætii, now *Griſons*, ſeated among the Alps. Their country, which was alſo called *Weſtern Illyricum*, was divided into Rhætia *Prima* or *Propria*, and *Secunda*; and was then of much larger extent, ſpreading itſelf towards Suabia, Bavaria, and Auſtria.

On the other ſide of the Hercynian foreſt, were, 1. The Suevi, who ſpread themſelves from the Viſtula to the river Elbe. 2. The Longobardi, ſo called, according to ſome, on account of their wearing long beards; but, according to others, on account of their conſiſting of two nations, viz. the Bardi and Lingones. Theſe dwelt along the river Elbe, and bordered ſouthward on the Chauci above-mentioned. 3. The Burgundi, of whoſe original ſeat we are uncertain. 4. The Semnones; who, about the time of Tiberius, were ſeated on the river Elbe. 5. The Angles, Saxons, and Goths; were probably the deſcendants of the Cimbri; and inhabited the countries of Denmark, along the Baltic ſea, and the peninſula of Scandinavia, containing Norway, Sweden, Lapland, and Finmark. 6. The Vandals were a Gothic nation, who, proceeding from Scandinavia, ſettled in the countries now called *Mecklenburgh* and *Brandenburgh*. 7. Of the ſame race were the Dacians, who ſettled themſelves in the neighbourhood of Palus Mæotis, and extended their territories along the banks of the Danube.

Theſe were the names of the German nations who performed the moſt remarkable exploits in their wars with the Romans. Beſides theſe, however, we find mention made of the Scordiſci, a Thracian nation, who afterwards ſettled on the banks of the Danube. About the year 113 B. C. they ravaged Macedon, and cut off a whole Roman army ſent againſt them; the general, M. Porcius Cato, grandſon to Cato the cenſor, being the only perſon who had the good fortune to make his eſcape. After this, they ravaged all Theſſaly; and advanced to the coaſts of the Adriatic, into which, becauſe it ſtopped their farther progreſs, they diſcharged a ſhower of darts. By another Roman general, however, they were driven back into their own country with great ſlaughter; and, ſoon after, Metellus ſo weakened them by repeated defeats, that they were incapable, for ſome time, of making any more attempts on the Roman provinces. At laſt, in the conſulſhip of M. Livius Druſus and L. Calpurnius Piſo, the former prevailed on them to paſs the Danube, which thenceforth became the boundary between the Romans and them. Notwithſtanding this, in the time of the Jugurthine war, the Scordiſci repaſſed the Danube on the ice, every winter, and being joined by the Triballi a people of Lower Mæſia, and the Daci of Upper Mæſia, penetrated as far as Macedon, committing every where dreadful ravages. So early did theſe northern nations begin to be formidable to the Romans, even when they were moſt renowned for warlike exploits.

Till the time of Julius Cæſar, however, we hear nothing more concerning the Germans. About 58 years B. C. he undertook his expedition into Gaul; during which, his aſſiſtance was implored by the Ædui, againſt Arioviſtus, a German prince who oppreſſed them. Cæſar, pleaſed with this opportunity of increaſing his power, invited Arioviſtus to an interview; but this being declined, he next ſent deputies deſiring him to reſtore the hoſtages he had taken from the Ædui, and to bring no more troops over the Rhine into Gaul. To this a haughty anſwer was returned; and a battle ſoon after enſued, in which Arioviſtus was entirely defeated, and with great difficulty made his eſcape.

In 55 B. C. Cæſar having ſubdued the Sueſſones, Bellovaci, Ambiani, Nervii, and other nations of Belgic Gaul, haſtened to oppoſe the Uſipetes and Tencteri. Theſe nations having been driven out of their own country by the Suevi, had croſſed the Rhine with a deſign to ſettle in Gaul. As ſoon as he appeared, the Germans ſent him a deputation, offering to join him provided he would aſſign them lands. Cæſar replied, that there was no room in Gaul for them; but he would deſire the Ubii to give them leave to ſettle among them. Upon this, they deſired time to treat with the Ubii; but in the mean time fell upon ſome Roman ſquadrons: which ſo provoked Cæſar, that he immediately marched againſt them, and, coming unexpectedly upon them, defeated them with great ſlaughter. They fled in the utmoſt confuſion; but the Romans purſued them to the conflux of the Rhine and the Maeſe, where the ſlaughter was renewed with ſuch fury, that almoſt 400,000 of the Germans periſhed. After this, Cæſar being reſolved to ſpread the terror of the Roman name through Germany, built a bridge over the Rhine, and entered that country. In this expedition, however, which was his laſt in Germany, he performed no remarkable exploit. A little before his death, indeed, he had projected the conqueſt of that as well as of a great many other countries; but his aſſaſſination prevented the execution of his deſigns. Nor is there any thing recorded of the Germans till about 17 B. C. when the Tencteri made an irruption into Gaul, and defeated M. Lollius, proconſul of that province. At laſt, however, they were repulſed, and forced to retire with great loſs beyond the Rhine.

6
Rhæti invade Italy.

Soon after this the Rhæti invaded Italy, where they committed the greateſt devaſtations, putting all the males they met to the ſword, without diſtinction of ſex or age: nay, we are told, that when they happened to take women with child, they conſulted their augurs to know whether the child was a male or female; and if they pronounced it a male, the mother was immediately maſſacred. Againſt theſe barbarians was ſent Druſus, the ſecond ſon of Livia, a youth of extraordinary valour and great accompliſhments. He found means to bring them to a battle; in which the Romans proved victorious, and cut in pieces great numbers of their enemies, with very little loſs on their own ſide. Thoſe who eſcaped the general ſlaughter, being joined by the Vindelici, took their route towards Gaul, with a deſign to invade that province. But Auguſtus, upon the firſt notice of their march, diſpatched againſt them Tiberius with ſeveral choſen legions. He was no leſs ſucceſsful than Druſus had been; for, having tranſported his troops over the lake Brigantium, now Conſtance, he fell unexpectedly on the enemy, gave them a total overthrow, took moſt of their ſtrong-holds, and obliged the whole nation to ſubmit to ſuch terms as he choſe to impoſe upon them. Thus were the Vindelici, the Rhæti, and Norici, three of the moſt barbarous nations in Germany, ſubdued. Tiberius, to keep the conquered countries in awe, planted two colonies in Vindelicia, and opened from thence a road into Rhætia and Noricum. One of the cities which he built for the defence of his colonies, he called, from his father Druſus, *Druſomagus*; the other by the name of Auguſtus, *Auguſta Vindelicorum*; which cities are now known by the names of *Mimminghen and Augſburg*. He next encountered the Pannonians, who had been ſubdued by Agrippa, but revolted on hearing the news of that great commander's death, which happened 11 years B. C. Tiberius, however, with the aſſiſtance of their neighbours the Scordiſci, ſoon forced them to ſubmit. They delivered up their arms, gave hoſtages, and put the Romans in poſſeſſion of all their towns and ſtrong-holds. Tiberius ſpared their lives; but laid waſte their fields, plundered their cities, and ſent the beſt part of their youth into other countries.

7
They are ſubdued, together with the Vindelici and Norici.

8
And the Pannonians.

In the mean time, Druſus having prevented the Gauls from revolting, which they were ready to do, prepared to oppoſe the Germans who dwelt beyond the Rhine. They had collected the moſt numerous and formidable army that had ever been ſeen in thoſe parts; with which they were advancing towards the Rhine, in order to invade Gaul. Druſus defeated them as they attempted to croſs that river; and, purſuing the advantage he had gained, entered the country of the

9 Exploits of Druſus in Germany.

Uſipetes, now *Relinchuſen*, and from thence advanced againſt the Sicambri, in the neighbourhood of the Lyppe and Iſſel. Them he overthrew in a great battle, laid waſte their country, burnt moſt of their cities, and, following the courſe of the Rhine, approached the German ocean, reducing the Friſii and the Chauci between the Ems and the Elbe. In theſe marches the troops ſuffered extremely for want of proviſions; and Druſus himſelf was often in great danger of being drowned, as the Romans who attended him were at that time quite unacquainted with the flux and reflux of the ocean.

The Roman forces went into eaſt Frieſland for their winter-quarters; and next year (10 B. C.) Druſus marched againſt the Tencteri, whom he eaſily ſubdued. Afterwards, paſſing the Lupias, now the Lyppe, he reduced the Catti and Cheruſci, extending his conqueſts to the banks of the Viſurgis or Weſer: which he would have paſſed, had he not been in want of proviſions, the enemy haing laid waſte the country to a conſiderable diſtance. As he was retiring, the Germans unexpectedly fell upon him in a narrow paſſage; and having ſurrounded the Roman army, cut a great many of them in pieces. But Druſus having animated his men by his example, after a bloody conflict, which laſted the whole day, the Germans were defeated with ſuch ſlaughter, that the ground was ſtrewed for ſeveral miles with dead bodies. Druſus found in their camp a great quantity of iron-chains which they had brought for the Romans; and ſo great was their confidence, that they had agreed before-hand about the diviſion of the booty. The Tencteri were to have the horſe, the Cheruſci and Sicambri the baggage, and the Uſipetes and Catti the captives. After this victory, Druſus built two forts to keep the conquered countries in awe; the one at the confluence of the Lyppe and the Alme, the other in the country of the Catti on the Rhine. On this occaſion alſo he made a famous canal, long after called in honour of him *Foſſa Druſiana*, to convey the waters of the Rhine into the Sala or Sale. It extended eight miles; and was very convenient for conveying the Roman troops by water to the countries of the Friſii and Chauci, which was the deſign of the undertaking.

The following year, (9 B. C.), Auguſtus, bent on ſubduing the whole of Germany, advanced to the banks of the Rhine, attended by his two ſons-in-law Tiberius and Druſus. The former he ſent againſt the Daci, who lived on the ſouth ſide of the Danube; and the latter to complete the conqueſts he had ſo ſucceſsfully begun in the weſtern parts of Germany. The former eaſily overcame the Daci, and tranſplanted 40,000 of them into Gaul. The latter, having paſſed the Rhine, ſubdued all the nations from that river to the Elbe; but having attempted in vain to croſs this laſt, he ſet out for Rome: an end, however, was put to his conqueſts and his life by a violent fever, with which he was ſeized on his return.

After the death of Druſus, Tiberius again over-ran all thoſe countries in which Druſus had ſpent the preceding ſummer; and ſtruck ſome of the northern nations with ſuch terror, that they ſent deputies to ſue for peace. This, however, they could not obtain upon any terms; the emperor declaring that he would not conclude a peace with one, unleſs they all deſired it. But the Catti, or according to ſome the Sicambri, could not by any means be prevailed upon to ſubmit; ſo that the war was ſtill carried on, though in a languid manner, for about 18 years. During this period, ſome of the German nations had quitted their foreſts, and begun to live in a civilized manner under the protection of the Romans; but one Quintilius Varus being ſent to command the Roman forces in that country, ſo provoked the inhabitants by his extortions, that not only thoſe who ſtill held out refuſed to ſubmit, but even the nations that had ſubmitted were ſeized with an eager deſire of throwing off the yoke. Among them was a young nobleman of extraordinary parts and valour, named *Arminius*. He was the ſon of Sigimer, one of the moſt powerful lords among the Catti, had ſerved with great reputation in the Roman armies, and been honoured by Auguſtus with the privileges of a Roman citizen and the title of knight. But the love of his country prevailing over his gratitude, he reſolved to improve the general diſcontent which reigned among his countrymen, to deliver them from the bondage of a foreign dominion. With this view he engaged, underhand, the leading men of all the nations between the Rhine and the Elbe, in a conſpiracy againſt the Romans. In order to put Varus off his guard, he at the ſame time adviſed him to ſhew himſelf to the inhabitants of the more diſtant provinces, adminiſter juſtice among them, and accuſtom them, by his example, to live after the Roman manner, which he ſaid would more effectually ſubdue them than the Roman ſword. As Varus was a man of a peaceable temper, and averſe from military toils, he readily conſented to this inſidious propoſal; and, leaving the neighbourhood of the Rhine, marched into the country of the Cheruſci. Having there ſpent ſome time in hearing cauſes and deciding civil controverſies, Arminius perſuaded him to weaken his army, by ſending out detachments to clear the country of robbers. When this was done, ſome diſtant nations of Germany roſe up in arms by Arminius's directions; while thoſe through which Varus was to paſs in marching againſt them, pretended to be in a ſtate of profound tranquillity, and ready to join the Romans againſt their enemies.

On the firſt news of the revolt, Varus marched againſt the enemy with three legions and ſix cohorts; but being attacked by the Germans as he paſſed through a wood, his army was almoſt totally cut off, while he himſelf and moſt of his officers fell by their own hands. Such a terrible overthrow, though it raiſed a general conſternation in Rome, did not, however, diſhearten Auguſtus, or cauſe him to abandon his enterpriſe. About two years after, (A. D. 12), Tiberius and Germanicus were appointed to command in Germany. The death of Auguſtus, however, which happened ſoon after, prevented Tiberius from going on his expedition; and Germanicus was for ſome time hindered from proceeding in his, by a revolt of the legions, firſt in Pannonia, and then in Germany. About the year 15, Germanicus having brought over the ſoldiers to their duty, laid a bridge acroſs the Rhine, over which he marched 12,000 legionaries, 26 cohorts of the allies, and eight *alæ* (ſquadrons of 300 each) of horſe. With theſe he firſt traverſed the Cœſian foreſt, (part of the Hercynian, and thought to lie partly ly in the duchy of Cleves, and partly in Weſtphalia), and ſome other woods. On his march he was informed that the Marſi were celebrating a feſtival with great mirth and jollity. Upon this he advanced with ſuch expedition, that he ſurpriſed them in the midſt of their debauch; and giving his army full liberty to make what havock they pleaſed, a terrible maſſacre enſued, and the country was deſtroyed with fire and ſword for 50 miles round, without the loſs of a ſingle man on the part of the Romans.—This general maſſacre rouſed the Bructeri, the Tubantes, and the Uſipetes; who, beſetting the paſſes through which the Roman army was to return, fell upon their rear, and put them into ſome diſorder; but the Romans ſoon recovered themſelves, and defeated the Germans with conſiderable loſs.

The following year, (A. D. 16), Germanicus taking advantage of ſome inteſtine broils which happened among the Catti, entered their country, where he put great numbers to the ſword. Moſt of their youth, however, eſcaped by ſwiming over the Adrana, now the *Eder*, and attempted to prevent the Romans from laying a bridge over that river: but being diſappointed in this, ſome of them ſubmitted to Germanicus, while the greater part, abandoning their villages, took refuge in the woods; ſo that the Romans, without oppoſition, ſet fire to all their villages, towns, &c. and having laid their capital in aſhes, began their march back to the Rhine.

Germanicus had ſcarce reached his camp, when he received a meſſage from Segeſtes, a German prince, in the intereſt of the Romans, acquainting him that he was beſieged in his camp by Arminius. On this advice, he inſtantly marched againſt the beſiegers; entirely defeated them; and took a great number of priſoners, among whom was Thuſneldis, the wife of Arminius, and daughter of Segeſtes, whom the former had carried off, and married againſt her father's will. Arminius then, more enraged than ever, for the loſs of his wife, whom he tenderly loved, ſtirred up all the neighbouring nations againſt the Romans. Germanicus, however, without being diſmayed by ſuch a formidable confederacy, prepared himſelf to oppoſe the enemy with vigour: but, that he might not be obliged to engage ſuch numerous forces at once, he detached his Lieutenant Cæcina, at the head of 40 cohorts, into the territories of the Bructeri; while his cavalry, under the command of Pedo, entered the country of the Friſii. As for Germanicus himſelf, he embarked the remainder of his army, conſiſting of four legions, on a neighbouring lake; and tranſported them by rivers and canals to the place appointed on the river Ems, where the three bodies met. In their march they found the ſaid remains of the legions conducted by Varus, which they buried with all the ceremony their circumſtances could admit. After this they advanced againſt Arminius, who retired and poſted himſelf advantageouſly cloſe to a wood. The Roman general followed him; and coming up with him, ordered his cavalry to advance and attack the enemy. Arminius, at their firſt approach, pretended to fly; but ſuddenly wheeled about, and giving the ſignal to a body of troops, whom he had concealed in the wood, to ruſh out, obliged the cavalry to give ground. The cohorts then advanced to their relief; but they too were put into diſorder, and would have been puſhed into a moraſs, had not Germanicus himſelf advanced with the reſt of the cavalry to their relief. Arminius did not think it prudent to engage theſe freſh troops, but retired in good order; upon which Germanicus alſo retired towards the Ems. Here he embarked with four legions, ordered Cæcina to reconduct the other four by land, and ſent the cavalry to the ſea-ſide, with orders to march along the ſhore to the Rhine. Though Cæcina was to return by roads well known, yet Germanicus adviſed him to paſs, with all poſſible ſpeed, a cauſeway, called the *long bridges*, which led acroſs vaſt marſhes, ſurrounded on all ſides with woods and hills that gently roſe from the plain.

Arminius, however, having got notice of Cæcina's march, arrived at the long bridges before Cæcina, and filled the woods with his men, who, on the approach of the Romans, ruſhed out, and attacked them with great fury. The legions, not able to manage their arms in the deep waters and ſlippery ground, were obliged to yield; and would in all probability have been entirely defeated, had not night put an end to the combat. The Germans, encouraged by their ſucceſs, inſtead of refreſhing themſelves with ſleep, ſpent the whole night in diverting the courſes of the ſprings which roſe in the neighbouring mountains; ſo that, before day, the camp which the Romans had begun was laid under water, and their works were overturned. Cæcina was for ſome time at a loſs what to do; but at laſt reſolved to attack the enemy by day break, and, having driven them to their woods, to keep them there in a manner beſieged, till the baggage and wounded men ſhould paſs the cauſeway, and get out of the enemy's reach. But when his army was drawn up, the legions poſted on the wings, ſeized with a ſudden panic, deſerted their ſtations, and occupied a field beyond the marſhes. Cæcina thought it adviſable to follow them; but the baggage ſtuck in the mire, as he attempted to croſs the marſhes, which greatly embaraſſed the ſoldiers. Arminius perceiving this, laid hold of the opportunity to begin the attack; and crying out, "This is a ſecond Varus, the ſame fate attends him and his legions," fell on the Romans with inexpreſſible fury. As he had ordered his men to aim chiefly at the horſes, great numbers of them were killed; and the ground becoming ſlippery with their blood and the ſlime of the marſh, the reſt either fell or threw their riders, and, galloping through the ranks, put them in diſorder. Cæcina diſtinguiſhed himſelf in a very eminent manner; but his horſe being killed, he would have been taken priſoner, had not the firſt legion reſcued him. The greedineſs of the enemy, however, ſaved the Romans from utter deſtruction; for juſt as the legions were quite ſpent, and on the point of yielding, the barbarians on a ſudden abandoned them in order to ſeize their baggage. During this reſpite, the Romans ſtruggled out of the marſh, and having gained the dry fields, formed a camp with all poſſible ſpeed, and fortified it in the beſt manner they could.

The Germans having loſt the opportunity of deſtroying the Romans, contrary to the advice of Arminius, attacked their camp next morning, but were repulſed with great ſlaughter; after which they gave Cæcina no more moleſtation till he reached the banks of the Rhine. Germanicus, in the mean time, having conveyed the legions he had with him down the river Ems into the ocean, in order to return by ſea to the river Rhine, and finding that his veſſels were overloaded, delivered the ſecond and fourteenth legions to Publius Vitellius, deſiring him to conduct them by land. But this march proved fatal to great numbers of them; who were either buried in the quickſands, or ſwallowed up by the overflowing of the tide, to which they were as yet utter ſtrangers. Thoſe who eſcaped, loſt their arms, utenſils, and proviſions; and paſſed a melancholy night upon an eminence, which they had gained by wading up to the chin. The next morning the land returned with the tide of ebb; when Vitellius, by an haſty march, reached the river Uſingis, by ſome thought to be the Hoerenſter, on which the city of Groningen ſtands. There Germanicus, who had reached that river with his fleet, took the legions again on board, and conveyed them to the mouth of the Rhine, whence they all returned to Cologne, at a time when it was reported they were totally loſt.

13
His ſecond expedition.

This expedition, however, coſt the Romans very dear, and procured very few advantages. Great numbers of men had periſhed; and by far the greateſt part of thoſe who had eſcaped ſo many dangers returned without arms, utenſils, horſes, &c. half naked, lamed, and unfit for ſervice. The next year, however, Germanicus, bent on the entire reduction of Germany, made vaſt preparations for another expedition. Having conſidered the various accidents that had befallen him during the war, he found that the Germans were chiefly indebted for their ſafety to their woods and marſhes, their ſhort ſummers and long winters; and that his troops ſuffered more from their long and tedious marches than from the enemy. For this reaſon he reſolved to enter the country by ſea, hoping by that means to begin the campaign earlier, and ſurpriſe the enemy. Having therefore built with great diſpatch, during the winter, 1000 veſſels of different ſorts, he ordered them early in the ſpring (A. D. 16) to fall down the Rhine, and appointed the iſland of the Batavians for the general rendezvous of his forces. When the fleet was ſailing, he detached Silius one of his lieutenants, with orders to make a ſudden irruption into the country of the Catti; and, in the mean time, he himſelf, upon receiving intelligence that a Roman fort on the Luppias was beſieged, haſtened with ſix legions to its relief. Silius was prevented, by ſudden rains, from doing more than taking ſome ſmall booty, with the wife and daughter of Arpen king of the Catti; neither did thoſe who beſieged the fort wait the arrival of Germanicus. In the mean time, the fleet arriving at the iſland of the Batavians, the proviſions and warlike engines were put on board and ſent forward; ſhips were aſſigned to the legions and allies; and the whole army being embarked, the fleet entered the canal formerly cut by Druſus, and from his name called *Foſſa Druſiana*. Hence he ſailed proſperouſly to the mouth of the Ems; where, having landed his troops, he marched directly to the Weſer, where he found Arminius encamped on the oppoſite bank, and determined to diſpute his paſſage. The next day Arminius drew out his troops in order of battle: but Germanicus, not thinking it adviſable to attack them, ordered the horſe to ford over under the command of his lieutenants Stertinius and Emilius; who, to divide the enemy's forces, croſſed the river in two different places. At the ſame time Cariovalda, the leader of the Batavian auxiliaries, croſſed the river where it was moſt rapid: but, being drawn into an ambuſcade, he was killed, together with moſt of the Batavian nobility; and the reſt would have been totally cut off, had not Stertinius and Emilius haſtened to their aſſiſtance. Germanicus in the mean time paſſed the river without moleſtation. A battle ſoon after enſued; in which the Germans were defeated with ſo great a ſlaughter that the ground was covered with arms and dead bodies for more than ten miles round; and among the ſpoils taken on this occaſion, were found, as formerly, the chains with which the Germans had hoped to bind their captives.

In memory of this ſignal victory Germanicus raiſed a mount, upon which he placed as trophies the arms of the enemy, and inſcribed underneath the names of the conquered nations. This ſo provoked the Germans, though already vanquiſhed and determined to abandon their country, that they attacked the Roman army unexpectedly on its march, and put them into ſome diſorder. Being repulſed, they encamped between a river and a large foreſt ſurrounded by a marſh except on one ſide, where it was incloſed by a broad rampart formerly raiſed by the Angrivarii as a barrier between them and the Cheruſci. Here another battle enſued; in which the Germans behaved with great bravery, but in the end were defeated with great ſlaughter.

After this ſecond defeat, the Angrivarii ſubmitted, and were taken under the protection of the Romans, and Germanicus put an end to the campaign. Some of the legions he ſent to their winter-quarters by land, while he himſelf embarked with the reſt on the river Ems, in order to return by ſea. The ocean proved at firſt very calm, and the wind favourable: but all of a ſudden a ſtorm ariſing, the fleet, conſiſting of 1000 veſſels, was diſperſed: ſome of them were ſwallowed up by the waves; others were daſhed in pieces againſt the rocks, or driven upon remote and unhoſpitable iſlands, where the men either periſhed by famine, or lived upon the fleſh of the dead horſes with which the ſhores ſoon appeared ſtrewed; for, in order to lighten their veſſels, and diſengage them from the ſhoals, they had been obliged to throw overboard their horſes and beaſts of burden, nay, even their arms and baggage. Moſt of the men, however, were ſaved, and even great part of the fleet recovered. Some of them were driven upon the coaſt of Britain; but the petty kings who reigned there, generouſly ſent them back.

On the news of this misfortune, the Catti, taking new courage, ran to arms; but Caius Silius being detached againſt them with 30,000 foot and 3000 horſe, kept them in awe. Germanicus himſelf, at the head of a numerous body, made a ſudden irruption into the territories of the Marſi, where he recovered one of Varus's eagles, and having laid waſte the country, he returned to the frontiers of Germany, and put his troops into winter-quarters; whence he was ſoon recalled by Tiberius, and never ſuffered to return into Germany again.

After the departure of Germanicus, the more northern nations of Germany were no more moleſted by the Romans. Arminius carried on a long and ſucceſsful war with Maroboduus king of the Marcomanni,

manni, whom he at laſt expelled, and forced to apply to the Romans for aſſiſtance; but, excepting Germanicus, it ſeems they had at this time no other general capable of oppoſing Arminius, ſo that Maroboduus was never reſtored. After the final departure of the Romans, however, Arminius having attempted to enſlave his country, fell by the treachery of his own kindred. The Germans held his memory in great veneration; and Tacitus informs us, that in his time they ſtill celebrated him in their ſongs.

15
h of
inius.

Nothing remarkable occurs in the hiſtory of Germany from this time till the reign of the emperor Claudius. A war indeed is ſaid to have been carried on by Lucius Domitius, father to the emperor Nero. But of his exploits we know nothing more than that he penetrated beyond the river Elbe, and led his army farther into the country than any of the Romans had ever done. In the reign of Claudius, however, the German territories were invaded by Cn. Domitius Corbulo, one of the greateſt generals of his age. But when he was on the point of forcing them to ſubmit to the Roman yoke, he was recalled by Claudius, who was jealous of the reputation he had acquired.

In the reign of Veſpaſian, a terrible revolt happened among the Batavians and thoſe German nations who had ſubmitted to the Romans, a particular account of which is given under the article Rome. The revolters were with difficulty ſubdued; but, in the reign of Domitian, the Dacians invaded the empire, and proved a more terrible enemy than any of the other German nations had been. After ſeveral defeats, the emperor was at laſt obliged to conſent to pay an annual tribute to Decebalus king of the Dacians; which continued to the time of Trajan. But this warlike prince refuſed to pay tribute; alleging, when it was demanded of him, that "he had never been conquered by Decebalus." Upon this the Dacians paſſed the Danube, and began to commit hoſtilities in the Roman territories. Trajan, glad of this opportunity to humble an enemy whom he began to fear, drew together a mighty army, and marched with the utmoſt expedition to the banks of the Danube. As Decebalus was not appriſed of his arrival, the emperor paſſed the river without oppoſition, and entering Dacia, laid waſte the country with fire and ſword. At laſt he was met by Decebalus with a numerous army. A bloody engagement enſued, in which the Dacians were defeated; tho' the victory coſt the Romans dear: the wounded were ſo numerous, that they wanted linen to bind up their wounds; and to ſupply the defect, the emperor generouſly devoted his own wardrobe. After the victory, he purſued Decebalus from place to place, and at laſt obliged him to conſent to a peace on the following terms. 1. That he ſhould ſurrender the territories which he had unjuſtly taken from the neighbouring nations. 2. That he ſhould deliver up his arms, his warlike engines, with the artificers who made them, and all the Roman deſerters. 3. That, for the future, he ſhould entertain no deſerters, nor take into his ſervice the natives of any country ſubject to Rome. 4. That he ſhould diſmantle all his fortreſſes, caſtles, and ſtrong-holds; and laſtly, that he ſhould have the ſame friends and foes with the people of Rome.

16
Daci-
invade
Roman
ire.

With theſe hard terms Decebalus was obliged to comply, though ſore againſt his will; and being introduced to Trajan, threw himſelf on the ground before him, acknowledging himſelf his vaſſal: after which the latter, having commanded him to ſend deputies to the ſenate for the ratification of the peace, returned to Rome.

This peace was of no long duration. Four years after, (A. D. 105), Decebalus, unable to live in ſervitude as he called it, began, contrary to the late treaty, to raiſe men, provide arms, entertain deſerters, fortify his caſtles, and invite the neighbouring nations to join him againſt the Romans as a common enemy. The Scythians hearkened to his ſolicitations; but the Jazyges, a neighbouring nation, refuſing to bear arms againſt Rome, Decebalus invaded their country. Hereupon Trajan marched againſt him; but the Dacian, finding himſelf unable to withſtand him by open force, had recourſe to treachery, and attempted to get the emperor murdered. His deſign, however, proved abortive, and Trajan purſued his march into Dacia. That his troops might the more readily paſs and repaſs the Danube, he built a bridge over that river; which by the ancients is ſtiled the moſt magnificent and wonderful of all his works*. To guard the bridge, he ordered two caſtles to be built; one on this ſide the Danube, and the other on the oppoſite ſide; and all this was accompliſhed in the ſpace of one ſummer. Trajan, however, as the ſeaſon was now far advanced, did not think it adviſable to enter Dacia this year, but contented himſelf with making the neceſſary preparations.

17
They are ſubdued by Trajan.

In the year 106, early in the ſpring, Trajan ſet out for Dacia; and having paſſed the Danube on the bridge he had built, reduced the whole country, and would have taken Decebalus himſelf had he not put an end to his own life, in order to avoid falling into the hands of his enemies. After his death the kingdom of Dacia was reduced to a Roman province; and ſeveral caſtles were built in it, and garriſons placed in them, to keep the country in awe.

18
Marcommanni and Quadi formidable to the empire.

After the death of Trajan, the Roman empire began to decline, and the northern nations to be daily more and more formidable. The province of Dacia indeed was held by the Romans till the reign of Gallienus; but Adrian, who ſucceeded Trajan, cauſed the arches of the bridge over the Danube to be broken down, leſt the barbarians ſhould make themſelves maſters of it, and invade the Roman territories. In the time of Marcus Aurelius, the Marcommanni and Quadi invaded the empire, and gave the emperor a terrible overthrow. He continued the war, however, with better ſucceſs afterwards, and invaded their country in his turn. It was during the courſe of this war that the Roman army is ſaid to have been ſaved from deſtruction by that miraculous event related under the article Christians, in Vol. III. p. 1935. par. ult.

In the end, the Marcommanni and Quadi were, by repeated defeats, brought to the verge of deſtruction; inſomuch that their country would probably have been reduced to a Roman province, had not Marcus Aurelius been diverted from purſuing his conqueſts by the revolt of one of his generals. After the death of Marcus Aurelius, the Germanic nations became every day more and more formidable to the Romans. Far from being able to invade and attempt the conqueſt of theſe northern countries, the Romans had the greateſt difficulty to repreſs the incurſions of their inhabitants. But for a particular account of their various invaſions of the Roman empire, and its total deſtruction by them at laſt, ſee the article Rome.

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* See *Architecture*, n° 138.

19 Roman empire deſtroyed by the Heruli.

The immediate deſtroyers of the Roman empire were the Heruli; who, under their leader Odoacer, dethroned Auguſtulus the laſt Roman emperor, and proclaimed Odoacer king of Italy. The Heruli were ſoon expelled by the Oſtrogoths; and theſe in their turn were ſubdued by Juſtinian, who re-annexed Italy to the eaſtern empire. But the Popes found means to obtain the temporal as well as ſpiritual juriſdiction over a conſiderable part of the country, while the Lombards ſubdued the reſt. Theſe laſt proved very troubleſome to the Popes, and at length beſieged Adrian I. in his capital. In this diſtreſs he applied to Charles the Great, king of France; who conquered both Italy and Germany, and was crowned emperor of the weſt in 800. See France, n° 24, *&c.*

20 Hiſtory of Germany ſince the time of Charlemagne.

The poſterity of Charlemagne inherited the empire of Germany until the year 880; at which time the different princes aſſumed their original independence, rejected the Carlovinian line, and placed Arnulph king of Bohemia on the throne. Since this time, Germany has ever been conſidered as an elective monarchy. Princes of different families, according to the prevalence of their intereſt and arms, have mounted the throne. Of theſe the moſt conſiderable, until the Auſtrian line acquired the imperial power, were the houſes of Saxony, Franconia, and Swabia. The reigns of theſe emperors contain nothing more remarkable than the conteſts between them and the popes; for an account of which, ſee the article Italy. From hence, in the beginning of the 13th century, aroſe the factions of the Guelphs and Gibelines, of which the former was attached to the popes, and the latter to the emperor; and both, by their virulence and inveteracy, tended to diſquiet the empire for ſeveral ages. The emperors too were often at war with the Infidels; and ſometimes, as happens in all elective kingdoms, with one another, about the ſucceſſion.

But what more deſerves our attention is the progreſs of government in Germany, which was in ſome meaſure oppoſite to that of the other kingdoms of Europe. When the empire, raiſed by Charlemagne, fell aſunder, all the different independent princes aſſumed the right of election; and thoſe now diſtinguiſhed by the name of *electors* had no peculiar or legal influence in appointing a ſucceſſor to the imperial throne; they were only the officers of the king's houſehold, his ſecretary, his ſteward, chaplain, marſhal, or maſter of his horſe, &c. By degrees, however, as they lived near the king's perſon, and had, like all other princes, independent territories belonging to them, they increaſed their influence and authority; and in the reign of Otho III. 984, acquired the ſole right of electing the emperor. Thus, while in the other kingdoms of Europe, the dignity of the great lords, who were all originally allodial or independent barons, was diminiſhed by the power of the king, as in France, and by the influence of the people, as in Great Britain; in Germany, on the other hand, the power of the electors was raiſed upon the ruins of the emperor's ſupremacy, and of the people's juriſdiction. In 1440, Frederic III. duke of Auſtria, was elected emperor, and the imperial dignity continued in the male line of that family for 300 years. His ſucceſſor Maximilian married the heireſs of Charles duke of Burgundy; whereby Burgundy, and the 17 provinces of the Netherlands, were annexed to the houſe of Auſtria. Charles V. grandſon of Maximilian, and heir to the kingdom of Spain, was elected emperor in the year 1519. Under him Mexico and Peru were conquered by the Spaniards; and in his reign happened the Reformation in ſeveral parts of Germany, which, however, was not confirmed by public authority till the year 1648, by the treaty of Weſtphalia, and in the reign of Ferdinand III. The reign of Charles V. was continually diſturbed by his wars with the German princes and the French king Francis I. Though ſucceſsful in the beginning of his reign, his good fortune, towards the concluſion of it, began to forſake him; which, with other reaſons, occaſioned his abdication of the crown*.

His brother Ferdinand I. who in 1558 ſucceeded to the throne, proved a moderate prince with regard to religion. He had the addreſs to get his ſon Maximilian declared king of the Romans in his own lifetime, and died in 1564. By his laſt will he ordered, that if either his own male iſſue, or that of his brother Charles, ſhould fail, his Auſtrian eſtates ſhould revert to his ſecond daughter Anne, wife to the elector of Bavaria, and her iſſue. We mention this deſtination, as it gave riſe to the late oppoſition made by the houſe of Bavaria to the pragmatic ſanction, in favour of the empreſs queen of Hungary, on the death of her father Charles VI. The reign of Maximilian II. was diſturbed with internal commotions, and an invaſion from the Turks; but he died in peace, in 1576. He was ſucceeded by his ſon Rodolph; who was involved in wars with the Hungarians, and in differences with his brother Matthias, to whom he ceded Hungary and Auſtria in his lifetime. He was ſucceeded in the empire by Matthias; under whom the reformers, who went under the names of *Lutherans* and *Calviniſts*, were ſo much divided among themſelves, as to threaten the empire with a civil war. The ambition of Matthias at laſt tended to reconcile them; but the Bohemians revolted, and threw the imperial commiſſaries out of a window at Prague. This gave riſe to a ruinous war, which laſted 30 years. Matthias thought to have exterminated both parties; but they formed a confederacy, called the *Evangelic League*, which was counterbalanced by a Catholic league.

Matthias dying in 1618, was ſucceeded by his couſin Ferdinand II.; but the Bohemians offered their crown to Frederic the elector Palatine, the moſt powerful Proteſtant prince in Germany, and ſon-in-law to his Britannic majeſty James I. That prince was incautious enough to accept of the crown: but he loſt it, by being entirely defeated by the duke of Bavaria and the imperial generals at the battle of Prague; and he was even deprived of his electorate, the beſt part of which was given to the duke of Bavaria. The Proteſtant princes of Germany, however, had among them at this time many able commanders, who were at the head of armies, and continued the war with wonderful obſtinacy: among them were the margrave of Baden Durlach, Chriſtian duke of Brunſwic, and count Mansfield; the laſt was one of the beſt generals of the age.

* See Charles

age. Chriſtiern IV. king of Denmark declared for them; and Richlieu, the French miniſter, was not fond of ſeeing the houſe of Auſtria aggrandized. The emperor, on the other hand, had excellent generals; and Chriſtiern, having put himſelf at the head of the evangelic league, was defeated by Tilly, an imperialiſt of great reputation in war. Ferdinand made ſo moderate a uſe of his advantages obtained over the Proteſtants, that they formed a freſh confederacy at Leipſic, of which the celebrated Guſtavus Adolphus king of Sweden was the head. An account of his glorious victories is given under the article SWEDEN. At laſt he was killed at the battle of Lutzen, in 1632. But the Proteſtant cauſe did not die with him. He had brought up a ſet of heroes, ſuch as the duke of Saxe Weimar, Torſtenſon, Banier, and others, who ſhook the Auſtrian power; till, under the mediation of Sweden, a general peace was concluded among all the belligerant powers, at Munſter, in the year 1648; which forms the baſis of the preſent political ſyſtem of Europe.

Ferdinand II. was ſucceeded by his ſon Ferdinand III. This prince died in 1657; and was ſucceeded the emperor Leopold, a ſevere, unamiable, and not very fortunate prince. He had two great powers to contend with, France on the one ſide, and the Turks on the other; and was a loſer in his war with both. France took from him Alſace, and many other frontier places of the empire; and the Turks would have taken Vienna, had not the ſiege been raiſed by John Sobieſki king of Poland. Prince Eugene of Savoy was a young adventurer in arms about the year 1697; and being one of the imperial generals, gave the Turks the firſt checks they received in Hungary. The empire, however, could not have withſtood the power of France; who purſued her conqueſts with ſuch rapidity, that the other parts of Europe were alarmed, and a great confederacy, conſiſting of the Empire, Great Britain, the Dutch under William Prince of Orange, and the northern powers, was formed to check the progreſs of the French, and render abortive the ambitious plan contrived by Lewis XIV. for founding an univerſal monarchy. At laſt, however, a peace was concluded at Ryſwick, in 1697; and two years after, the Turks conſented to a peace, which was ſigned at Carlowitz in 1699. The Hungarians, ſecretly encouraged by the French, and exaſperated by the unfeeling tyranny of Leopold, were ſtill in arms, under the protection of the Porte, when that prince died in 1705.

He was ſucceeded by his ſon Joſeph, who put the electors of Cologne and Bavaria to the ban of the empire; but being ill ſerved by prince Lewis of Baden, general of the empire, the French partly recovered their affairs, notwithſtanding their repeated defeats. The duke of Marlborough had not all the ſucceſs he expected or deſerved. Joſeph himſelf was ſuſpected of a deſign to ſubvert the Germanic liberties; and it was plain by his conduct, that he expected England ſhould take the labouring oar in the war, which was to be entirely carried on for his benefit. The Engliſh were diſguſted at his ſlowneſs and ſelfiſhneſs: but he died in 1711, before he had reduced the Hungarians; and leaving no male iſſue, he was ſucceeded in the empire by his brother Charles VI. whom the allies were endeavouring to place on the throne of Spain, in oppoſition to Philip, duke of Anjou, grandſon to Lewis XIV.

When the peace of Utrecht took place in 1713, Charles at firſt made a ſhew as if he would continue the war; but found himſelf unable, now that he was forſaken by the Engliſh. He therefore was obliged to conclude a peace with France at Baden in 1714, that he might attend the progreſs of the Turks in Hungary; where they received a total defeat from prince Eugene, at the battle of Peterwaradin. They received another of equal importance from the ſame general in 1717, before Belgrade, which fell into the hands of the imperialiſts; and next year the peace of Paſſarowitz, between them and the Turks, was concluded. Charles employed every minute of his leiſure in making arrangements for increaſing and preſerving his hereditary dominions in Italy and the Mediterranean. Happily for him, the crown of Britain devolved to the houſe of Hanover; an event which gave him a very deciſive weight in Europe, by the connections between George I. and II. and the empire. Charles was ſenſible of this; and carried matters with ſo high a hand, that, about the years 1724 and 1725, a breach enſued between him and George I. and ſo unſteady was the ſyſtem of affairs all over Europe at that time, that the capital powers often changed their old alliances, and concluded new ones contradictory to their intereſt. Without entering into particulars, it is ſufficient to obſerve, that the ſafety of Hanover, and its aggrandizement, was the main object of the Britiſh court; as that of the emperor was the eſtabliſhment of the pragmatic ſanction, in favour of his daughter, the preſent empreſs-queen, he having no male iſſue. Mutual conceſſions upon thoſe great points reſtored a good underſtanding between George II. and the emperor Charles; and the elector of Saxony, flattered with the view of gaining the throne of Poland, relinquiſhed the great claims he had upon the Auſtrian ſucceſſion.

The emperor, after this, had very bad ſucceſs in a war he entered into with the Turks, which he had undertaken chiefly to indemnify himſelf for the great ſacrifices he had made in Italy to the princes of the houſe of Bourbon. Prince Eugene was then dead, and he had no general to ſupply his place. The ſyſtem of France, however, under cardinal Fleury, happened at that time to be pacific; and ſhe obtained for him, from the Turks, a better peace than he had reaſon to expect. Charles, to keep the German and other powers eaſy, had, before his death, given his eldeſt daughter, the preſent empreſs queen, in marriage to the duke of Lorrain, a prince who could bring no acceſſion of power to the Auſtrian family.

Charles died in 1740; and was no ſooner in the grave, than all he had ſo long laboured for muſt have been overthrown, had it not been for the firmneſs of George II. The young king of Pruſſia entered and conquered Sileſia, which he ſaid had been wrongfully diſmembered from his family. The king of Spain and the elector of Bavaria ſet up claims directly incompatible with the pragmatic ſanction, and in this they were joined by France; though all thoſe powers had ſolemnly guaranteed it. The imperial throne, after a conſiderable vacancy, was filled up by the elector of Bavaria, who took the title of *Charles VII.* in January

1742.

1742. The French poured their armies into Bohemia, where they took Prague; and the queen of Hungary, to take off the weight of Pruſſia, was forced to cede to that prince the moſt valuable part of the duchy of Sileſia by a formal treaty.

Her youth, her beauty, and ſufferings, and the noble fortitude with which ſhe bore them, touched the hearts of the Hungarians, into whoſe arms ſhe threw herſelf and her little ſon; and though they had been always remarkable for their diſaffection to the houſe of Auſtria, they declared unanimouſly in her favour. Her generals drove the French out of Bohemia; and George II. at the head of an Engliſh and Hanoverian army, gained the battle of Dettingen, in 1743. Charles VII. was at this time miſerable on the imperial throne, and would have given the queen of Hungary almoſt her own terms; but ſhe haughtily and impolitically rejected all accommodation, though adviſed to it by his Britannic majeſty, her beſt and indeed only friend. This obſtinacy gave a colour for the king of Pruſſia to invade Bohemia, under pretence of ſupporting the imperial dignity: but though he took Prague, and ſubdued the greateſt part of the kingdom, he was not ſupported by the French; upon which he abandoned all his conqueſts, and retired into Sileſia. This event confirmed the obſtinacy of the queen of Hungary; who came to an accommodation with the emperor, that ſhe might recover Sileſia. Soon after, his imperial majeſty, in the beginning of the year 1745, died; and the duke of Lorrain, then grand duke of Tuſcany, conſort to the queen of Hungary, after ſurmounting ſome difficulties, was choſen emperor.

The bad ſucceſs of the allies againſt the French and Bavarians in the Low Countries, and the loſs of the battle of Fontenoy, retarded the operations of the empreſs-queen againſt his Pruſſian majeſty. The latter beat the emperor's brother, prince Charles of Lorrain, who had before driven the Pruſſians out of Bohemia: and the conduct of the empreſs queen was ſuch, that his Britannic majeſty thought proper to guarantee to him the poſſeſſion of Sileſia, as ceded by treaty. Soon after, his Pruſſian majeſty pretended that he had diſcovered a ſecret convention which had been entered into between the empreſs-queen, the empreſs of Ruſſia, and the king of Poland as elector of Saxony, to ſtrip him of his dominions, and to divide them among themſelves. Upon this his Pruſſian majeſty, very ſuddenly, drove the king of Poland out of Saxony, defeated his troops, and took poſſeſſion of Dreſden; which he held till a treaty was made under the mediation of his Britannic majeſty, by which the king of Pruſſia acknowledged the duke of Lorrain, great duke of Tuſcany, for emperor. The war, however, continued in the Low Countries, not only to the diadvantage, but to the diſcredit, of the Auſtrians and Dutch, till it was finiſhed by the treaty of Aix-la-Chapelle, in April 1748. By that treaty Sileſia was once more guaranteed to the king of Pruſſia. It was not long before that monarch's jealouſies were renewed and verified; and the empreſs of Ruſſia's views falling in with thoſe of the empreſs-queen and the king of Poland, who were unnaturally ſupported by France in their new ſchemes, a freſh war was kindled in the empire. The king of Pruſſia declared againſt the admiſſion of the Ruſſians into Germany, and his Britannic majeſty againſt that of the French. Upon thoſe two principles all former differences between theſe monarchs were forgotten, and the Britiſh parliament agreed to pay an annual ſubſidy of 670,000l. to his Pruſſian majeſty during the continuance of the war.

The flames of war now broke out in Germany with greater fury and more deſtructive violence than ever. The armies of his Pruſſian majeſty, like an irreſiſtable torrent, burſt in Saxony; totally defeated the imperial general Brown at the battle of Lowoſitz; forced the Saxons to lay down their arms, though almoſt impregnably fortified at Pirna; and the elector of Saxony fled to his regal dominions in Poland. After this, his Pruſſian majeſty was put to the ban of the empire; and the French poured, by one quarter, their armies, as the Ruſſians did by another, into the empire. The conduct of his Pruſſian majeſty on this occaſion is the moſt amazing that is to be met with in hiſtory; for a particular account of which, ſee the article PRUSSIA.

At laſt, however, the taking of Colberg by the Ruſſians, and of Schweidnitz by the Auſtrians, was on the point of completing his ruin, when his moſt formidable enemy, the empreſs of Ruſſia, died, January 5. 1762; George II. his only ally, had died on the 25th of October, 1760.

The deaths of thoſe illuſtrious perſonages were followed by great conſequences. The Britiſh miniſtry of George III. ſought to finiſh the war with honour, and the new emperor of Ruſſia recalled his armies. His Pruſſian majeſty was, notwithſtanding, ſo very much reduced by his loſſes, that the empreſs-queen, probably, would have completed his deſtruction, had it not been for the wiſe backwardneſs of other German princes, not to annihilate the houſe of Brandenburg. At firſt the empreſs-queen rejected all terms propoſed to her, and ordered 30,000 men to be added to her armies. The viſible backwardneſs of her generals to execute her orders, and new ſucceſſes obtained by his Pruſſian majeſty, at laſt prevailed on her to agree to an armiſtice, which was ſoon followed by the treaty of Hubertſburg, which ſecured to his Pruſſian majeſty the poſſeſſion of Sileſia. Upon the death of the emperor, her huſband, in 1765, her ſon Joſeph, who had been crowned king of the Romans in 1764, ſucceeded him in the empire.

At preſent, Germany is bounded on the north by the Baltic Sea, Denmark, and the German Ocean; on the eaſt by Pruſſia, Hungary, and Poland; and on the weſt by the Low Countries, Lorraine, and Franche Compte: ſo that it now comprehends the Palatinates of Cologn, Triers, and Liege, which formerly belonged to the Gauls; and is diſmembered of Frieſland, Groningen, and Overyſſel, which are now incorporated with the Low Countries.

Since the time of Charles the Great, this country has been divided into High and Low Germany. The firſt comprehends the Palatinate of the Rhine, Franconia, Suabia, Bavaria, Bohemia, Moravia, Auſtria, Carinthia, Carniola, Stiria, the Swiſs, and the Griſons. The provinces of Low Germany are, the Low Country of the Rhine, Triers, Cologne, Mentz, Weſtphalia, Heſſe, Brunſwic, Miſnia, Luſatia, High Saxony upon the Elbe, Low Saxony upon the Elbe, Mecklenburg, Lu-

Lunenburg, Brandenburg, and Pomerania. For a particular deſcription of all theſe, ſee the articles as they occur in the order of the alphabet.

22 ſtitu- of the ire.

The empire, as we have already obſerved, is elective; and the laws require no other qualifications in a candidate, but that he be *juſtus, bonus, et utilis,* without any limitation in regard to religion, nation, ſtate, or age. But as the Popiſh electors are more in number than the Proteſtant, a Roman-catholic prince is always choſen. The election is at Franckfort on the Maine, within three months after the former emperor's death. The electors appear either in perſon or by their envoys; and if an elector abſent himſelf, the election, notwithſtanding, is valid. Before the day of election, all foreigners are ordered to depart the town. Whoever has more than half the voices of the college for him, is elected; and an elector may even give his vote for himſelf. When the election is over, the perſon elected, or his plenipotentiary, muſt immediately ſubſcribe and ſwear to the capitulation of election: but if the perſon elected is not preſent in perſon, he muſt ſwear to it himſelf before he is crowned, and before he can take upon him the government; which, till then, belongs to the vicars of the empire. His coronation, for which he appoints a day himſelf, is always performed in the place where he was elected; though both election and coronation ought to be in the city of Aix-la-Chapelle. He then takes a general oath of a ruler, and, among other things, promiſes all due veneration to the Pope and church. The emperors uſed formerly to be crowned by the Popes, till the reign of Charles V. but from that time the papal coronation has been diſpenſed with. However, immediately upon his entering upon the government, he teſtifies his veneration for the Pope by an embaſſy. The title of the emperor runs thus: "N. by the grace of God, elected Roman emperor *(imperator)*, at all times augmenter of the empire *(ſemper Auguſtus)*, in or of Germany king." Then follow the titles of the hereditary imperial dominions. The ſtates of the empire give the emperor the title of "Moſt illuſtrious, moſt powerful, and moſt invincible Roman emperor;" the laſt of which is omitted by the electors. The emperor is looked upon by all other crowned heads and ſtates in Europe as the firſt European potentate, and as ſuch precedence is given him and his ambaſſadors.

3 s of pe.

He is the ſupreme head of the German empire; but his power in the adminiſtration thereof is very limited. With reſpect to eccleſiaſtical matters, his prerogative conſiſts principally in the right of the firſt petition *(jus primari arum precum)*; by virtue of which, in all foundations and cloiſters of the empire, he may, once during his adminiſtration, confer a benefice on any perſon qualified for it by the ſtatutes; and in that of a panis brief to each foundation or cloiſter in the empire, by virtue of which, ſuch foundation is obliged to admit into it the perſon who has obtained the emperor's brief, and there provide him, during life, with meat, drink, cloaths, and other neceſſaries. With reſpect to temporal matters, he can create princes, dukes, marquiſſes, counts, barons, knights, &c. raiſe countries and territories to a higher rank; beſtow arms, and grant letters of reſpite and protection, ſecuring a debtor againſt his creditor; eſtabliſh univerſities, fairs, and markets; empower any perſon to adopt another, and to aſſume a title from his eſtate; erect any place into a ſanctuary; confer majority on minors; legitimate children born out of wedlock; confirm the contracts and ſtipulations of the empire; remit oaths extorted from them; inveſt ſuch as poſſeſs fiefs of the empire, and decide in feudal matters relative thereto, &c. but he cannot grant to any perſon privileges detrimental to the rights of the immediate ſovereign of that perſon. He can alſo grant excluſive privileges for printing particular books, and for new-invented machines, &c. He appoints moſt of the officers, civil and military, of the empire, except ſuch as are hereditary; as the great chancellor, treaſurer, &c. but theſe are only honorary. In ancient times the emperor had conſiderable domains and incomes in the empire; but almoſt all theſe have been ſucceſſively mortgaged and alienated, ſo that at preſent the certain revenues of the emperor are very inconſiderable: but then, as he has the diſpoſal of moſt offices, the creation of princes and noblemen, is entitled to all confiſcations and forfeitures, and inveſts the ſeveral princes in their eſtates, beſides thoſe that hold fiefs of the empire in Italy, the profit of theſe articles may amount to a large ſum. He has alſo ſome offerings from the Jews, and the free gifts of the order of knights of the empire. A ſucceſſor in the empire is frequently choſen by the electors during the life of the emperor, who is ſtyled *king of the Romans*. He is elected and crowned in the ſame manner as the emperor; has the title of *majeſty*; takes precedence of all other kings in Chriſtendom; and ſucceeds of courſe at the emperor's death.

24 Arms of the empire.

The arms of the empire are a black eagle with two heads, hovering with expanded wings in a field of gold; and over the heads of the eagle is ſeen the imperial crown.

25 The diet.

The diet of the empire conſiſts of the emperor, the nine electors, the eccleſiaſtical and ſecular princes, and the deputies of imperial cities.. The electors are divided into ſpiritual and temporal. The ſpiritual electors are, the archbiſhops of Mentz, Triers, and Cologne; and the ſecular, thoſe of Bohemia, Palatine, Brandenburgh, Saxony, Bavaria, and Hanover. The ſpiritual electors are ſuch of courſe as ſoon as they are choſen to their ſees by their reſpective chapters. In the reign of Henry IV. the right of election is ſaid to have been introduced. Till the peace of Weſtphalia there were only ſeven electors, when an eighth was added; and, in 1692, a ninth, in favour of the illuſtrious houſe of Brunſwic Lunenburg, now in poſſeſſion of a much higher and infinitely more valuable dignity, viz. the crown of Great Britain. The ſpiritual are ſtyled by the emperor, *highly worthy nephews*; the temporal, *moſt illuſtrious uncles*. By the other members of the empire, the ſpiritual, who were not born princes, are ſtyled, *your electoral grace*; but ſuch as were, and alſo the temporal electors, have the appellation of, *your electoral ſerenity*. Foreign kings ſtyle the temporal electors, and thoſe of the ſpiritual who were princes born, *brothers*. The ſpiritual are alſo ſtiled, *highly and moſt worthy*; and the temporal, *moſt illuſtrious*.

26 Powers of the electors.

The elector of Mentz is arch-chancellor of the holy Roman empire in Germany, and director of the electoral college. This prince notifies the death of an emperor to his co-electors, appoints the diet of election, adminiſters the oath to the electors or their envoys, collects their voices, proclaims the election, anoints the elected emperor, and either he or the elector of Cologne crowns him. He hears all grievances, and other matters, before the different colleges of the empire. He names a vice-chancellor of the empire, who takes an oath to him, as well as to the emperor. He appoints all officers for the chancery of the empire; has ſupreme juriſdiction over them; as alſo the inſpection of the archives of the empire, and the protection of the poſt-office, in conſequence of which his counſellors pay no poſtage.

The elector of Treves is the arch-chancellor of the holy Roman empire in Gaul and the kingdom of Arles; but this at preſent is only a bare title. At an election of the king of the Romans, he has the firſt voice; and, before the election, takes the oath of the elector of Mentz.

The elector of Cologne is arch-chancellor of the holy Roman empire in Italy. At an election of a king of the Romans, he has the ſecond voice; and he crowns the emperor, when the coronation is at Aix-la-Chapelle, and in the archbiſhopric of Cologne.

The king and elector of Bohemia is arch-cupbearer of the holy Roman empire, precedes all the temporal electors whatſoever, and has the third voice in the electoral college.

The elector of Bavaria is arch-ſewer of the holy Roman empire. At the coronation he carries the monde before the emperor, ranks next to Bohemia, places four ſilver diſhes, weighing twelve marks, on the imperial table, and ſerves up the firſt courſe.

The elector of Saxony is arch-marſhal of the holy Roman empire. He alſo, when there is no emperor, is one of the vicars of the empire. At the diets, and on other ſolemn occaſions, he carries the ſword of ſtate before the emperor; and, at the coronation, he rides into a heap of oats, and fills a ſilver meaſure with that grain. During the holding of the diets, he has juriſdiction over all electoral and other officers of the ſtates of the empire, as alſo in criminal matters. When the ſee of Mentz is vacant, he holds the directory of the diet, and the right of protection over the imperial city of Mullhauſen, and all trumpeters throughout the Roman empire.

The elector of Brandenburgh is arch-chamberlain of the holy Roman empire; carries the ſceptre before the emperor, which he bears alſo in his coat of arms; preſents the emperor with water in a ſilver baſon in order to waſh himſelf; may proceed with reſpect to his fiefs, principalities, and lands, as with allodial eſtates; and, at his own pleaſure, impoſe new tolls, and erect mills on all rivers.

The elector Palatine was formerly arch-ſewer, but ſince the treaty of Weſtphalia arch-treaſurer. This houſe has the right of protection over all the braziers of a large diſtrict, and throughout all Germany is protector of the order of St. John; can raiſe nobles and gentlemen to the degree of counts; and has the right of venery, by virtue of which, all illegitimate perſons, and others of foreign countries, who within a year and a day have no ſucceeding lord, may be made bondſmen in ſuch places as are ſubject to his juriſdiction; ſo that they muſt bind themſelves to the duties of the electorate, and to the payment of a certain tribute and mortuaries.

When the elector of Bavaria was put under the ban of the empire in 1706, the Palatine recovered the office of arch-ſewer, and the elector of Brunſwic Lunenburg obtained the office of arch-treaſurer, by which he ſtill ſtiles himſelf, 'till another ſuitable arch-office be conferred on him. He enjoys the alternate ſucceſſion in the biſhopric of Oſnaburgh, together with ſome other rights and privileges.

Without the privity of theſe electors, the emperor can do nothing with regard to leagues and wars of the empire, alienations and mortgages of lands belonging to it, &c. At their inveſtiture they pay no fees, and a new-elected emperor muſt immediately confirm their privileges and dignities. The diets are held by the emperor, with the conſent of the electors; and, at their deſire, each elector enjoys a right of appointing two chamber-court aſſeſſors, and their electorates have an unlimited privilege *de non appellando*. They may meet together, and hold what are called *electoral diets*. A ſubject may be guilty of treaſon againſt them; and their whole electorates deſcend to their firſt-born. By the imperial capitulation, their envoys are to take place of princes in perſon.

Next to the electors are the princes of the empire, who are alſo partly ſpiritual, and partly temporal. The ſpiritual are archbiſhops, biſhops, abbots, provoſts, abbeſſes, the maſters of the Teutonic order, and of St John; but of theſe, ſome have each a voice, and others vote by colleges. The temporal princes are dukes, marquiſſes, counts, viſcounts, and barons; of which, as among the ſpiritual, the higher have ſingle voices, but the lower vote by colleges.

Not only all thoſe princes who have ſeat and voice in the diet, but many others, are veſted with ſovereign power in their reſpective territories, or at leaſt are under very few reſtraints. They are, indeed, more free and abſolute than ſome crowned heads; but ſtill they are ſubject to the general laws of the empire, and ſworn not to engage in any wars or alliances to the prejudice of the emperor and empire. But here it is to be obſerved, that many have titles of nobility though they are no ſovereigns, nor have any ſeat in the diets: ſome, however, have a ſeat, that do not hold immediately of the emperor; or, which is the ſame, are immediately ſubject to ſome other prince, and only mediately to the emperor. The Franks, in imitation of the Romans, reduced all Germany into provinces, over which they placed governors with different titles. They were generally of noble families; and, if there was no material objection againſt it, their ſons were appointed to ſucceed them: from whence theſe governors came at length to inſiſt on a right of ſucceeding their anceſtors, and refuſed to pay homage to the German emperors, every one taking upon him to exerciſe regal power in his province; from whence have ſprung up ſo many petty ſovereigns in the empire. Theſe officers were either *hertogen* or dukes, to whom were committed the government of the larger diſtricts; *graffen*, or earls, who had the care of ſmaller parts; *pſaltz-graven*, *palſgraves*, or counts-palatine, who adminiſtered juſtice when in the verge of the court; *landgraves*, who were ſet over provinces; *margraves*, or marquiſſes, who were charged with the care of the marches or borders; and *burgraves*, who were governors of the royal caſtles and forts. The third college of the diet is that of the free or imperial cities, *i. e.* ſuch as are governed by magiſtrates of their own, and ſtand immediately under the emperor and empire. Some of theſe are wholly Catholic, others entirely Lutheran, and others again mixed. Within their territory they exerciſe ſupreme power; and are divided into two benches, the Rheniſh and Suabian. As the princes of the empire took advantage of the neceſſities or indulgence of the German emperors, to erect the governments they held in capacity of viceroys or governors, into independent principalities and ſtates, ſo did the cities now called *free* and *imperial*. The emperors, frequently wanting ſupplies of money to carry on wars, or for other occaſions, borrowed large ſums of the wealthy trading towns, and paid them again in munificent grants and privileges, making them free ſtates, and independent of the governors of the provinces where they ſtood: accordingly, theſe cities, like the princes, exerciſe all kinds of ſovereign power that are conſiſtent with the general laws of the empire; they make laws, conſtitute courts of juſtice, coin money, raiſe forces, and enter into alliances and confederacies; only acknowledging the emperor for their ſupreme lord, and contributing their ſhare towards the common defence of the empire.

27 ers of diet.

The diet meets at Ratiſbon on the emperor's ſummons, and any of the princes may ſend their deputies thither in their ſtead. The diet makes laws, raiſes taxes, determines differences between the ſeveral princes and ſtates, and can relieve ſubjects from the oppreſſions of their ſovereign: and there are two ſupreme councils, called the *aulic council*, and the *chamber of Witzlar*, to which any of the princes and ſtates, or their ſubjects, may appeal, when they apprehend themſelves aggrieved. The empire was anciently divided into ten circles; which diviſion was confirmed by the emperor Charles V. who ſettled the portion which every circle, and every prince and member of each circle, ſhould contribute towards the ordinary and extraordinary taxes of the empire. This was entered in a regiſter, called a *matriculation-book*, which is kept by the elector of Mentz. The taxes are either ordinary or extraordinary. The former is what is ſtyled the *chamber-terms*, or the money which each ſtate of the empire is to contribute annually for maintaining the chamber-judicatory of the emperor and empire. The latter are called *Roman months*, which are a certain rate of money or troops ſettled by the ſtates of the empire, and granted ſometimes to the emperor; as for inſtance, for the ſupport of the emperor, or of the army of the empire, or the forts thereof, or for the war againſt the Turks, the expences of an embaſſy of the empire, &c. By the matricula ſettled by Charles V. twelve florins were to be paid monthly in lieu of every horſeman, and four for every foot ſoldier. Afterwards it was enacted, that ſixty florins ſhould be advanced in lieu of every trooper wanting, and twelve for every footman; and theſe payments obtained the name of *Roman months*, becauſe the forces or money abovementioned were at firſt applied towards the forming a body of horſe and foot for ſix months, to conduct the emperor in his journey to Rome to receive the papal coronation.

28 Annual meetings of the ſtates.

Beſides the diet, there are yearly meetings of the ſtates of one, two, or three of the circles that lie neareſt to one another, called from thence *correſponding circles*; of which there are three claſſes: firſt, the Upper Rhine, Lower Rhine, and Weſtphalia; ſecondly, the Upper and Lower Saxony; and, thirdly, Franconia, Suabia, and Auſtria. That of Upper Saxony aſſembles uſually at Leipſic; that of Franconia at Nuremberg; and that of Suabia at Ulm. They treat of the regulation of their coin, the public peace, their treaſure, magazines, fortifications, and commerce, rectifying the matricula, putting the decrees of the empire in execution, and appointing judges of the imperial chamber of Witzlar or Spire, and of the aulic council at Vienna; and have power of enacting laws which are not inconſiſtent with the conſtitution of the empire. In every circle there are one or two directors, who ſummon the ſtates of the circle, and have the command of the militia when embodied, regulating their march, quarters, &c. and putting the decrees of the empire in execution, when any prince or member refuſes to comply with their reſolutions. It is to be obſerved here, that the Proteſtant eſtates of the empire, in the diets, are called the *evangelic body*, and have a director, viz. the elector of Saxony. Beſides the higher nobility, or high *adel* of the empire, conſiſting of princes, counts, &c. there is the lower *adel*, or rank of knighthood, which is very numerous in Germany.

29 Character of the ancient Germans.

With regard to the character of the ancient Germans, they are deſcribed to us by the Greek and Roman writers, as reſembling the Gauls, and differing from other nations by the largeneſs of their ſtature, ruddy complexion, blue eyes, and yellow buſhy hair, haughty and threatening looks, ſtrong conſtitutions, and being proof againſt hunger, cold, and all kinds of hardſhip.

Their native diſpoſition diſplayed itſelf chiefly in their martial genius, and in their ſingular fidelity. The former of theſe they did indeed carry to ſuch an exceſs, as came little ſhort of downright ferocity: but, as to the latter, they not only valued themſelves highly upon it, but were greatly eſteemed by other nations for it; inſomuch that Auguſtus, and ſeveral of his ſucceſſors, committed the guard of their perſons to them, and almoſt all other nations either courted their friendſhip and alliance, or hired them as auxiliaries: though it muſt be owned, at the ſame time, that their extreme love of liberty, and their hatred of tyranny and oppreſſion, have often hurried them to treachery and murder, eſpecially when they have thought themſelves ill uſed by thoſe who hired them; for, in all ſuch caſes, they were eaſily ſtirred up, and extremely vindictive. In other caſes, Tacitus tells us, they were noble, magnanimous, and beneficent, without ambition to aggrandize their dominions, or invading thoſe from whom they received no injury; rather chooſing to employ their ſtrength and valour defenſively, than offenſively; to preſerve their own, than to ravage their neighbours.

Their friendſhip and intercourſe was rather a compound of honeſt bluntneſs and hoſpitality, than of wit, humour, or gallantry. All ſtrangers were ſure to meet with a kind reception from them, to the utmoſt of their ability: even thoſe who were not in a capacity to entertain them, made it a piece of duty to introduce them to thoſe who could; and nothing was looked upon as more ſcandalous and deteſtable, than to refuſe them either the one or the other. They do not ſeem, indeed, to have had a taſte for grand and elegant entertainments; they affected in every thing, in their houſes, furniture, diet, &c. rather plainneſs and ſimplicity, than ſumptuouſneſs and luxury. If they learned the Romans and Gauls the uſe of money, it was rather becauſe they found it more convenient than their ancient way of bartering one commodity for another; and then they preferred thoſe ancient coins which had been ſtamped during the times of the Roman liberty, eſpecially ſuch as were either milled or cut in the rims, becauſe they could not be ſo eaſily cheated in them, as in ſome others, which were frequently nothing but copper, or iron, plated over with ſilver. This laſt metal they likewiſe preſerred before gold, not becauſe it made a greater ſhew, but becauſe it was more convenient for buying and ſelling: And as they became, in time, more feared by, or more uſeful to, the Romans; ſo they learned how to draw enough of it from them to ſupply their whole country, beſides what flowed to them from other nations.

As they deſpiſed ſuperfluities in other caſes, ſo they did alſo in the connubial way: every man was contented with one wife, except ſome few of their nobles, who allowed themſelves a plurality, more for ſhew than pleaſure; and both were ſo faithful to each other, and chaſte, true, and diſintereſted, in their conjugal affections, that Tacitus prefers their manners, in this reſpect, to thoſe of the Romans. The men ſought not dowries from their wives, but beſtowed them upon them. Their youth, in thoſe cold climes, did not begin ſo ſoon to feel the warmth of love, as they do in hotter ones: it was a common rule with them, not to marry young; and thoſe were moſt eſteemed who continued longeſt in celibacy, becauſe they looked upon it as an effectual means to make them grow tall and ſtrong; and to marry, or be concerned with a woman, before they were full twenty-years old, was accounted ſhameful wantonneſs. The women ſhared with their huſbands not only the care of their family, and the education of their children, but even the hardſhips of war. They attended them in the field, cooked their victuals for them, dreſſed their wounds, ſtirred them up to fight manfully againſt their enemies, and ſometimes have by their courage and bravery recovered a victory when it was upon the point of being ſnatched from them. In a word, they looked upon ſuch conſtant attendance on them, not as a ſervitude, like the Roman dames, but as a duty and an honour. But what appears to have been ſtill an harder fate upon the ancient German dames was, that their great Odinus excluded all thoſe from his *valhalla*, or paradiſe, who did not, by ſome violent death, follow their deceaſed huſbands thither. Yet notwithſtanding their having been anciently in ſuch high repute for their wiſdom, and ſuppoſed ſpirit of prophecy, and their continuing ſuch faithful and tender helpmates to their huſbands, they ſunk, in time, ſo low in their eſteem, that, according to the old Saxon law, he that hurt or killed a woman, was to pay but half the fine that he ſhould have done if he had hurt or killed a man.

There is ſcarcely any one thing in which the Germans, though ſo nearly allied in moſt of their other cuſtoms to the Gauls, were yet more oppoſite to them than in their funerals. Thoſe of the latter were performed with great pomp and profuſion; thoſe of the former were done with the ſame plainneſs and ſimplicity which they obſerved in all other things: the only grandeur they affected in them was, to burn the bodies of their great men with ſome peculiar kinds of wood; but then the funeral pile was neither adorned with the cloaths and other fine furniture of the deceaſed, nor perfumed with fragant herbs and gums: each man's armour, that is, his ſword, ſhield, and ſpear, were flung into it, and ſometimes his riding-horſe. The Danes, indeed, flung into the funeral-pile of a prince, gold, ſilver, and other precious things, which the chief mourners, who walked, in a gloomy guiſe, round the fire, exhorted the byſtanders to fling liberally into it in honour of the deceaſed. They afterwards depoſited their aſhes in urns, like the Gauls, Romans, and other nations; as it plainly appears, from the vaſt numbers which have been dug up all over the country, as well as from the ſundry diſſertations which have been written upon them by ſeveral learned moderns of that nation. One thing we may obſerve, in general, that, whatever ſacrifices they offered for their dead, whatever preſents they made to them at their funerals, and whatever other ſuperſtitious rites they might perform at them, all was done in conſequence of thoſe excellent notions which their ancient religion had taught them, the immortality of the ſoul, and the bliſs or miſery of a future life.

It is impoſſible, indeed, as they did not commit any thing to writing till very lately, and as none of the ancient writers have given us any account of it, to gueſs how ſoon the belief of their great Odin, and his paradiſe, was received among them. It may, for aught we know, have been older than the times of Tacitus, and he have known nothing of it, by reaſon of their ſcrupulous care in concealing their religion from ſtrangers: but as they conveyed their doctrines to poſterity by ſongs and poems, and moſt of the northern poets tell us that they have drawn their intelligence from thoſe very poems which were ſtill preſerved among them; we may rightly enough ſuppoſe, that whatever doctrines are contained in them, were formerly profeſſed by the generality of the nation, eſpecially ſince we find their ancient practice ſo exactly conformable to it. Thus, ſince the ſureſt road to this paradiſe was, to excel in martial deeds, and to die intrepidly in the field of battle; and ſince none were excluded from it but baſe cowards, and betrayers of their country; it is natural to think, that the ſignal and exceſſive bravery of the Germans flowed from this ancient belief of theirs: and, if their females were ſo brave and faithful, as not only to ſhare with their huſbands all the dangers and fatigues of war, but, at length, to follow them, by a voluntary death, into the other world; it can hardly be attributed to any thing elſe but a ſtrong perſuaſion of their being admitted to live with them in that place of bliſs. This belief, therefore, whether received originally from the old Celtes, or afterwards taught them by the ſince deified Odin, ſeems, from their general practice, to have been univerſally received by all the Germans, though they might differ one from another in their notions of that future life.

The notion of a future happineſs obtained by martial exploits, eſpecially by dying ſword in hand, made them bewail the fate of thoſe who lived to an old age, as diſhonourable here, and hopeleſs hereafter: upon which account, they had a barbarous way of ſending them into the other world, willing or not willing. And this cuſtom laſted ſeveral ages after their receiving Chriſtianity, eſpecially among the Pruſſians and Venidi; the former of whom, it ſeems, diſpatched, by a quick death, not only their children, the ſick, ſervants, &c. but even their parents, and ſometimes themſelves: and among the latter we have inſtances of this horrid parricide being practiſed even in the beginning of the 14th century. All that need be added is, that, if thoſe perſons, thus ſuppoſed to have lived long enough, either deſired to be put to death, or, at leaſt, ſeemed chearfully to ſubmit to what they knew they could not avoid, their exit was commonly preceded with a faſt, and their funeral with a feaſt; but if they endeavoured to ſhun it, as it ſometimes happened, both ceremonies were performed with the deepeſt mourning. In the former, they rejoiced at their deliverance, and being admitted into bliſs; in the latter, they bewailed their cowardly excluding themſelves from it. Much the ſame thing was done towards thoſe wives, who betrayed a backwardneſs to follow their dead huſbands.

We muſt likewiſe obſerve, that, in theſe funerals, as well as in all their other feaſts, they were famed for drinking to exceſs; and one may ſay of them, above all the other deſcendents of the ancient Celtes, that their hoſpitality, banquets, &c. conſiſted much more in the quantity of ſtrong liquors, than in the elegance of eating. Beer and ſtrong mead, which were their natural drink, were looked upon as the chief promoters of health, ſtrength, fertility, and bravery; upon which account, they made no ſcruple to indulge themſelves to the utmoſt in them, not only in their feaſts, and eſpecially before an engagement, but even in their common meals.

The modern Germans in their perſons are tall, fair, and ſtrong built. The ladies have generally fine complexions; and ſome of them, eſpecially in Saxony, have all the delicacy of features and ſhape that are ſo bewitching in a certain iſland of Europe.

Both men and women affect rich dreſſes, which in faſhion are the ſame as in France and England; but the better ſort of men are exceſſively fond of gold and ſilver lace, eſpecially if they are in the army. The ladies at the principal courts differ not much in their dreſs from the French and Engliſh, only they are not ſo exceſſively fond of paint as the former. At ſome courts they appear in rich furs; and all of them are loaded with jewels, if they can obtain them. The female part of the burghers families, in many German towns, dreſs in a very differeut manner, and ſome of them inconceivably fantaſtic, as may be ſeen in many prints publiſhed in books of travels: but in this reſpect they are gradually reforming, and many of them make quite a different appearance in their dreſs from what they did thirty or forty years ago. As to the peaſantry and labourers, they dreſs as in other parts of Europe, according to their employments, conveniency, and opulence. In Weſtphalia, and moſt other parts of Germany, they ſleep between two featherbeds, or rather the upper one of down, with ſheets ſtitched to them, which by uſe becomes a very comfortable practice. The moſt unhappy part of the Germans are the tenants of little needy princes, who ſqueeze them to keep up their own grandeur; but, in general, the circumſtances of the common people are far preferable to thoſe of the French.

The Germans are naturally a frank, honeſt, hoſpitable people, free from artifice and diſguiſe. The higher orders are ridiculouſly proud of titles, anceſtry, and ſhew. The Germans, in general, are thought to want animation, as their perſons promiſe more vigour and activity than they commonly exert, even in the field of battle. But when commanded by able generals, eſpecially the Italians, ſuch as Montecuculi and prince Eugene, they have done great things, both againſt the Turks and the French. The imperial arms have ſeldom made any remarkable figure againſt either of thoſe two nations, or againſt the Swedes or Spaniards, when commanded by German generals. This poſſibly might be owing to the arbitrary obſtinacy of the court of Vienna; for in the two laſt wars the Auſtrians exhibited prodigies of military valour and genius.

Induſtry, application, and perſeverance, are the great characteriſtics of the German nation, eſpecially the mechanical part of it. Their works of art would be incredible were they not viſible, eſpecially in watch and clock making, jewellery, turnery, ſculpture, drawing, painting, and certain kinds of architecture. The Germans have been charged with intemperance in eating and drinking; and perhaps not unjuſtly, owing to the vaſt plenty of their country in wine and proviſions of every kind. But thoſe practices ſeem now to be wearing out. At the greateſt tables, though the gueſts drink pretty freely at dinner, yet the repaſt is commonly finiſhed by coffee, after three or four public toaſts have been drank. But no people have more feaſting at marriages, funerals, and birth-days.

The Geman nobility are generally men of ſo much honour, that a ſharper in other countries, eſpecially in England, meets with more credit if he pretends to be a German, than of any other nation.

The merchants and tradeſmen are very civil and obliging. All the ſons of noblemen inherit their fathers titles, which greatly perplexes the heralds and genealogiſts of that country. This perhaps is one of the reaſons why the German huſbands are not quite ſo complaiſant as they ought otherwiſe to be to their ladies, who are not entitled to any pre-eminence at the table; nor indeed do they ſeem to affect it, being far from either ambition or loquacity, though they are ſaid to be ſomewhat too fond of gaming. From what has been premiſed, it may eaſily be conceived, that many of the German nobility, having no other hereditary eſtate than a high-ſounding title, eaſily enter into their armies, and thoſe of other ſovereigns. Their fondneſs for title is attended with many other inconveniencies. Their princes think that the cultivation of their lands, tho' it may treble their revenue, is below their attention; and that, as they are a ſpecies of beings ſuperior to labourers of every kind, they would demean themſelves in being concerned in the improvement of their grounds.

The domeſtic diverſions of the Germans are the ſame as in England; billiards, cards, dice, fencing, dancing, and the like. In ſummer, people of faſhion repair to places of public reſort, and drink the waters. As to their field-diverſions, beſides their favourite one of hunting, they have bull and bear-beating, and the like. The inhabitants of Vienna live luxuriouſly, a great part of their time being ſpent in feaſting and carouſing; and in winter, when the ſeveral branches of the Danube are frozen over, and the ground covered with ſnow, the ladies take their recreations in ſledges of different ſhapes, ſuch as griffins, tygers, ſwans, ſcollop-ſhells, &c. Here the lady ſits, dreſſed in velvet lined with rich furs, and adorned with laces and jewels, having on her head a velvet cap; and the ſledge is drawn by one horſe, ſtag, or other creatures ſet off with plumes of feathers, ribbons, and bells. As this diverſion is taken chiefly in the night-time, ſervants ride before the ſledge with torches, and a gentleman ſitting on the ſledge behind guides the horſe.

GERMEN, the ſeed-bud; defined by Linnæus to be the baſe of the piſtillum, which contains the rudiments of the ſeed; and, in progreſs of vegetation, ſwells and becomes the ſeed-veſſel.

In aſſimilating the vegetable and animal kingdoms, Linnæus denominates the ſeed-bud the *ovarium* or *uterus* of plants; and affirms its exiſtence to be chiefly at the time of the diſperſion of the male-duſt by the antheræ; as, after its impregnation, it becomes a ſeed-veſſel.

Germen, by Pliny and the ancient botaniſts, is uſed to ſignify a bud containing the rudiments of the leaves. See Gemma.

GERMINATIO, among botaniſts, comprehends the preciſe time which the ſeeds take to riſe after they have been committed to the ſoil.—The different ſpecies of ſeeds are longer or ſhorter in riſing, according to the degree of heat which is proper to each. Millet, wheat, and ſeveral of the graſſes, riſe in one day; blite, ſpinach, beans, muſtard, kidney-beans, turneps, and rocket, in three days; lettuce and dill, in four; cucumber, gourd, melon, and creſs, in five; radiſh and beet, in ſix; barley, in ſeven; orach, in eight; purſlane, in nine; cabbage, in ten; hyſſop, in thirty; parſley, in forty or fifty days; peach, almond, walnut, cheſnut, pæony, horned-poppy, hypecoum, and ranunculus falcatus, in one year; roſe-buſh, cornel-tree, hawthorn, medlar, and hazel-nut, in two. The ſeeds of ſome ſpecies of orchis, and of ſome liliaceous plants, never riſe at all. Of ſeeds, ſome require to be ſowed almoſt as ſoon as they are ripe, otherwiſe they will not ſprout or germinate. Of this kind are the ſeeds of coffee and fraxinella. Others, particularly thoſe of the pea-bloom flowers, preſerve their germinating faculty for a ſeries of years.—Mr Adanſon aſſerts, that the ſenſitive plant retains that virtue for thirty or forty years.

Air and water are the agents of germination. The humidity of the air alone makes ſeveral ſeeds to riſe that are expoſed to it. Seeds too are obſerved to riſe in water, without the intervention of earth: but water, without air, is inſufficient.—Mr Homberg's experiments on this head are deciſive. He put ſeveral ſeeds under the exhauſted-receiver of an air-pump, with a view to eſtabliſh ſomething certain on the cauſes of germination. Some of them did not riſe at all; and the greateſt part of thoſe which did, made very weak and feeble productions.

Thus it is for want of air that ſeeds which are buried at a very great depth in the earth, either thrive but indifferently, or do not riſe at all.

They frequently preſerve, however, their germinating virtue for many years, within the bowels of the earth; and it is not unuſual, upon a piece of ground being newly dug to a conſiderable depth, to obſerve it ſoon after covered with ſeveral plants, which had not been ſeen there in the memory of man.

Were this precaution frequently repeated, it would doubtleſs be the means of recovering certain ſpecies of plants which are regarded as loſt; or which perhaps, never coming to the knowledge of botaniſts, might hence appear the reſult of a new creation.

Some ſeeds require a greater quantity of air than others. Thus purſlane, which does not riſe till after lettuce in the free air, riſes before it *in vacuo;* and both proſper but little, or periſh altogether, whilſt creſſes vegetate as freely as in the open air.

GERVAISE, (or Gervase), of Tilbury, a famous Engliſh writer of the 13th century; thus named from his being born at Tilbury on the Thames. He was nephew to Henry II. king of England; and was in great credit with Otho IV. emperor of Germany, to whom he dedicated a Deſcription of the world, and a Chronicle. He alſo compoſed a hiſtory of England, that of the Holy Land, and other works.

GERUND, in grammar, a verbal noun of the neuter gender, partaking of the nature of a participle, declinable only in the ſingular number, through all the caſes except the vocative; as nom. *amandum*, gen. *amandi*, dat. *amando*, accuſ. *amandum*, abl. *amando*. The word is formed of the Latin *gerundivus*, and that from the verb *gerere*, "to bear."

The *gerund* expreſſes not only the *time*, but alſo the *manner*, of an action; as, "he fell in running poſt."—It differs from the participle, in that it expreſſes the *time*, which the participle does not; and from the tenſe properly ſo called, in that it expreſſes the *manner*, which the tenſe does not.

Grammarians are much embarraſſed to ſettle the nature and character of the *gerunds*. It is certain they are not verbs, nor diſtinct moods of verbs, in regard they do not mark any judgment, or affirmation of the mind, which is the eſſence of a verb. And, beſide, they have caſes; which verbs have not. Some, therefore, will have them to be adjectives paſſive, whoſe ſubſtantive is the infinitive of the verb: on this footing they denominate them *verbal nouns*, or names formed of verbs, and retaining the ordinary regimen thereof. Thus, ſay they, *tempus eſt legendi libros*, or *librorum*, is as much as to ſay, *tempus eſt* τȣ *legere libros*, vel *librorum*. But others ſtand up againſt this deciſion.

GESNER (Conrad), a celebrated phyſician and naturaliſt, was born at Zurich in 1516. Having finiſhed his ſtudies in France, he travelled into Italy, and taught medicine and philoſophy in his own country with extraordinary reputation. He was acquainted with the languages; and excelled ſo much in natural hiſtory, that he was ſurnamed the *Pliny of Germany*.

He died in 1565, leaving many works behind him; the principal of which are, 1. A hiſtory of animals, plants, and foſſils; 2. *Bibliotheca Univerſalis*; 3. A Greek and Latin lexicon.

GESTATION, among phyſicians. See Pregnancy.

GESTRICIA, a province of Sweden, bounded by Helſingia on the north, by the Bothnic gulph on the eaſt, by Upland on the ſouth, and by Dalecarlia on the weſt.

GESTURE, in rhetoric, conſiſts chiefly in the proper action of the hands and face. See Declamation, n° xii. and Oratory, n° 130, 131.

GETHIN (Lady Grace), an Engliſh lady of uncommon parts, was the daughter of Sir George Norton of Abbots-Leigh in Somerſetſhire, and born in the year 1676. She had all the advantages of a liberal education; and became the wife of Sir Richard Gethin, of Gethin-Grott in Ireland. She was miſtreſs of great accompliſhments, natural and acquired, but did not live long enough to diſplay them to the world; for ſhe died in the 21ſt year of her age. She was buried in Weſtminſter-abbay, where a beautiful monument with an inſcription is erected over; and, for perpetuating her memory, proviſion was made for a ſermon to be preached in Weſtminſter-abbey, yearly, on Aſh-Wedneſday for ever. She wrote, and left behind her, in looſe papers, a work, which, ſoon after her death, was methodized, and publiſhed under the title of "*Reliquiæ Gethinianæ*: or, Some remains of "the moſt ingenious and excellent lady, Grace lady "Gethin, lately deceaſed. Being a collection of choice "diſcourſes, pleaſant apophthegms, and witty ſentences. Written by her, for the moſt part, by way "of eſſay, and at ſpare hours." Lond. 1700, 4to; with her picture before it.

GEUM, Avens, or *Herb-Bennet*; a genus of the pentagynia order, belonging to the icoſandria claſs of plants. There are five ſpecies, of which the moſt remarkable are, 1. The urbanum, with thick fibrous roots of an aromatic taſte, rough, ſerrated leaves, and upright, round, hairy ſtalks terminated by large yellow flowers, ſucceeded by globular fruit. 2. The rivale, with a very thick, fleſhy, and fibrous root, hairy leaves, and upright ſtalks, 10 or 12 inches high, terminated by purple flowers nodding on one ſide. Of this there are varieties with red and with yellow flowers.—Both theſe are natives of Britain, and are eaſily propagated either by the root or ſeed. The roots of the firſt, gathered in the ſpring before the ſtem comes up, and infuſed in ale, give it a pleaſant flavour, and prevent its growing-ſour. Infuſed in wine, they have a ſtomachic virtue. The taſte is mildly auſtere and aromatic, eſpecially when the plant grows in warm dry ſituations; but in moiſt ſhady places, it hath little virtue. Cows, goats, ſheep, and ſwine, eat the plant; horſes are not fond of it.—The powdered root of the ſecond ſpecies will cure tertian agues, and is daily uſed for that purpoſe by the Canadians. Sheep and goats eat the plant; cows, horſes, and ſwine, are not fond of it.

GHENT, a city of the Auſtrian Netherlands, capital of the province of Flanders. It is ſeated on four navigable rivers, the Scheld, the Lys, the Lieve, and the Moere, which run through it, and divide it into canals. Theſe form 26 little iſles, over which there are 300 bridges: among which there is one remarkable for a ſtatue of braſs of a young man who was obliged to cut off his father's head; but as he was going to ſtrike, the blade flew into the air, and the hilt remained in his hand, upon which they were both pardoned. There is a picture of the whole tranſaction in the town-houſe. Ghent is ſurrounded with walls and other fortifications, and is tolerably ſtrong for a place of its circumference. But all the ground within the walls is not built upon. The ſtreets are large and well paved, the market-places ſpacious, and the houſes built with brick. But the Friday's market-place is the largeſt, and is remarkable for the ſtatue of Charles V. which ſtands upon a pedeſtal in the imperial habit. That of Cortere is remarkable for a fine walk under ſeveral rows of trees. In 1737 a fine opera-houſe was built here, and a guard-houſe for the garriſon. Near the town is a very high tower, with a handſome clock and chimes. The great bell weighs 11,000 pounds.

This town is famous for the pacifications ſigned here, in 1526, for ſettling the tranquillity of the Seventeen Provinces, which was afterwards confirmed by the king of Spain. It was taken by Lewis XIV. in 1678, who afterwards reſtored it. The French took poſſeſſion of it again after the death of Charles II. of Spain. In 1706, it was taken by the duke of Marlborough; and by the French, in 1708; but it was retaken the ſame year. Laſt of all, the French took it by ſurpriſe after the battle of Fontenoy; but at the peace of Aix la Chapelle, it was rendered back. This is the birth-place of John of Gaunt. It is very well ſeated for trade, on account of its rivers and canals. It carries on a great commerce in corn; and has linen, woollen, and ſilk manufactures. E. Long. 4. 0. N. Lat. 51. 24.

GIAGH, in chronology, a cycle of 12 years; in uſe among the Turks and Cathayans.

Each year of the giagh bears a name of ſome animal: the firſt, that of a mouſe; the ſecond, that of a bullock; the third, of a lynx or leopard; the fourth, of a hare; the fifth, of a crocodile; the ſixth, of a ſerpent; the ſeventh, of a horſe; the eighth, of a ſheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog.

They alſo divide the day into 12 parts, which they call *giaghs*, and diſtinguiſh them by the name of ſome animals. Each giagh contains two of our hours, and is divided into eight kehs, as many as there are quarters in our hours.

GIALLOLINO, in natural hiſtory, a fine yellow pigment much uſed under the name of Naples Yellow.

GIANT, a perſon of extraordinary bulk and ſtature.

The romances of all ages have furniſhed us with ſo many extravagant accounts of giants of incredible bulk and ſtrength, that the exiſtence of ſuch people is now generally diſbelieved. It is commonly thought, that the ſtature of man hath been the ſame in all ages; and ſome have even pretended to *demonſtrate* the impoſſibility of the exiſtence of giants mathematically. Of theſe our countryman M'Laurin hath been the moſt explicit. "In general, (ſays he), it will eaſily appear, that the efforts tending to deſtroy the coheſion of beams ariſing from their own gravity only, increaſe in the quadruplicate ratio of their lengths; but that the oppoſite efforts tending to preſerve their coheſion, increaſe only in the triplicate proportion of the ſame lengths. From which it follows, that the greater beams muſt be in greater danger of breaking than the leſſer ſimilar ones; and that though a leſſer beam may be firm and ſecure, yet a greater ſimilar one may be made ſo long, that it will neceſſarily break by its own weight. Hence Galileo juſtly concludes, that what appears very firm, and ſucceeds very well in models, may be very weak and infirm, or even fall to pieces by its own weight, when it comes to be executed in large dimenſions according to the model.

“ From the ſame principle he argues, that there are neceſſary limits in the operations of nature and art, which they cannot ſurpaſs in magnitude. Were trees of a very enormous ſize, their branches would fall by their own weight. Large animals have not ſtrength in proportion to their ſize; and if there were any land-animals much larger than thoſe we know, they could hardly move, and would be perpetually ſubject to the moſt dangerous accidents. As to the animals of the ſea, indeed, the caſe is different; for the gravity of the water in a great meaſure ſuſtains thoſe animals; and in fact, theſe are known ſometimes to be vaſtly larger than the greateſt land-animals. Nor does it avail againſt this doctrine to tell us, that bones have ſometimes been found which were ſuppoſed to have belonged to giants of immenſe ſize; ſuch as the ſkeletons mentioned by Strabo and Pliny, the former of which was 60 cubits high, and the latter 46: for naturaliſts have concluded on juſt grounds, that in ſome caſes theſe bones had belonged to elephants; and that the larger ones were bones of whales, which had been brought to the places where they were found by the revolutions of nature that have happened in paſt times. Though it muſt be owned, that there appears no reaſon why there may not have been men who have exceeded by ſome feet in height the talleſt we have ſeen.”

It will eaſily be ſeen, that arguments of this kind can never be concluſive; becauſe, along with an increaſe of ſtature in any animal, we muſt always ſuppoſe a proportional increaſe in the coheſion of the parts of its body. Large works ſometimes fail when conſtructed on the plan of models, becauſe the coheſion of the materials whereof the model is made and of the large work are the ſame; but a difference in this reſpect will produce a very remarkable difference in the ultimate reſult. Thus, ſuppoſe a model is made of firwood, the model may be firm and ſtrong enough; but a large work made alſo of fir, when executed according to the plan of the model, may be ſo weak that it will fall to pieces with its own weight. If, however, we make uſe of iron for the large work inſtead of fir, the whole will be ſufficiently ſtrong, even though made exactly according to the plan of the model. The like may be ſaid with regard to large and ſmall animals. If we could find an animal whoſe bones exceeded in hardneſs and ſtrength the bones of other animals as much as iron exceeds fir, ſuch an animal might be of a monſtrous ſize, and yet be exceedingly ſtrong. In like manner, if we ſuppoſe the fleſh and bones of a giant to be greatly ſuperior in hardneſs and ſtrength to the bones of other men, the great ſize of his body will be no objection at all to his ſtrength. The whole of the matter, therefore, concerning the exiſtence of giants, muſt reſt on the credibility of the accounts we have from thoſe who pretend to have ſeen them, and not on any arguments drawn *a priori*.

In the ſcripture we are told of *giants*, who were produced from the marriages of the *ſons of God* with the *daughters of men*. But of this paſſage no ſufficient explanation hath yet been found: nor can we be ſure that the word tranſlated *giants* does there imply any extraordinary ſtature; ſeeing in other places it is explained by *falling away*, *revolting*, or *tranſgreſſing*. In other places of ſcripture, however, giants, with their dimenſions, are mentioned in ſuch a manner that we cannot poſſibly doubt; as in the caſe of Og king of Baſhan, and Goliath. In a memoir read before the Academy of Sciences at Rouen, M. Le Cat gives the following account of giants that are ſaid to have exiſted in different ages.

“ Profane hiſtorians have given ſeven feet of height to Hercules their firſt hero; and in our days we have ſeen men eight feet high. The giant who was ſhewn in Rouen, in 1735, meaſured eight feet ſome inches. The emperor Maximin was of that ſize; Skenkius and Platerus, phyſicians of the laſt century, ſaw ſeveral of that ſtature; and Goropius ſaw a girl who was ten feet high.—The body of Oreſtes, according to the Greeks, was eleven feet and a half; the giant Galbara, brought from Arabia to Rome under Claudius Cæſar, was near ten feet; and the bones of Secondilla and Puſio, keepers of the gardens of Salluſt, were but ſix inches ſhorter. Funnam, a Scotſman, who lived in the time of Eugene II. king of Scotland, meaſured eleven feet and a half: and Jacob le Maire, in his voyage to the ſtreights of Magellan, reports, that, on the 17th of December 1615, they found at Port Deſire ſeveral graves covered with ſtones; and having the curioſity to remove the ſtones, they diſcovered human ſkeletons of ten and eleven feet long. The chevalier Scory, in his voyage to the Pike of Teneriffe, ſays, that they found in one of the ſepulchre caverns of that mountain the head of a Guanche which had 80 teeth, and that the body was not leſs than 15 feet long. The giant Ferragus, ſlain by Orlando nephew of Charlemagne, was 18 feet high. Rioland, a celebrated anatomiſt, who wrote in 1614, ſays, that ſome years before there was to be ſeen in the ſuburbs of St Germain the tomb of the giant Iſoret, who was 20 feet high. In Rouen, in 1509, in digging in the ditches near the Dominicans, they found a ſtone-tomb containing a ſkeleton whoſe ſkull held a buſhel of corn, and whoſe ſhin-bone reached up to the girdle of the talleſt man there, being about four feet long, and conſequently the body muſt have been 17 or 18 feet high. Upon the tomb was a plate of copper, whereon was engraved, “ In this tomb lies the noble and puiſſant lord, the chevalier Ricon de Vallemont, and his bones.” Platerus, a famous phyſician, declares, that he ſaw at Lucerne the true human bones of a ſubject which muſt have been at leaſt 19 feet high. Valence in Dauphiné boaſts of poſſeſſing the bones of the giant Bucart, tyrant of the Vivarais, who was ſlain by an arrow by the count De Cabillon his vaſſal. The Dominicans had a part of the ſhin-bone, with the articulation near of the knee, and his figure painted in freſco, with an inſcription, ſhewing that this giant was 22 feet and a half high, and that his bones were found in 1705, near the banks of the Morderi, a little river at the foot of the mountain of Cruſſol, upon which (tradition ſays) the giant dwelt.

"January 11. 1613, ſome maſons digging near the ruins of a caſtle in Dauphiné, in a field which (by tradition) had long been called *the giant's field*, at the depth of 18 feet diſcovered a brick-tomb 30 feet long, 12 feet wide, and 8 feet high; on which was a grey ſtone, with the words *Theutobochus Rex* cut thereon. When the tomb was opened, they found a human ſkeleton entire, 25 feet and a half long, 10 feet wide acroſs the ſhoulders, and five feet deep from the breaſt-bone to the back. His teeth were about the ſize each of an ox's foot, and his ſhin-bone meaſured four feet. – Near Mazarino, in Sicily, in 1516, was found a giant 30 feet high; his head was the ſize of an hogſhead, and each of his teeth weighed five ounces. Near Palermo, in the valley of Mazara, in Sicily, a ſkeleton of a giant 30 feet long was found, in the year 1548; and another of 33 feet high, in 1550; and many curious perſons have preſerved ſeveral of theſe gigantic bones.

"The Athenians found near their city two famous ſkeletons, one of 34 and the other of 36 feet high.

"At Totu, in Bohemia, in 758, was found a ſkeleton, the head of which could ſcarce be encompaſſed by the arms of two men together, and whoſe legs, which they ſtill keep in the caſtle of that city, were 26 feet long. The ſkull of the giant found in Macedonia, September 1691, held 210 pounds of corn.

"The celebrated Sir Hans Sloane, who treated this matter very learnedly, does not doubt theſe facts; but thinks the bones were thoſe of elephants, whales, or other enormous animals.

"Elephants bones may be ſhewn for thoſe of giants; but they can never impoſe on connoiſſeurs. Whales, which, by their immenſe bulk, are more proper to be ſubſtituted for the largeſt giants, have neither arms nor legs; and the head of that animal hath not the leaſt reſemblance to that of a man. If it be true, therefore, that a great number of the gigantic bones which we have mentioned have been ſeen by anatomiſts, and by them have been reputed real human bones, the exiſtence of giants is proved."

With regard to the credibility of all, or any of theſe accounts, it is difficult to determine any thing. If, in any caſtle of Bohemia, the bones of a man's leg 26 feet in length are preſerved, we have indeed a deciſive proof of the exiſtence of a giant, in compariſon of whom moſt others would be but pigmies. Nor indeed could theſe bones be ſuppoſed to belong to an elephant; for an elephant itſelf would be but a dwarf in compariſon of ſuch an enormous monſter. But if theſe bones were really kept in any part of Bohemia, it ſeems ſtrange that they have not been frequently viſited, and particular deſcriptions of them given by the learned who have travelled into that country.—It is certain, however, that there have been nations of men conſiderably exceeding the common ſtature. Thus, all the Roman hiſtorians inform us, that the Gauls and Germans exceeded the Italians in ſize, and it appears that the Italians in thoſe days were of much the ſame ſtature with the people of the preſent age. Among theſe northern nations, it is alſo probable, that there would be as great differences in ſtature, as there are among the preſent race of men. If that can be allowed, we may eaſily believe that ſome of theſe barbarians might be called *giants*, without any great impropriety. Of this ſuperiority of ſize, indeed, the hiſtorian Florus gives a notable inſtance in Teutobochus, abovementioned, king of the Teutones; who being defeated and taken priſoner by Marius, was carried in triumph before him at Rome, when his head reached above the trophies that were carried in the ſame proceſſion.

But whether theſe accounts are credited or not, we are very certain, that the ſtature of the human body is by no means abſolutely fixed. We are ourſelves a kind of giants in compariſon of the Laplander; nor are theſe the moſt diminutive people to be found upon the earth. The abbe la Chappe, in his journey into Siberia in order to obſerve the laſt tranſit of Venus, paſſed through a village inhabited by people called *Wotiacks*, neither men nor women of whom were above four feet high. The accounts of the Patagonians alſo, which cannot be entirely diſcredited, render it very probable, that ſomewhere in South America there is a race of people very conſiderably exceeding the common ſize of mankind, and conſequently that we cannot altogether diſcredit the relations of giants handed down to us by ancient authors; though what degree of credit we ought to give them, is not eaſy to be determined.

Giants-*Cauſeway*, a vaſt collection of Baſaltic pillars in the county of Antrim in Ireland. See the article **Basaltes**.

The principal or grand cauſeway, for there are ſeveral leſs conſiderable and ſcattered fragments of ſimilar workmanſhip, conſiſts of a moſt irregular arrangement of many hundred thouſands of columns of a black kind of rock, hard as marble: almoſt all of them are of a pentagonal figure, but ſo cloſely and compactly ſituated on their ſides, though perfectly diſtinct from top to bottom, that ſcarce any thing can be introduced between them. The columns are of an unequal height and breadth; ſome of the higheſt, viſible above the ſurface of the ſtrand, and at the foot of the impending angular precipice, may be about 20 feet; they do not exceed this height, at leaſt none of the principal arrangement. How deep they are fixed in the ſtrand, was never yet diſcovered. This grand arrangement extends nearly 200 yards, viſible at low water; how far beyond, is uncertain: from its declining appearance, however, at low water, it is probable it does not extend under water to a diſtance any thing equal to what is ſeen above. The breadth of the principal cauſeway, which runs out in one continued range of columns, is, in general, from 20 to 30 feet; at one place or two it may be nearly 40 for a few yards. In this account are excluded the broken and ſcattered pieces of the ſame kind of conſtruction, that are detached from the ſides of the grand cauſeway, as they do not appear to have ever been contiguous to the principal arrangement, though they have frequently been taken into the width; which has been the cauſe of ſuch wild and diſſimilar repreſentations of this cauſeway, which different accounts have exhibited. The higheſt part of this cauſeway is the narroweſt at the very foot of the impending cliff, from whence the whole projects, where, for four or five yards, it is not above ten or fifteen feet wide. The columns of this narrow part incline from a perpendicular a little to the weſtward, and form a ſlope on their tops, by the very unequal height of the columns on the two ſides, by which an aſcent is made at the foot of the cliff, from the head of one column to the next above, *gradatim*, to the top of the great cauſeway, which, at the diſtance of half a dozen yards from the cliff, obtains a perpendicular poſition, and, lowering in its general height, widens to about 20 or between 20 and 30 feet, and for 100 yards nearly is always above water. The tops of the columns for this length being nearly of an equal height, they form a grand and ſingular parade, that may be eaſily walked on, rather inclining to the water's edge. But from high water-mark, as it is perpetually waſhed by the beating ſurges on every return of the tide, the platform lowers conſiderably, and becomes more and more uneven, ſo as not to be walked on but with the greateſt care. At the diſtance of 150 yards from the cliff, it turns a little to the eaſt for 20 or 30 yards, and then ſinks into the ſea. The figure of theſe columns is almoſt unexceptionably pentagonal, or compoſed of five ſides; there are but very few of any other figure introduced: ſome few there are of three, four, and ſix ſides, but the generality of them are five-ſided, and the ſpectator muſt look very nicely to find any of a different conſtruction: yet what is very extraordinary, and particularly curious, there are not two columns in ten thouſand to be found, that either have their ſides equal among themſelves, or whoſe figures are alike. Nor is the compoſition of theſe columns or pillars leſs deſerving the attention of the curious ſpectator. They are not of one ſolid ſtone in an upright poſition; but compoſed of ſeveral ſhort lengths, curiouſly joined, not with flat ſurfaces, but articulated into each other like ball and ſocket, or like the joints in the vertebræ of ſome of the larger kind of fiſh, the one end at the joint having a cavity, into which the convex end of the oppoſite is exactly fitted. This is not viſible, but by disjoining the two ſtones. The depth of the concavity or convexity is generally about three or four inches. And what is ſtill farther remarkable of the joint, the convexity, and the correſpondent concavity, is not conformed to the external angular figure of the column, but exactly round, and as large as the ſize or diameter of the column will admit; and, conſequently, as the angles of theſe columns are, in general, extremely unequal, the circular edges of the joint are ſeldom coincident with more than two or three ſides of the pentagonal, and from the edge of the circular part of the joint to the exterior ſides and angles they are quite plain. It is ſtill farther very remarkable, likewiſe, that the articulations of theſe joints are frequently inverted; in ſome the concavity is upwards, in others the reverſe. This occaſions that variety and mixture of concavities and convexities on the tops of the columns, which is obſervable throughout the platform of this cauſeway, yet without any diſcoverable deſign or regularity with reſpect to the number of either. The length, alſo, of theſe particular ſtones, from joint to joint, is various: in general, they are from 18 to 24 inches long; and, for the moſt part, longer toward the bottom of the columns than nearer the top, and the articulation of the joints ſomething deeper. The ſize, or diameter, likewiſe, of the columns is as different as their length and figure; in general, they are from 15 to 20 inches in diameter. There are really no traces of uniformity or deſign diſcovered throughout the whole combination, except in the form of the joint, which is invariably by an articulation of the convex into the concave of the piece next above or below it; nor are there any traces of a finiſhing in any part, either in height, length, or breadth, of this curious cauſeway. If there is here and there a ſmooth top to any of the columns above water, there are others juſt by, of equal height, that are more or leſs convex or concave, which ſhew them to have been joined to pieces that have been waſhed or by other means taken off. And undoubtedly thoſe parts that are always above water have, from time to time, been made as even as might be; and the remaining ſurfaces of the joints muſt naturally have been worn ſmoother by the conſtant friction of weather and walking, than where the ſea, at every tide, is beating upon it and continually removing ſome of the upper ſtones and expoſing freſh joints. And farther, as theſe columns preſerve their diameters from top to bottom, in all the exterior ones, which have two or three ſides expoſed to view, the ſame may, with reaſon, be inferred of the interior columns, whoſe tops only are viſible. Yet what is very extraordinary, and equally curious, in this phenomenon, is, that notwithſtanding the univerſal diſſimilitude of the columns, both as to their figure and diameter, and though perfectly diſtinct from top to bottom, yet is the whole arrangement ſo cloſely combined at all points, that hardly a knife can be introduced between them either on the ſides or angles. And it is really a moſt curious piece of entertainment to examine the cloſe contexture and nice inſertion of ſuch an infinite variety of angular figures as are exhibited on the ſurface of this grand parade. From the infinite diſſimilarity of the figure of theſe columns, this will appear a moſt ſurpriſing circumſtance to the curious ſpectator; and would incline him to believe it a work of human art, were it not, on the other hand, inconceivable that the wit or invention of man ſhould conſtruct and combine ſuch an infinite number of columns, which ſhould have a general apparent likeneſs, and yet be ſo univerſally diſſimilar in their figure, as that, from the minuteſt examination, not two in ten or twenty thouſand ſhould be found, whoſe angles and ſides are equal among themſelves, or of the one column to thoſe of the other. That it is the work of nature, there can be no doubt to an attentive ſpectator, who carefully ſurveys the general form and ſituation, with the infinitely various figuration of the ſeveral parts of this cauſeway. There are no traces of regularity or deſign in the outlines of this curious phenomenon; which, including the broken and detached pieces of the ſame kind of workmanſhip, are extremely ſcattered and confuſed, and, whatever they might originally, do not, at preſent, appear to have any connection with the grand or principal cauſeway, as to any ſuppoſable deſign or uſe in its firſt conſtruction, and as little deſign can be inferred from the figure or ſituation of the ſeveral conſtituent parts. The whole exhibition is, indeed, extremely confuſed, diſuniform, and deſtitute of every appearance of uſe or deſign in its original conſtruction. But what, beyond diſpute, determines its original to have been from nature, is, that the very cliffs, at a great diſtance from the cauſeway, eſpecially in the bay to the eaſtward, exhibit, at many places, the ſame kind of columns, figured and jointed in all reſpects like thoſe of the grand cauſeway: ſome of them are ſeen near to the top of the cliff, which in general, in theſe bays to the eaſt and weſt of the cauſeway, is near 300 feet in height; others again are ſeen about midway, and at different elevations from the ſtrand. A very conſiderable expoſure of them is ſeen in the very bottom of the bay to the eaſtward, near a hundred rods from the cauſeway, where the earth has evidently fallen away from them upon the ſtrand, and exhibits a moſt curious arrangement of many of theſe pentagonal columns, in a perpendicular poſition, ſupporting, in appearance, a cliff of different ſtrata of earth, clay, rock, &c. to the height of 150 feet or more, above. Some of theſe columns are between 30 and 40 feet high, from the top of the ſloping bank below them; and, being longeſt in the middle of the arrangement, ſhortening on either hand in view, they have obtained the appellation of *organs*, from a rude likeneſs, in this particular to the exterior or frontal tubes of that inſtrument; and as there are few broken pieces on the ſtrand near it, it is probable that the outſide range of columns that now appears, is really the original exterior line, to the ſeaward, of this collection. But how far they extend internally into the bowels of the incumbent cliff, is unknown. The very ſubſtance, indeed, of that part of the cliff which projects to a point, between the two bays on the eaſt and weſt of the cauſeway, ſeems compoſed of this kind of materials; for beſides the many pieces that are ſeen on the ſides of the cliff that circulate to the bottom of the bays, particularly the eaſtern ſide, there is, at the very point of the cliff, and juſt above the narrow and higheſt part of the cauſeway, a long collection of them ſeen, whoſe heads or tops juſt appearing without the ſloping bank, plainly ſhew them to be in an oblique poſition, and about half-way between the perpendicular and horizontal. The heads of theſe, likewiſe, are of mixed ſurfaces, convex and concave, and the columns evidently appear to have been removed from their original upright, to their preſent inclining or oblique poſition, by the ſinking or falling of the cliff.

GIBBOUS, a term in medicine, denoting any protuberance or convexity of the body, as a perſon haunched or hump-backed.

Infants are much more ſubject to gibboſity than adults, and it oftener proceeds from external than internal cauſes. A fall, blow, or the like, frequently thus diſtorts the tender bones of infants. When it proceeds from an internal cauſe, it is generally from a relaxation of the ligaments that ſuſtain the ſpine, or a caries of its vertebræ; though the ſpine may be inflected foreward, and the vertebræ thrown out by a too ſtrong and repeated action of the abdominal muſcles. This, if not timely redreſſed, grows up and fixes as the bones harden, till in adults it is totally irretrievable: but when the diſorder is recent, and the perſon young, there are hopes of a cure. The common method is by a machine of paſteboard, wood, or ſteel, which is made to preſs principally on the gibbous part; and this by long wearing may ſet all right. The ſurgeons, however, have a different inſtrument, which they call a *croſs*, much more efficacious, though not quite ſo convenient in the wearing. By the uſe of this, the parts are always prevented from growing any worſe, and are often cured. During the application of theſe aſſiſtances, the parts ſhould be at times rubbed with hungary-water, ſpirit of lavender, or the like, and defended with a ſtrengthening plaſter.

GIBBOUS, in aſtronomy, a term uſed in reference to the enlightened parts of the moon, whilſt ſhe is moving from the firſt quarter to the full, and from the full to the laſt quarter: for all that time the dark part appears horned, or falcated; and the light one hunched out, convex, or gibbous.

GIBELINS, or **GIBELLINS**, a famous faction in Italy, oppoſite to another called the GUELPHS.

Theſe two factions ravaged and laid waſte Italy for a long ſeries of years; ſo that the hiſtory of that country, for the ſpace of two centuries, is no more than a detail of their mutual violences and ſlaughters. The Gibelins ſtood for the emperor againſt the pope: but concerning their origin and the reaſon of their names, we have but a very obſcure account. According to the generality of authors, they roſe about the year 1240, upon the emperor Fredrick II.'s being excommunicated by the pope Gregory IX. Other writers maintain, that the two factions aroſe ten years before, though ſtill under the ſame pope and emperor. But the moſt probable opinion is that of Maimbourg, who ſays, that the two factions of Guelphs and Gibellins aroſe from a quarrel between two ancient and illuſtrious houſes on the confines of Germany, that of the Henries of Gibeling, and that of the Guelphs of Adorf. See (*Hiſtory* of) ITALY.

GIBET, a machine in manner of a gallows, whereon notorious criminals, after execution, are hung in irons or chains, as ſpectacles *in terrorem*. See GALLOWS.—The word in French, *gibet*, properly denotes what we call gallows: it is ſuppoſed to come originally from the Arabic *gibel*, "mount, or elevation of ground;" by reaſon *gibets* are uſually placed on hills or eminences.

GIBBET. See GIBET.

GIBRALTAR, a famous promontory, or rather peninſula, of Spain, lying in N. Lat. 35° 50′, W. Long. 5° 35′. To the ancients it was known by the name of *Calpe*, and was alſo called one of the *Pillars of Hercules*; by the Arabians it is called *Gebel Tarek*, that is, the Mount of Tarek, from *Tarek*, the name of the Saracen general who conquered Spain in the beginning of the eighth century. The whole is an immenſe rock, riſing perpendicularly about 440 yards, meaſuring, from north to ſouth, about two Engliſh miles, but not above one in breadth from eaſt to weſt.—The town lies along the bay on the weſt ſide of the mountain on a decline; by which, generally ſpeaking, the rains paſs through it, and keep it clean. The old town was conſiderably larger than the new, which at preſent conſiſts of between 4 and 500 houſes. Many of the ſtreets are narrow and irregular: the buildings are of different materials; ſome of natural ſtone out of the quarries, ſome of a factitious or artificial ſtone, and a few of brick. The people are ſupplied with freſh proviſions chiefly from the coaſt of Barbary, with fruit, roots, and vegetables, of all ſorts from thence, or from their own gardens. Beſides what is properly called the town, there are ſeveral ſpacious and commodious public edifices erected; ſuch as barracks for the ſoldiers, with apartments for their officers, magazines of different kinds, ſtorehouſes for proviſions, &c. The inhabitants, excluſive of the Britiſh ſubjects dependent on the garriſon, or who reſide there from other motives, conſiſt of ſome Spaniards, a few Portugueſe, a conſiderable number of Genoeſe, and about as many Jews; making in the whole, according to Dr Campbell, between two and three thouſand, without reckoning the garriſon; though ſome make them much fewer. The town may be ſaid to have two ports; the firſt lying to the north, and is proper only for ſmall veſſels; the other is very commodious for large veſſels, and has a fine ſtone quay. The bay is very beautiful and capacious, being in breadth about five miles, and in depth eight or nine, with ſeveral ſmall rivers running into it. It is very advantageous to the place. There is no ground to be found in the middle of it at an hundred fathoms depth, ſo that a ſquadron may lie there in great ſafety; the breezes from it are very refreſhing; and it contributes likewiſe to the ſubſiſtence of the inhabitants, by ſupplying them with plenty of fiſh.

The ſtrait of Gibraltar, through which the ocean paſſes into the Mediterranean, thereby dividing Europe from Africa, runs from weſt to eaſt about 13 leagues. In this ſtrait there are three remarkable promontories or capes on the Spaniſh ſide, and as many oppoſite to them on the Barbary ſide. The firſt of theſe, on the ſide of Spain, is cape Trefalgar, oppoſite to which is cape Spartel; and in the neighbourhood of this ſtood the fortreſs of Tangier, once in the poſſeſſion of the Britiſh. The next on the Spaniſh ſide is Tariſa; and over againſt it lies Malabata, near the town of Alcaſſar, where the ſtraits are about five leagues broad. Laſtly, Gibraltar, facing the mountain of Abyla, near the fortreſs and town of Ceuta, which make the eaſtern entry of the ſtraits.

The fortreſs of Gibraltar was formerly thought to be impregnable; but, in 1704, it was propoſed by the two Engliſh Admirals Sir John Leake and Sir George Rooke, and by Prince George of Heſſe Darmſtadt, to attempt the reduction of it. The fleet entered the bay on the 21ſt of July; the prince landed a body of troops on the Iſthmus, between the bay and the Mediterranean; the fleet cannonaded the town from the bay; and a detachment of Engliſh ſeamen having debarked at Europa point, with ſome loſs, carried the outworks. This made ſuch an impreſſion on the inhabitants and the garriſon, that the governor (the Marquis de Salinas) capitulated; and the Prince of Heſſe took poſſeſſion of the place on the 24th of the ſame month, with the loſs of leſs than 100 men. The Spaniards, extremely ſenſible of the loſs they had ſuſtained, immediately ſent an army of 10,000 men, under the command of the Marquis le Villadarias, to beſiege it; and at the ſame time the Count de Thoulouſe, who commanded the French fleet in the Mediterranean, put to ſea in order to co-operate with the Spaniards. This produced the battle of Malaga, Auguſt 13th 1704, in which the French were defeated; though Sir George Rooke was in no condition to proſecute his victory, on account of his want of ammunition. The ſiege, however, went on, and the place was ſo much preſſed, that if Sir John Leake, who was ſent to its relief, had arrived one day later, the place had been inevitably loſt. Five hundred Spaniards had bound themſelves by an oath, either to become maſters of Gibraltar, or to periſh in the attempt. They had accordingly concealed themſelves in ſome of the caves, of which there are many in the ſouthern part of the promontory. The mountain had alſo at that time many trees upon it, by which the Spaniards aſcended, and which were on that account afterwards cut down by the garriſon. The enterprize of the Spaniards, however, did not ſucceed; for, having attempted to ſcale the walls, they were all to a man deſtroyed. Marſhal de Teſſe then joined the Spaniſh army, with a conſiderable body of French troops, and the ſiege was continued for ſix months longer; when the French fleet being defeated by Sir John Leake*, they were forced to turn the ſiege into a blockade. The excellent conduct, however, of Sir John Leake, and the Prince of Heſſe Darmſtadt, obliged them at laſt to abandon the enterprize. On the concluſion of the war, the fortreſs of Gibraltar was ceded to Britain, but without any territory; and ever ſince the Spaniards have fortified lines on the Iſthmus, to prevent any communication between the garriſon and the country. They have ever ſince continued to behold it with a jealous eye, and have meditated ſeveral attempts againſt it. In 1727 they again beſieged it in form with a great army: but having made very little progreſs during four months, which they conſumed before it, a ceſſation of arms took place; and no further attempt has been made till the preſent year (1779.)

The poſſeſſion of Gibraltar is of very great conſequence to Britain. It not only gives us the command of the Straits, and their navigation: but affords refreſhment and accommodation to our fleets in time of war, and to our merchantmen at all times; which, to a maritime power, is of very great advantage. From its ſituation, it divides both the kingdoms of France and Spain; that is, it hinders a ready communication by ſea between the different parts of theſe kingdoms. This, of courſe, hinders the conjunction of the fleets and ſquadrons with each other, or at leaſt renders it ſo difficult as to be a perpetual check upon theſe ambitious powers. It awes alſo the piratical ſtates of Barbary, and in like manner the emperor of Morocco; inſomuch, that our commerce is more ſafe than that of any other European power, which gives us great advantages in point of freight. It is otherwiſe highly favourable to our trade in the Mediterranean and Levant. It procures us the reſpect of the Italian and other powers; who, though far diſtant from Britain, muſt conſider this as an inſtance of her power to hurt or aſſiſt them. It alſo ſaves us the expence of ſquadrons and convoys, upon any diſputes or diſturbances that may happen among thoſe powers, and which would otherwiſe be neceſſary for the protection of our navigation.

GIBSON (Richard), an Engliſh painter, commonly called the *Dwarf*, was originally page to a lady at Mortlake; who, obſerving that his genius led him to painting, had the generoſity to get him inſtructed in the rudiments of that art. He devoted himſelf to Sir Lely's manner, and copied his pictures

* See

to admiration, eſpecially his portraits: his paintings in water-colours were alſo eſteemed. He was in great favour with Charles I. who made him his page of the back-ſtairs; and he had the honour to inſtruct in drawing queen Mary and queen Anne when they were princeſſes. He married one Mrs Anne Shepherd, who was alſo a dwarf; on which occaſion king Charles I. honoured their marriage with his preſence, and gave away the bride. Mr Waller wrote a poem on this occaſion, intitled "The Marriage of the Dwarfs;" in which are theſe lines:

" Deſign or chance makes others wive,
" But nature did this match contrive;
" Eve might as well have Adam fled,
" As ſhe deny'd her little bed
" To him, for whom heav'n ſeem'd to frame
" And meaſure out this only dame."

Mr Fenton, in his notes on this poem, obſerves that he had ſeen this couple painted by Sir Peter Lely; and that they were of an equal ſtature, each being three feet ten inches high. However, they had nine children, five of which arrived at maturity; theſe well proportioned, and of the uſual ſtandard of mankind. But what nature denied this couple in ſtature, ſhe gave them in length of days: for Mr Gibſon died in the 75th year of his age; and his wife, having ſurvived him almoſt 20 years, died in 1709, aged 89.

GIBSON (Dr Edmund), biſhop of London, was born in Weſtmoreland, in 1669. He applied himſelf early and vigorouſly to learning, and diſplayed his knowledge in ſeveral writings and tranſlations, which recommended him to the patronage of archbiſhop Tenniſon. He was appointed domeſtic chaplain to his Grace; and we ſoon after find him rector of Lambeth, and archdeacon of Surry. Becoming thus a member of the convocation, he engaged in a controverſy, which was carried on with great warmth by the members of both houſes, and defended his patron's rights, as preſident, in eleven pamphlets; he then formed and completed his more comprehenſive ſcheme of the legal duties and rights of the Engliſh clergy, which was at length publiſhed under the title of *Codex Juris Eccleſiaſtici Anglicani*, in folio. Archbiſhop Teniſon dying in 1715, and Dr Wake biſhop of Lincoln being made archbiſhop of Canterbury, Dr Gibſon ſucceeded the latter in the ſee of Lincoln, and in 1720 was promoted to the biſhoprick of London. He now not only governed his dioceſe with the moſt exact regularity, but by his great care promoted the ſpiritual affairs of the Church of England colonies in the Weſt-Indies. He was extremely jealous of the leaſt of the privileges belonging to the church; and therefore, though he approved of the toleration of the Proteſtant Diſſenters, he continually guarded againſt all the attempts made to procure a repeal of the corporation and teſt acts; in particular, his oppoſition to thoſe licentious aſſemblies called *maſquerades*, gave great umbrage at court, and effectually excluded him from all further favours. He ſpent the latter part of his life in writing and printing paſtoral letters, viſitation-charges, occaſional ſermons, and tracts againſt the prevailing immoralities of the age. His paſtoral letters are juſtly eſteemed as the moſt maſterly productions againſt infidelity and enthuſiaſm. His moſt celebrated work, the *Codex*, has been already mentioned. His other publications are, 1. An edition of Drummond's *Polemo Middiana*, and James V. of Scotland's *Cantilena Ruſtica*, with notes. 2. The *Chronicon Saxonicum*, with a Latin tranſlation, and notes. 3. *Reliquiæ Spelmannianæ*, the poſthumous works of Sir Henry Spelman, relating to the laws and antiquities of England. 4. An edition of *Quintilian de Arte Oratoria*, with notes. 5. An Engliſh tranſlation of Camden's *Britannia*, with additions, two volumes folio: and, 5. A number of ſmall pieces, that have been collected together and printed in three volumes folio.—His intenſe application to ſtudy impaired his his health; notwithſtanding which, he attained the age of 79. He expired in September 1748, after an epiſcopate of near 33 years.

With regard to biſhop Gibſon's private life and character, he was in every reſpect a perfect œconomiſt. His abilities were ſo well adapted to diſcharge the duties of his ſacred function, that, during the incapacity of archbiſhop Wake, the tranſaction of eccleſiaſtical affairs was committed to the biſhop of London. He was a true friend to the eſtabliſhed church and government, and as great an enemy to perſecution. He was uſually conſulted by the moſt learned and exalted perſonages in church and ſtate, and the greateſt deference was paid to his judgment. He poſſeſſed the ſocial virtues in an eminent degree; his beneficence was very extenſive; and had ſuch generoſity, that he freely gave two thouſand five hundred pounds, left him by Dr Crow, who was once his chaplain, to Crow's own relations, who were very poor.

GIFT, *Donum*, in law, is a conveyance which paſſeth either lands or goods; and is of a larger extent than a grant, being applied to things moveable and immoveable; yet as to things immoveable, when taken ſtrictly, it is applicable only to lands and tenements given in tail; but *gift*, and *grant*, are too often confounded.

GIGG, GIGA, or JIGG; a gay, briſk, and ſprightly compoſition; and yet in full meaſure, as well as the allemande, which is more ſerious.—Menage takes the word to ariſe from the Italian *giga*, a muſical inſtrument mentioned by Dante.

GILAN, or GHILAN, a conſiderable province of Aſia, in Perſia, lying on the ſide of the Caſpian ſea, and to the S. W. of it. It is ſuppoſed to be the Hyrcania of the ancients. It is very agreeably ſituated, having the ſea on one ſide, and high mountains on the other; and there is no entering in but through narrow paſſes, which may eaſily be defended. The ſides of the mountains are covered with many ſorts of fruit-trees, and in the higheſt parts of them there are deer, bears, wolves, leopards, and tygers; which laſt the Perſians have a method of taming, and hunt with them as we do with dogs.—Gilan is one of the moſt fruitful provinces of all Perſia; and produces abundance of ſilk, oil, wine, rice, and tobacco, beſides excellent fruits. The inhabitants are brave, and of a better complexion than the other Indians, and the women are accounted extremely handſome. Reſht is the capital town.

GILBERT, or GILBERD, (William), a phyſician, was born at Colcheſter, in the year 1540, the eldeſt ſon of the recorder of that borough. Having ſpent ſome time in both univerſities, he went abroad;

and at his return ſettled in London, where he practiſed with conſiderable reputation. He became a member of the college of phyſicians, and phyſician in ordinary to Queen Elizabeth, who, we are told, gave him a penſion to encourage him in his ſtudies. From his epitaph it appears that he was alſo phyſician to King James I. He died in the year 1603, aged 63; and was buried in Trinity-church in Colcheſter, where a handſome monument was erected to his memory. His books, globes, inſtruments, and foſſils, he bequeathed to the college of phyſicians, and his picture to the ſchool-gallery at Oxford. He wrote, 1. *De magnete, magneticeſque corporibus, et de magno magnete tellure, phyſiologia nova;* London 1900, folio. 2. *De mundo noſtro ſublunari, philoſophia nova;* Amſterdam 1651, 4to. He was alſo the inventor of two mathematical inſtruments for finding the latitude at ſea without the help of ſun, moon, or ſtars. A deſcription of theſe inſtruments was afterwards publiſhed by Thomas Blondeville in his *Theoriques of the planets.*

GILBERT (Sir Humphrey), a brave officer, and ſkilful navigator, was born about the year 1539, in Devonſhire, of an ancient and honourable family. Though a ſecond ſon, he inherited a conſiderable fortune from his father. He was educated at Eaton, and afterwards at Oxford; where probably he did not continue long, as he hath eſcaped the induſtrious Anthony Wood. It ſeems he was intended to finiſh his ſtudies in the Temple; but, being introduced at court by his aunt Mrs Catharine Aſhley, then in the queen's ſervice, he was diverted from the ſtudy of the law, and commenced ſoldier. Having diſtinguiſhed himſelf in ſeveral military expeditions, particularly that to Newhaven in 1563, he was ſent over to Ireland to aſſiſt in ſuppreſſing a rebellion; where, for his ſignal ſervices, he was made commander in chief and governor of Munſter, and knighted by the lord deputy, Sir Henry Sidney, on the firſt day of the year 1570. He returned ſoon after to England, where he married a rich heireſs. Nevertheleſs, in 1572, he ſailed with a ſquadron of nine ſhips, to reinforce Colonel Morgan, who at that time meditated the recovery of Fluſhing.

Probably on his return to England he reſumed his coſmographical ſtudies, to which he was naturally inclined: for, in the year 1576, he publiſhed his book on the North-weſt paſſage to the Eaſt Indies; and as Martin Frobiſher ſailed the ſame year, probably it was in conſequence of this treatiſe. In 1578, he obtained from the queen a very ample patent, empowering him to diſcover and poſſeſs in North America any lands then unſettled. He ſailed to Newfoundland, but ſoon returned to England without ſucceſs: nevertheleſs, in 1583, he embarked a ſecond time with five ſhips, the largeſt of which put back on account of a contagious diſtemper on board. Our general landed on Newfoundland on the third of Auguſt, and on the fifth took poſſeſſion of the harbour of St John's. By virtue of his patent, he granted leaſes to ſeveral people; but, though none of them remained there at that time, they ſettled afterwards in conſequence of theſe leaſes: ſo that Sir Humphrey deſerves to be remembered as the real founder of our vaſt American empire. On the 20th of Auguſt, he put to ſea again, on board a ſmall ſloop; which on the 29th foundered in a hard gale of wind. Thus periſhed Sir Humphrey Gilbert; a man of quick parts, a brave ſoldier, a good mathematician, a ſkilful navigator, and of a very enterpriſing genius. We learn alſo, that he was remarkable for his eloquence, being much admired for his patriotic ſpeeches both in the Engliſh and Iriſh parliaments. He wrote "A diſcourſe to prove a paſſage by the north-weſt to Cathaia and the Eaſt Indies, printed Lond. 1576." This treatiſe, which is a maſterly performance, is preſerved in Hakluyt's collection of voyages, vol. iii. p. 11. The ſtyle is ſuperior to moſt, if not to all, the writers of that age; and ſhews the author to have been a man of conſiderable reading. He mentions, at the cloſe of this work, another treatiſe, on Navigation, which he intended to publiſh: it is probably loſt.

GILBERTINES, a religious order founded in England by St Gilbert, in the reign of Henry I. The nuns followed the rule St Benedict, and the monks that of Auguſtin. There were many monaſteries of this order in different parts of England.

GILCHRIST (Dr Ebenezer), an eminent Scots phyſician, was born at Dumfries in 1707. He began the ſtudy of medicine at Edinburgh, which he afterwards proſecuted at London and Paris. He obtained the degree of doctor of medicine from the univerſity of Rheims; and in the year 1732, he returned to the place of his nativity, where he afterwards conſtantly reſided, and continued the practice of medicine till his death.

It may with juſtice be ſaid, that few phyſicians of the preſent century have exerciſed their profeſſion in a manner more reſpectable or ſucceſsful than Dr Gilchriſt; and few have contributed more to the improvement of the healing art. Having engaged in buſineſs in an early period of life, his attention was wholly devoted to obſervation. Endowed by nature with a judgment acute and ſolid, with a genius active and inventive, he ſoon diſtinguiſhed himſelf by departing, in various important particulars, from eſtabliſhed but unſucceſsful modes of practice. Several of the improvements which he introduced have procured him great and deſerved reputation, both at home and abroad.

His practice, in ordinary caſes, was allowed to be judicious, and placed him high in the confidence and eſteem of the inhabitants of that part of the country where he lived. But his uſefulneſs was not confined to his own neighbourhood. On many occaſions he was conſulted by letter from the moſt diſtant parts of the country.

In different collections are to be found ſeveral of his performances, which prove that he had ſomething new and uſeful to offer upon every ſubject to which he applied himſelf. But thoſe writings which do him the greateſt honour, are two long diſſertations on Nervous Fevers, in the Medical Eſſays and Obſervations publiſhed by a Society in Edinburgh; and a treatiſe on the uſe of Sea-voyages in medicine, which firſt made its appearance in the year 1757, and was afterwards re-printed in 1771. By means of the former, the attention of phyſicians was firſt turned to a ſpecies of fever which is now found to prevail univerſally in this country; and the liberal uſe of wine, which he was the firſt among the moderns to recommend, has ſince been adopted in theſe fevers by the moſt judicious phyſicians of the preſent age, and has probably contributed not a little to the ſucceſs of their practice. His treatiſe on Sea-voyages points out in a manner ſo clear, and ſo much on the ſure footing of experience, their utility in various diſtempers, particularly in conſumptions, that there is now a proſpect of our being able to employ a remedy in this untractable diſeaſe much more efficacious than any hitherto in uſe. Dr Gilchriſt died in 1774.

GILD, or GUILD. See GUILD.

GILDAS (ſurnamed *the Wiſe*), was born in Wales, in the year 511. Where he was educated is uncertain; but it appears from his own writings that he was a monk. Some writers ſay that he went over to Ireland; others, that he viſited France and Italy. They agree however in aſſerting, that after his return to England, he became a celebrated and moſt aſſiduous preacher of the goſpel. Du Pin ſays he founded a monaſtery at Venetia in Britain. Gildas is the only Britiſh author of the ſixth century, whoſe works are printed; they are therefore valuable on account of their antiquity, and as containing the only information we have concerning the times of which he wrote. His *Hiſtory of Britain* is, however, a very flimſy performance, and his ſtyle obſcure and inelegant.

GILDING, the art of ſpreading or covering a thing over with gold, either in leaf or liquid. The art of gilding was not unknown among the ancients, though it never arrived among them at the perfection to which the moderns have carried it. Pliny aſſures us, that the firſt gilding ſeen at Rome, was after the deſtruction of Carthage, under the cenſorſhip of Lucius Mummius, when they began to gild the ceilings of their temples and palaces; the Capitol being the firſt place on which this enrichment was beſtowed. But he adds, that luxury advanced on them ſo haſtily, that in a little time you might ſee all, even private and poor perſons, gild the very walls, vaults, &c. of their houſes.

We need not doubt but they had the ſame method with us, of beating gold, and reducing it into leaves; though it ſhould ſeem they did not carry it to the ſame height, if it be true which Pliny relates, that they only made 750 leaves of four fingers ſquare out of a whole ounce. Indeed he adds, that they could make more; that the thickeſt were called *bracteæ Præneſtinæ*, by reaſon of a ſtatue of the goddeſs Fortune at Præneſte gilt with ſuch leaves; and that the thinner ſort were called *bracteæ queſtoriæ*.

The modern gilders do alſo make uſe of gold-leaves of divers thickneſſes; but there are ſome ſo fine, that a thouſand do not weigh above four or five drachms. The thickeſt are uſed for gilding on iron, and other metals; and the thinneſt, on wood. But we have another advantage over the ancients, in the manner of uſing or applying the gold: the ſecret of painting in oil, diſcovered of late ages, furniſhes us with means of gilding works that ſhall endure all the injuries of time and weather, which to the ancients was impracticable. They had no way to lay the gold on bodies that would not endure the fire, but with whites of eggs, or ſize; neither of which will endure the water: ſo that they could only gild ſuch places as were ſheltered from the moiſture of the weather.

The Greeks called the compoſition on which they applied their gilding on wood, *leucophæum* or *leucophorum*; which is deſcribed as a ſort of glutinous, compound earth, ſerving, in all probability, to make the gold ſtick, and bear poliſhing. But the particulars of this earth, its colour, ingredients, &c. the antiquaries and naturaliſts are not agreed upon.

The luſtre and beauty of gold have occaſioned ſeveral inquiries and diſcoveries concerning the different methods of applying it to different ſubſtances. Hence the art of gilding is very extenſive, and contains many particular operations and various management.

3 Falſe gilding with laquer or Dutch-leaf.

A colour of gold is given by painting and by varniſhes, without employing gold; but this is a falſe kind of gilding. Thus a very fine golden colour is given to braſs and to ſilver, by applying upon theſe metals a gold-coloured varniſh, which, being tranſparent, ſhews all the brilliancy of the metals beneath. Many ornaments of braſs are varniſhed in this manner, which is called *gold lacquering*, to diſtinguiſh them from thoſe which are really gilt. Silver-leaves thus varniſhed are put upon leather, which is then called *gilt leather*. See LACQUER.

Amongſt the falſe gilding may alſo be reckoned thoſe which are made with thin leaves of copper or braſs, called *Dutch-leaf*. In this manner are made all the kinds of what is called *gilt paper*.

In the true gilding, gold is applied to the ſurface of bodies. The gold intended for this purpoſe ought in general to be beat into thin leaves, or otherwiſe divided into very fine parts.

4 Gilding with ſize.

As metals cannot adhere well merely by contact to any but to other metallic ſubſtances, when gold is to be applied to the ſurface of ſome unmetallic body, that ſurface muſt be previouſly covered with ſome gluey and tenacious ſubſtance, by which the gold ſhall be made to adhere. Theſe ſubſtances are in general called *ſizes*. Some of theſe are made of vegetable and animal glues, and others of oily, gluey, and drying matters. Upon them the leaves of gold are applied, and preſſed down with a little cotton or a hare's foot; and when the whole is dry, the work is to be finiſhed and poliſhed with a hard inſtrument, called a *dogs-tooth*, to give luſtre.

5 With oil.

When the work is required to be capable of reſiſting rain or moiſture, it ought to be previouſly covered with a compoſition of drying oil and yellow ochre ground together; otherwiſe a water-ſize may be uſed, which is prepared by boiling cuttings of parchment or white leather in water, and by mixing with this ſome chalk or whiting: ſeveral layers of this ſize muſt be laid upon the wood, and over theſe a layer of the ſame ſize mixed with yellow ochre. Laſtly, another mixture, called *gold ſize*, is to be applied above theſe; upon which the gold-leaves are to be fixed. This gold ſize, the uſe of which is to make the gold-leaf capable of being burniſhed, is compoſed of tobacco-pipe clay, ground with ſome ruddle or black lead, and tempered with a little tallow or oil of olives. The edges of glaſſes may be gilt by applying, firſt, a very thin coat of varniſh, upon which the gold-leaf is to be fixed; and when the varniſh is hardened, may be burniſhed. This varniſh is prepared by boiling powdered amber with linſeed oil in a braſs veſſel to which a valve is fitted, and by diluting the above ſolution with four or five times its quantity of oil of turpentine; and that it may dry ſooner, it may be ground with ſome white lead.

6 Of gilding metals.

The method of applying gold upon metals is entirely different. The ſurface of the metal to be gilt is firſt to be cleaned; and then leaves are to be applied to it, which, by means of rubbing with a poliſhed blood-ſtone, and a certain degree of heat, are made to adhere perfectly well. In this manner ſilver-leaf is fixed and burniſhed upon braſs in the making of what is called *French plate*, and ſometimes alſo gold-leaf is burniſhed upon copper and upon iron.

Gold is applied to metals in ſeveral other manners. One of theſe is by previouſly forming the gold into a paſte or amalgam with mercury. In order to obtain a ſmall amalgam of gold and mercury, the gold is firſt to be reduced into thin plates or grains, which are heated red-hot, and thrown into mercury previouſly heated, till it begins to ſmoke. Upon ſtirring the mercury with an iron rod, the gold totally diſappears. The proportion of mercury to gold is generally as ſix or eight to one.

With this amalgam the ſurface of the metal to be gilded is to be covered; then a ſufficient heat is to be applied to evaporate the mercury; and the gold is laſtly to be burniſhed with a blood-ſtone.

7 Uſe of the nitrous acid in gilding.

This method of gilding by amalgamation is chiefly uſed for gilding copper, or an allay of copper, with a ſmall portion of zinc, which more readily receives the amalgam; and is alſo preferable for its colour, which more reſembles that of gold than the colour of copper. When the metal to be gilt is wrought or chaſed, it ought to be previouſly covered with quickſilver, before the amalgam is applied, that this may be eaſier ſpread: but when the ſurface of the metal is plain, the amalgam may be applied directly to it. The quickſilver or amalgam is made to adhere to the metal by means of a little aquafortis, which is rubbed on the metallic ſurface at the ſame time, by which this ſurface is cleanſed from any ruſt or tarniſh which might prevent the union or adheſion of the metals. But the uſe of the nitrous acid in this operation is not, as is generally ſuppoſed, confined merely to cleanſe the ſurface of the metal to be gilt from any ruſt or tarniſh it may have acquired; but it alſo greatly facilitates the application of the amalgam to the ſurface of that metal, probably in the following manner: It firſt diſſolves part of the mercury of the amalgam; and when this ſolution is applied to the copper, this latter metal having a ſtronger diſpoſition to unite with the nitrous acid than the mercury has, precipitates the mercury upon its ſurface, in the ſame manner as a poliſhed piece of iron precipitates upon its ſurface copper, from a ſolution of blue vitriol. When the metal to be gilt is thus covered over with a thin precipitated coat of mercury, it readily receives the amalgam. In this ſolution and precipitation of mercury, the principal uſe of the nitrous acid in the proceſs of gilding appears to conſiſt. The amalgam being equally ſpread over the ſurface of the metal to be gilt, by means of a bruſh, the mercury is then to be evaporated by a heat juſt ſufficient for that purpoſe; for if it be too great, part of the gold may alſo be expelled, and part of it will run together, and leave ſome of the ſurface of the metal bare: while the mercury is evoporating, the piece is to be, from time to time, taken from the fire, that it may be examined, that the amalgam may be ſpread more equally by means of a bruſh, that any defective parts of it may be again covered, and that the heat may not be too ſuddenly applied to it: when the mercury is evaporated, which is known by the ſurface being entirely become of a dull yellow colour, the metal muſt then undergo other operations, by which the fine gold-colour is given to it. Firſt, the gilded piece of metal is rubbed with a ſcratch-bruſh (which is a bruſh compoſed of braſs wire) till its ſurface is made ſmooth; then it is covered over with a compoſition called *gilding wax*, and is again expoſed to the fire till the wax be burnt off. This wax is compoſed of bees-wax, ſometimes mixed with ſome of the following ſubſtances; red ochre, verdegriſe, copper-ſcales, alum, vitriols, borax: but, according to Dr Lewis, the ſaline ſubſtances alone are ſufficient, without any wax. By this operation the colour of the gilding is heightened; and this effect ſeems to be produced by a perfect diſſipation of ſome mercury remaining after the former operation. This diſſipation is well effected by this equable application of heat. The gilt ſurface is then covered over with a ſaline compoſition conſiſting of nitre, alum, or other vitriolic ſalt, ground together, and mixed up into a paſte with water or urine. The piece of metal thus covered is expoſed to a certain degree of heat, and then quenched in water. By this method its colour is further improved, and brought nearer to that of gold. This effect ſeems to be produced by the acid of nitre (which is diſengaged by the vitriolic acid of the alum or other vitriolic ſalt during the expoſure to heat) acting upon any particles of copper which may happen to lie on the gilded ſurface. Laſtly, ſome artiſts think that they give an additional luſtre to their gilt-work by dipping it in a liquor prepared by boiling ſome yellow materials, as ſulphur, orpiment, or turmeric. The only advantage of this operation is, that a part of the yellow matter, as the ſulphur, or turmeric, remains in ſome of the hollows of the carved work, in which the gilding is apt to be more imperfect, and to which it gives a rich and ſolid appearance.

Iron cannot be gilt by amalgamation, unleſs, as it is ſaid, it be previouſly coated with copper by dipping in a ſolution of blue vitriol. Iron may alſo receive a golden coat from a ſaturated ſolution of gold in aquaregia, mixed with ſpirit of wine, the iron having a greater affinity with the acid, from which it therefore precipitates the gold. Whether any of theſe two methods be applicable to uſe, is uncertain: but the method commonly employed of fixing gold upon iron is that abovementioned, of burniſhing gold-leaf upon this metal when heated ſo as to become blue; and the operation will be more perfect, if the ſurface has been previouſly ſcratched or graved.

Another method is mentioned by authors of gilding upon metals, and alſo upon earthen ware, and upon glaſs; which is, to fuſe gold with regulus of antimony, to pulverize the maſs which is ſufficiently brittle to admit that operation, to ſpread this powder upon the piece to be gilt, and expoſe it to ſuch a fire that the regulus may be evaporated, while the gold remains fixed. The inconveniencies of this method, according to Dr Lewis, are, that the powder does not adhere to the piece, and cannot be equally ſpread; that part of the gold is diſſipated along with the regulus; that glaſs is fuſible with the heat neceſſary for the evaporation of regulus of antimony; and that copper is liable to be corroded by the regulus, and to have its ſurface rendered uneven.

8 prove- nts by Lewis.

l. Com. rts.

On the ſubject of gilding by amalgamation Dr Lewis has the following remarks. "There are two principal inconveniencies in this buſineſs: One, that the workmen are expoſed to the fumes of the mercury, and generally, ſooner or later, have their health greatly impaired by them: the other, the loſs of the mercury; for tho' part of it is ſaid to be detained in cavities made in the chimney for that purpoſe, yet the greateſt part of it is loſt. From ſome trials I have made, it appeared that both theſe inconveniencies, particularly the firſt and moſt conſiderable one, might in good meaſure be avoided, by means of a furnace of a due conſtruction. If the communication of a furnace with its chimney, inſtead of being over the fire, is made under the grate, the aſh-pit door or other apertures beneath the grate cloſed, and the mouth of the furnace left open; the current of air, which otherwiſe would have entered beneath, enters now at the top, and, paſſing down thro' the grate to the chimney, carries with it completely both the vapour of the fuel, and the fumes of ſuch matters as are placed upon it: the back part of the furnace ſhould be raiſed a little higher above the fire than the fore part, and an iron plate laid over it, that the air may enter only at the front, where the workman ſtands, who will be thus effectually ſecured from the fumes, and from being incommoded by the heat, and at the ſame time have full liberty of introducing, inſpecting, and removing the work. If ſuch a furnace is made of ſtrong forged (not milled) iron plate, it will be ſufficiently durable: the upper end of the chimney may reach above a foot and a half higher than the level of the fire: over this is to be placed a larger tube, leaving an interval of an inch or more all round between it and the chimney, and reaching to the height of 10 or 12 feet, the higher the better. The external air, paſſing up between the chimney and the outer pipe, prevents the latter from being much heated, ſo that the mercurial fumes will condenſe againſt its ſides into running quickſilver, which, falling down to the bottom, is there catched in a hollow rim formed by turning inwards a portion of the lower part, and conveyed, by a pipe at one ſide, into a proper receiver.

9 u me- of rai- old s.

"Mr Hellot communicates, in the Memoirs of the French Academy for the year 1745, a method of making raiſed figures of gold on works of gold or ſilver, found among the papers of Mr du Fay, and of which Mr du Fay himſelf had ſeen ſeveral trials. Fine gold in powder (ſuch as reſults from the parting of gold and ſilver by aquafortis, is directed to be laid in a heap on a levigating ſtone, a cavity made in the middle of the heap, and half its weight of pure mercury put into the cavity: ſome of the fetid ſpirit, obtained from garlick root by diſtillation in a retort, is then to be added, and the whole immediately mingled and ground with a muller, till the mixture is reduced into an uniform grey powder. The powder is to be ground with lemon juice to the conſiſtence of paint, and applied on the piece previouſly well cleaned and rubbed over with the ſame acid juice: the figures drawn with it may be raiſed to any degree by repeating the application. The piece is expoſed to a gentle fire till the mercury is evaporated ſo as to leave the gold yellow, which is then to be preſſed down, and rubbed with the finger and a little ſand, which makes it appear ſolid and brilliant: after this it may be cut and embelliſhed. The author obſerves, that being of a ſpongy texture, it is more adviſeable to cut it with a chiſel than to raiſe it with a graver; that it has an imperfection of being always pale; and that it would be a deſirable thing to find means of giving it colour, as by this method ornaments might be made of exquiſite beauty and with great facility. As the paleneſs appears to proceed from a part of the mercury retained by the gold, I apprehend it might be remedied by the prudent application of a little warm aquafortis, which, diſſolving the mercury from the exterior part, would give at leaſt a ſuperficial high colour: if the piece is ſilver, it muſt be defended from the aquafortis by covering it with wax. Inſtruments or ornaments of gold, ſtained by mercury, where the gold is connected with ſubſtances incapable of bearing fire, may be reſtored to their colour by the ſame means.

10 Another method.

"The foregoing proceſs is given entirely on the authority of the French writer. I have had no experience of it myſelf, but have ſeen very elegant figures of gold raiſed upon ſilver, on the ſame principle, by a different procedure. Some cinnabar was ground, not with the diſtilled ſpirit, but with the expreſſed juice of garlick, a fluid remarkably tenacious. This mixture was ſpread all over the poliſhed ſilver; and when the firſt layer was dry, a ſecond, and after this a third was applied. Over theſe were ſpread as many layers of another mixture, compoſed chiefly of aſphaltum and linſeed oil boiled down to a due conſiſtence. The whole being dried, with a gentle heat, on a kind of wire-grate, the figures were traced and cut down to the ſilver ſo as to make its ſurface rough: the inciſions were filled with an amalgam of gold, raiſed to different heights in different parts according to the nature of the deſign; after which a gentle fire, at the ſame time that it evaporated the mercury, deſtroyed the tenacity of the gummy juice, ſo that the coating, which ſerved to confine the amalgam, and as a guide in the application of it, was now eaſily got off. The gold was then preſſed down and embelliſhed as in the former method; and had this advantage, that the ſurface of the ſilver under it having been made rough, it adhered more firmly, ſo as not to be in danger of coming off, as M. du Fay ſays the gold applied in his way ſometimes did. The artiſt, however, found the proceſs ſo troubleſome, that though he purchaſed the receipt for a conſiderable ſum, he has laid the practice aſide."

Finally, ſome metals, particularly ſilver, may be gilt in the following manner:

11 Eaſy method of gilding ſilver.

Let gold be diſſolved in aqua-regia. In this ſolution pieces of linen are to be dipt, and burnt to black aſhes. Theſe aſhes being rubbed on the ſurface of the ſilver by means of a wet linen rag, apply the particles of gold which they contain, and which by this method adhere very well. The remaining part of the aſhes is to be waſhed off; and the ſurface of the ſilver, which in this ſtate does not ſeem to be gilt, is to be burniſhed with a blood-ſtone, till it acquire a fine colour of gold. This method of gilding is very eaſy, and conſumes a very ſmall quantity of gold. Moſt gilt ornaments upon fans, ſnuff-boxes, and other toys of much ſhow and little value, are nothing but ſilver gilt in this manner.

12
Methods of gilding glaſs.

Gold may alſo be applied to glaſs, porcelain, and other vitrified matters. As the ſurface of theſe matters is very ſmooth, and conſequently is capable of a very perfect contact with gold leaves, theſe leaves adhere to them with ſome force, although they are not of metallic nature. This gilding is ſo much more perfect, as the gold is more exactly applied to the ſurface of the glaſs. The pieces are then to be expoſed to a certain degree of heat, and burniſhed ſlightly to give them luſtre.

A more ſubſtantial gilding is fixed upon glaſs, enamel, and porcelain, by applying to theſe ſubſtances powder of gold mixed with a ſolution of gum arabic, or with ſome eſſential oil, and a ſmall quantity of borax; after which a ſufficient heat is to be applied to ſoften the glaſs and the gold, which is then to be burniſhed. With this mixture any figures may be drawn. The powders for this purpoſe may be made, 1. By grinding gold-leaf with honey, which is afterwards to be waſhed away with water. 2. By diſtilling to dryneſs a ſolution of gold in aqua-regia. 3. By evaporating the mercury from an amalgam of gold, taking care to ſtir well the maſs near the end of the proceſs. 4. By precipitating gold from its ſolution in aqua-regia by applying to it a ſolution of green vitriol in water, or ſome copper, and perhaps ſome other metallic ſubſtances.

GILL, a meaſure of capacity, containing a quarter of an Engliſh pint.

GILLS, in ichthyology. See BRANCHIÆ.

GILOLO, a large iſland of the pacific ocean, lying between 1° S. Lat. and 2° N. Lat. and between 125° and 128° E. Long. It belongs to the Dutch; but does not produce any of the fine ſpices, tho' it lies in the neighbourhood of the ſpice-iſlands. The natives are fierce and cruel ſavages.

GILPIN (Bernard), rector of Houghton, diſtinguiſhed by his extraordinary piety and hoſpitality, was deſcended from an ancient and honourable family in Weſtmoreland, and born in 1517. As he was bred in the Catholic religion, ſo he for ſome time defended it againſt the reformers, and at Oxford held a diſputation with Hooper afterward biſhop of Worceſter and martyr for the Proteſtant faith; but was ſtaggered in another diſputation with Peter Martyr, and began ſeriouſly to examine the conteſted points by the beſt authorities. Thus, being preſented to the vicarage of Norton in the dioceſe of Durham, he ſoon reſigned it, and went abroad to conſult eminent profeſſors on both ſides; and after three years abſence returned a little before the death of queen Mary, ſatisfied in the general doctrines of the reformation. He was kindly received by his uncle Dr Tonſtall, biſhop of Durham; who ſoon after gave him the archdeaconry of Durham, to which the rectory of Eſſington was annexed. When repairing to his pariſh, tho' the perſecution was then at its height, he boldly preached againſt the vices, errors, and corruptions of the times, eſpecially in the clergy, on which a charge conſiſting of 13 articles was drawn up againſt him, and preſented in form to the biſhop. But Dr Tonſtall found a method of diſmiſſing the cauſe in ſuch a manner as to protect his nephew, without endangering himſelf, and ſoon after preſented him to the rich living of Houghton le Spring. He was a ſecond time accuſed to the biſhop, and again protected; when his enemies, enraged at this ſecond defeat, laid their complaint before Dr Bonner, biſhop of London: who immediately gave orders to apprehend him. Upon which Mr Gilpin bravely prepared for martyrdom; and ordering his houſe-ſteward to provide him a long garment, that he might make a decent appearance at the ſtake, ſet out for London. Luckily, however, he broke his leg on the journey; which protracted his arrival until the news of the queen's death freed him from all further apprehenſions. Being immediately ſet at liberty, he returned to Houghton, where he was received by his pariſhioners with the ſincereſt joy.

Upon the deprivation of the Popiſh biſhops, he was offered the ſee of Carliſle, which he declined; and confining his attention to his rectory, diſcharged all the duties of his function in the moſt exemplary manner. To the greateſt humanity and courteſy, he added an unwearied application to the inſtruction of thoſe under his care. He was not ſatisfied with the advice he gave in public, but uſed to inſtruct in private; and brought his pariſhioners to come to him with their doubts and difficulties. He had a moſt engaging manner towards thoſe whom he thought well-diſpoſed: nay, his very reproof was ſo conducted, that it ſeldom gave offence; the becoming gentleneſs with which it was urged, made it always appear the effect of friendſhip. Thus, with unceaſing aſſiduity, did he employ himſelf in admoniſhing the vicious, and encouraging the well-intentioned; by which means, in a few years, he made a greater change in his neighbourhood, than could well have been imagined. A remarkable inſtance, what reformation a ſingle man may effect, when he hath it earneſtly at heart!

But his hopes were not ſo much in the preſent generation, as in the ſucceeding. It was an eaſier taſk, he found, to prevent vice, than to correct it; to form the young to virtue, than to amend the bad habits of the old. He employed much of his time, therefore, in endeavouring to improve the minds of the younger part of his pariſh; ſuffering none to grow up in an ignorance of their duty; but preſſing it as the wiſeſt part to mix religion with their labour, and amidſt the cares of this life to have a conſtant eye upon the next. He attended to every thing which might be of ſervice to his pariſhioners. He was very aſſiduous in preventing all law-ſuits among them. His hall is ſaid to have been often thronged with people, who came to him about their differences. He was not indeed much acquainted with law; but he could decide equitably, and that ſatisfied: nor could his ſovereign's commiſſion have given him more weight, than his own character gave him.

His hoſpitable manner of living was the admiration of the whole country. He ſpent in his family every fortnight 40 buſhels of corn, 20 buſhels of malt, and a whole ox; beſides a proportionable quantity of other kinds of proviſion. Strangers and travellers found a cheerful reception. All were welcome that came; and even their beaſts had ſo much care taken of them, that it was humorouſly ſaid, "If a horſe was turned "looſe in any part of the country, it would immediately "make its way to the rector of Houghton's."

Every Sunday, from Michaelmas till Eaſter, was a ſort of public day with him. During this ſeaſon he expected to ſee all his pariſhioners and their families.

For their reception, he had three tables well covered: the firſt was for gentlemen, the ſecond for huſbandmen and farmers, and the third for day-labourers. This piece of hoſpitality he never omitted, even when loſſes, or a ſcarcity of proviſion, made its continuance rather difficult to him. He thought it his duty, and that was a deciding motive. Even when he was abſent from home, no alteration was made in his family-expences: the poor were fed as uſual, and his neighbours entertained.

But notwithſtanding all this painful induſtry, and the large ſcope it had in ſo extended a pariſh, Mr Gilpin thought the ſphere of his benevolence yet too confined. It grieved him extremely, to ſee every where in the pariſhes around him, ſo great a degree of ignorance and ſuperſtition, occaſioned by the ſhameful neglect of the paſtoral care in the clergy of thoſe parts. Theſe bad conſequences induced him to ſupply, as far as he could, what was wanting in others. For this purpoſe, every year he uſed regularly to viſit the moſt neglected pariſhes in Northumberland, Yorkſhire, Cheſhire, Weſtmoreland, and Cumberland; and that his own pariſh in the mean time might not ſuffer, he was at the expence of a conſtant aſſiſtant. In each place he ſtayed two or three days; and his method was, to call the people about him, and lay before them, in as plain a way as poſſible, the danger of leading wicked, or even careleſs lives; explaining to them the nature of true religion; inſtructing them in the duties they owed to God, their neighbour, and themſelves; and ſhewing them how greatly a moral and religious conduct would contribute to their preſent as well as future happineſs.

As Mr Gilpin had all the warmth of an enthuſiaſt, though under the direction of a very calm and ſober judgment, he never wanted an audience, even in the wildeſt parts; where he rouſed many to a ſenſe of religion, who had contracted the moſt inveterate habits of inattention to every thing of a ſerious nature. And wherever he came, he uſed to viſit all the gaols and places of confinement; few in the kingdom having at that time any appointed miniſter. And by his labours, and affectionate manner of behaving, he is ſaid to have reformed many very abandoned perſons in thoſe places. He would employ his intereſt likewiſe for ſuch criminals whoſe caſes he thought attended with any hard circumſtances, and often procured pardons for them.

There is a tract of country upon the border of Northumberland, called *Readſ-dale* and *Tine-dale*, of all barbarous places in the north, at that time the moſt barbarous. Before the Union, this place was called the *debateable land*, as ſubject by turns to England and Scotland, and the common theatre where the two nations were continually acting their bloody ſcenes. It was inhabited by a kind of deſperate banditti, rendered fierce and active by conſtant alarms: they lived by theft, uſed to plunder on both ſides of the barrier; and what they plundered on one, they expoſed to ſale on the other; by that means eſcaping juſtice. And in this dreadful country, where no man would even travel that could help it, Mr Gilpin never failed to ſpend ſome part of every year.

He generally choſe the Chriſtmas holidays for his journey, becauſe he found the people at that ſeaſon moſt diſengaged, and moſt eaſily aſſembled. He had ſet places for preaching, which were as regularly attended as the aſſize-towns of a circuit. If he came where there was a church, he made uſe of it: if not, of barns, or any other large building; where great crowds of people were ſure to attend him, ſome for his inſtructions, and others for his charity.—This was a very difficult and laborious employment. The country was ſo poor, that what proviſion he could get, extreme hunger only could make palatable. The inclemency of the weather, and the badneſs of the roads through a mountainous country, and at that ſeaſon covered with ſnow, expoſed him likewiſe often to great hardſhips. Sometimes he was overtaken by the night, the country being in many places deſolate for ſeveral miles together, and obliged to lodge out in the cold. At ſuch times, we are told, he would make his ſervant ride about with his horſes, whilſt himſelf on foot uſed as much exerciſe as his age and the fatigues of the preceding day would permit. All this he cheerfully underwent; eſteeming ſuch ſervices well compenſated by the advantages which he hoped might accrue from them to his uninſtructed fellow-creatures.

The diſintereſted pains he took among theſe barbarous people, and the good offices he was always ready to do them, drew from them the warmeſt and ſincereſt expreſſions of gratitude. Indeed, he was little leſs than adored among them, and might have brought the whole country almoſt to what he pleaſed. One inſtance that is related, ſhews how greatly he was revered. By the careleſſneſs of his ſervant, his horſes were one day ſtolen. The news was quickly propagated, and every one expreſſed the higheſt indignation at the fact. The thief was rejoicing over his prize, when, by the report of the country, he found whoſe horſes he had taken. Terrified at what he had done, he inſtantly came trembling back, confeſſed the fact, returned the horſes, and declared he believed the devil would have ſeized him directly, had he carried them off, knowing them to have been Mr Gilpin's.

We have already taken notice of Mr Gilpin's uncommonly generous and hoſpitable manner of living. The value of his rectory was about 400l. a year: an income, indeed, at that time very conſiderable, but yet in appearance very unproportionate to the generous things he did: indeed, he could not have done them, unleſs his frugality had been equal to his generoſity. His friends, therefore, could not but wonder to find him, amidſt his many great and continual expences, entertain the deſign of building and endowing a grammar-ſchool: a deſign, however, which his exact œconomy ſoon enabled him to accompliſh, though the expence of it amounted to upwards of 500l. His ſchool was no ſooner opened, than it began to flouriſh; and there was ſo great a reſort of young people to it, that in a little time the town was not able to accommodate them. He put himſelf, therefore, to the inconvenience of fitting up a part of his own houſe for that purpoſe, where he ſeldom had fewer than twenty or thirty children. Some of theſe were the ſons of perſons of diſtinction, whom he boarded at eaſy rates: but the greater part were poor children, whom he not only educated, but cloathed and maintained: he was at the expence likewiſe of boarding in the town many other poor children. He uſed to bring ſeveral every

Gilpin.

year from the different parts where he preached, particularly Readſ-dale and Tine-dale; which places he was at great pains in civilizing, and contributed not a little towards rooting out that barbariſm which every year prevailed leſs among them.

As to his ſchool, he not only placed able maſters in it, whom he procured from Oxford, but himſelf likewiſe conſtantly inſpected it. And, that encouragement might quicken the application of his boys, he always took particular notice of the moſt forward: he would call them *his own ſcholars*, and would ſend for them often into his ſtudy, and there inſtruct them himſelf. One method uſed by him to fill his ſchool, was a little ſingular. Whenever he met a poor boy upon the road, he would make trial of his capacity by a few queſtions; and if he found it ſuch as pleaſed him, he would provide for his education. And beſides thoſe whom he ſent from his own ſchool to the univerſities, and there wholly maintained, he would likewiſe give to others, who were in circumſtances to do ſomething for themſelves, what farther aſſiſtance they needed. By which means he induced many parents to allow their children a liberal education, who otherwiſe would not have done it. And Mr Gilpin did not think it enough to afford the means only of an academical education to theſe young people, but endeavoured to make it as beneficial to them as he could. He ſtill conſidered himſelf as their proper guardian; and ſeemed to think himſelf bound to the public for their being made uſeful members of it, as far as it lay in his power to make them ſo. With this view he held a punctual correſpondence with their tutors; and made the youths themſelves frequently write to him, and give him an account of their ſtudies. So ſolicitous indeed was he about them, knowing the many temptations to which their age and ſituation expoſed them, that once every other year he generally made a journey to the univerſities, to inſpect their behaviour. And this uncommon care was not unrewarded; for many of his ſcholars became ornaments to the church, and exemplary inſtances of piety.

To the account that hath been already given of Mr Gilpin's hoſpitality and benevolence, the following particulars may be added. Every Thurſday throughout the year, a very large quantity of meat was dreſſed wholly for the poor; and every day they had what quantity of broth they wanted. Twenty-four of the pooreſt were his conſtant penſioners. Four times in the year a dinner was provided for them; when they received from his ſteward a certain quantity of corn, and a ſum of money: and at Chriſtmas they had always an ox divided among them.

Wherever he heard of any in diſtreſs, whether of his own pariſh, or any other, he was ſure to relieve them. In his walks abroad, he would frequently bring home with him poor people, and ſend them away cloathed as well as fed. He took great pains to inform himſelf of the circumſtances of his neighbours, that the modeſty of the ſufferer might not prevent his relief. But the money beſt laid out was, in his opinion, that which encouraged induſtry. It was one of his greateſt pleaſures to make up the loſſes of his laborious neighbours, and prevent their ſinking under them. If a poor man had loſt a beaſt, he would ſend him another in his room: or if any farmer had had a bad year, he would make him an abatement in his tythes.—Thus, as far as he was able, he took the miſfortunes of his pariſh upon himſelf; and, like a true ſhepherd, expoſed himſelf for his flock. But of all kinds of induſtrious poor, he was moſt forward to aſſiſt thoſe who had large families: ſuch never failed to meet with his bounty, when they wanted to ſettle their children in the world.

In the diſtant pariſhes where he preached, as well as in his own neighbourhood, his generoſity and benevolence were continually ſhewing themſelves; particularly in the deſolate parts of Northumberland. "When " he began his journey," ſays an old manuſcript life of him, "he would have ten pounds in his purſe; and, " at his coming home, he would be twenty nobles in " debt, which he would always pay within a fortnight " after."—In the gaols he viſited, he was not only careful to give the priſoners proper inſtructions, but uſed to purchaſe for them likewiſe what neceſſaries they wanted.

Even upon the public road, he never let ſlip an opportunity of doing good. He has often been known to take off his cloak, and give it to an half-naked traveller: and when he has had ſcarce money enough in his pocket to provide himſelf a dinner, yet would he give away part of that little, or the whole, if he found any who ſeemed to ſtand in need of it.—Of this benevolent temper, the following inſtance is preſerved. One day returning home, he ſaw in a field ſeveral people crowding together; and judging ſomething more than ordinary had happened, he rode up, and found that one of the horſes in a team had ſuddenly dropped down, which they were endeavouring to raiſe; but in vain, for the horſe was dead. The owner of it ſeemed much dejected with his misfortune; and declaring how grievous a loſs it would be to him, Mr Gilpin bade him not be diſheartened: "I'll let you have, (ſays he) "honeſt man, that horſe of mine," and pointed to his ſervant's.—"Ah! maſter, (replied the countryman) my pocket will not reach ſuch a beaſt as that." "Come, come, (ſaid Mr Gilpin) take him, take " him; and when I demand my money, then thou " ſhalt pay me."

This worthy and excellent divine, who merited and obtained the glorious titles of *the Father of the Poor*, and *the Apoſtle of the North*, died in 1583, in the 66th year of his age.

GILTHEAD, in ichthyology. See Sparus.

GIN. See Geneva.

Gin, in mechanics, a machine for driving piles, fitted with a windlaſs and winches at each end, where eight or nine men heave, and round which a rope is reeved that goes over the wheel at the top: one end of this rope is ſeized to an iron-monkey, that hooks to a beetle of different weights, according to the piles they are to drive, being from eight to thirteen hundred weight; and when hove up to a croſs-piece, near the wheel, it unhooks the monkey, and lets the beetle fall on the upper end of the pile, and forces the ſame into the ground: then the monkey's own weight overhauls the windlaſs, in order for its being hooked again to the beetle.

GINKGO, the maiden-hair tree, is a native of Japan, where it is alſo known by the names of *Ginan* and *Itſio*. It riſes with a long, erect, thick and branched ſtem, to the ſize of a walnut-tree. The bark is aſh-coloured, the wood brittle and ſmooth, the pith ſoft and fungous. The leaves are large, expanded from a narrow bottom into the figure of a maiden-hair leaf, unequally parted, ſtreaked, without fibres or nerves; both ſurfaces having the ſame appearance, and ſupported upon footſtalks, which are compreſſed upon the upper ſurface, and extended into the ſubſtance of the leaf. From the uppermoſt ſhoots hang the flowers in long catkins that are filled with the fertilizing powder; and to which ſucceeds the fruit, adhering to a thick fleſhy pedicle, which proceeds from the boſom of the leaves. This fruit is either exactly or nearly round, and of the appearance and ſize of a damaſk plum. The ſubſtance ſurrounding the fruit is fleſhy, juicy, white, very harſh, and adheres ſo firmly to the incloſed nut, as not to be ſeparated from it, except by putrefaction. The nut, properly termed *Gineau*, reſembles the piſtachia nut, eſpecially a Perſian ſpecies named *bergjes piſtai;* but is almoſt double in ſize, and of the figure of an apricot ſtone. The ſhell is ſomewhat white, woody, and brittle; and incloſes a white looſe kernel, having the ſweetneſs of an almond, along with a degree of harſhneſs. Theſe kernels taken after dinner are ſaid to promote digeſtion, and to give relief in ſurfeits; whence they never fail to make part of the deſſert in great feaſts and anniverſary entertainments.—Many of theſe plants have been reared by Mr James Gordon at his nurſery near Mile-end. They ſeem to be very hardy, and thrive in this country in the open air.

GINGER, the root of a ſpecies of amomum. See AMOMUM.

GINGIVÆ, the gums. See GUMS.

GINGLYMUS, in anatomy. See ANATOMY, n° 2, d.

GINSENG. See PANAX.

GIOIA (Flavio,) of Amalfi, in the kingdom of Naples, the celebrated mathematican; who, from his knowledge of the magnetic powers, invented the mariner's compaſs, by which the navigation of the Europeans was extended to the moſt diſtant regions of the globe: before this invention, navigation was confined to coaſting. The king of Naples being a younger branch of the royal family of France, he marked the north point with a fleur de lis, in compliment to that country. It is ſaid the Chineſe knew the compaſs long before; be this as it may, the Europeans are indebted to Gioia for this invaluable diſcovery. He flouriſhed A.D. 300.

GIRAFFE, in zoology. See CERVUS.

GIRALD (Barry), or *Giraldus Cambrenſis*. See BARRY.

GIORGIONE, ſo called from his comely aſpect, was an illuſtrious Venetian painter, born in 1478. He received his firſt inſtructions from Giovanni Bellino; but ſtudying afterwards the works of Leonardo da Vinci, he ſoon ſurpaſſed them both, being the firſt among the Lombards who found out the admirable effects of ſtrong lights and ſhadows. Titian became his rival in this art; and was ſo careful in copying the life, that he excelled Giorgione in diſcovering the delicacies of nature, by tempering the boldneſs of his colouring. The moſt valuable piece of Giorgione in oil is that of Chriſt carrying his croſs, now in the church of San Rovo in Venice; where it is held in great veneration. He died of the plague young, in 1511.

GIOSEPPINO, an eminent painter, ſo called by way of contraction from *Gioſeppe d'Arpino*, the town of Naples, where he was born in 1560. Being carried to Rome very young, and employed by painters then at work in the Vatican to grind their colours, he ſoon made himſelf maſter of the elements of deſign, and by degrees grew very famous. His wit and humour gained him the favour of popes and cardinals, who found him buſineſs in plenty. Gregory XIII. ſhewed him great reſpect; and Lewis XIII. of France made him a knight of the order of St Michael. By the force of a happy genius he acquired a light and agreeable manner of deſigning; though it is remarked by De Piles, that he degenerated into a ſtyle which neither partook of true nature, nor of the antique. His battles in the capitol are the moſt eſteemed of all his pieces. He died at Rome in 1640.

GIOTTO, an ingenious painter, ſculptor, and architect of Florence, born in 1276. He was the diſciple of Cimabue; but far ſuperior to his maſter in the air of his heads, the attitude of his figures, and in the tone of his colouring; but could not expreſs livelineſs in the eyes, tenderneſs in the fleſh, or ſtrength in the muſcles of his naked figures. He was principally admired for his works in moſaic; the beſt of which is over the grand entrance of St Peter's church at Rome. The obſervation of Alberti on that piece is, that in the ſhip of Giotto, the expreſſion of fright and amazement of the diſciples at ſeeing St Peter walk upon the water is ſo excellent, that each of them exhibits ſome characteriſtic ſign of his terror. His death happened in 1336, and the city of Florence honoured his memory with a ſtatue of marble over his tomb.

GIRALDI (Lilio Gregorio), an ingenious critic, and one of the moſt learned men that modern Italy has produced, was born at Ferrara in 1479. He was at Rome when it was plundered by the emperor Charles V.; and having thus loſt all he had, and being tormented by the gout, he ſtruggled through life with ill fortune and ill health. He wrote, nevertheleſs, 17 performances, which were collected and publiſhed at Baſil in 2 vols folio in 1580, and at Leyden in 1696. Authors of the firſt rank have beſtowed the higheſt eulogies on Giraldus; particularly Caſaubon and Thuanus.

GIRALDI (John Baptiſt Cintio), an Italian poet of the ſame family with the foregoing Lilio, was born in 1504. He was ſecretary to the duke of Ferrara, and afterwards became profeſſor of rhetoric at Pavia. He died in 1573. His works, which conſiſt chiefly of tragedies, were collected and publiſhed at Venice by his ſon Celſo Giraldi, in 1583; and ſome ſcruple not to rank him among the beſt tragic writers Italy has produced.

GIRARDON (Francis), a celebrated French architect and ſculptor, born at Troyes, in 1627. Lewis XIV. being informed of his great talents, ſent him to Rome with a penſion of 1000 crowns. At his return into France, he laboured for the royal palaces, and the gardens of Verſailles and Trianon; where there are many of his works executed in bronze and in marble, from the deſigns of Charles le Brun. The mauſoleum of cardinal de Richlieu, in the Sorbonne, and the equeſtrian ſtatue of Lewis XIV. at the Place de Vendome, where the ſtatue and horſe are caſt in one piece, paſs for his moſt excellent performances. Girardon was profeſſor, rector, and chancellor, of the Academy of Painting and Sculpture; and had the poſt of inſpector-general of all the works done in ſculpture. He died in 1715.

GIRONNE, or Gironny, in heraldry, a coat of arms divided into girons, or triangular figures, meeting in the centre of the ſhield, and alternately colour and metal.

GITTITH, a Hebrew word occurring frequently in the Pſalms, and generally tranſlated *wine-preſſes*. The conjectures of interpreters are various concerning this word. Some think it ſignifies a ſort of muſical inſtrument; others, that the pſalms with this title were ſung after the vintage; laſtly, others, that the hymns of this kind were invented in the city of Gath. Calmet is rather of opinion, that it was given to the claſs of young women or ſongſtreſſes of Gath to be ſung by them; Pſal. viii. 1. lxxxi. 1. lxxxiv. 1. Dr Hammond thinks that the pſalms with this title were all ſet to the ſame tune, and made on Goliah the Gittite.

GIULA, a ſtrong town of Upper Hungary, on the frontiers of Tranſilvania. It was taken by the Turks in 1566, and retaken by the Imperialiſts in 1695. It is ſeated on the river Kereſblan, in E. Long. 21. 1. N. Lat. 46. 25.

GIUSTANDEL, a large and ſtrong town of Turkey in Europe, and in Macedonia, with a Greek archbiſhop's ſee. It is ſeated near the lake Ochrida, in E. Long. 20. 50. N. Lat. 41. 10.

GLACIES mariæ. See Lapis *Specularis*.

GLACIS, in building, an eaſy inſenſible ſlope or declivity.

The deſcent of the glacis is leſs ſteep than that of the talus. In gardening, a deſcent ſometimes begins in talus, and ends in glacis.

The glacis of the corniche, is an eaſy imperceptible ſlope in the cymatium, to promote the deſcent and draining off the rain-water.

Glacis, in fortification, that maſs of earth which ſerves as a parapet to the covered way, ſloping eaſily towards the champaign or field.

GLADE, in gardening and agriculture, an opening and light paſſage made through a wood, by lopping off the branches of trees along that way.

GLADIATORS, in antiquity, perſons who fought, generally in the arena at Rome, for the entertainment of the people.

The gladiators were uſually ſlaves, and fought out of neceſſity; though ſometimes freemen made profeſſion thereof, like our prize-fighters, for a livelihood. The Romans borrowed this cruel diverſion from the Aſiatics; and we find that even the high-prieſts had their ludi pontificales, and ludi ſacerdotales. As from the earlieſt ages of antiquity we read that it was cuſtomary to ſacrifice priſoners of war to the manes of the great men that fell in the engagement, in proceſs of time they came to ſacrifice ſlaves at the funerals of all perſons of condition; but as it would have appeared barbarous to cut their throats like beaſts, they were appointed to fight with each other, and to do their beſt to ſave their own lives by killing their adverſary. Hence aroſe the maſters of arms called *laniſtæ*, and men learned to fight. Theſe laniſtæ bought ſlaves to train up to this cruel trade, whom they afterwards ſold to ſuch as had occaſion to exhibit ſhews. Junius Brutus, who expelled the kings, was the firſt that honoured the funeral of his father with theſe inhuman diverſions at the ſepulchre of the deceaſed: but afterwards they were removed to the circus and amphitheatres; and other perſons, beſides ſlaves, would hire themſelves to this infamous office.

They were all firſt ſworn that they would fight till death; and if they failed, they were put to death, either by fire, ſwords, clubs, whips, &c. It was uſual with the people, or emperor, to grant them life when they ſhewed no ſigns of fear. Auguſtus decreed that it ſhould always be granted them.

From ſlaves and freed-men, the wanton ſport ſpread to perſons of rank, as we find in Nero's time. And Domitian exhibited combats of women in the nighttime. We alſo read, that dwarfs encountered with one another. Conſtantine the Great firſt prohibited theſe combats in the Eaſt; but the practice was not entirely aboliſhed in the Weſt before Theodoric king of the Oſtrogoths in the year 500.

When any perſon deſigned to entertain the people with a ſhow of gladiators, he ſet up bills in the public places, giving an account of the time, the number and names of the combatants, and the circumſtances whereby they were to be diſtinguiſhed; each having his ſeveral badge, which generally was a peacock's feather: they alſo gave notice what time the ſhow would laſt; and ſometimes gave repreſentations of theſe things in painting, as is practiſed among us by thoſe who have any thing to ſhow at fairs, &c.

Upon the day appointed for the ſhow, in the firſt place the gladiators were brought out all together, and obliged to take a circuit round the arena in a very ſolemn and pompous manner. After this they proceeded *paria componere*, to match them by pairs, in which great care was taken to make the matches equal. The firſt ſort of weapons they made uſe of were ſtaves, or wooden foils called *rudes*; and the ſecond were effective weapons, as ſwords, poinards, &c.

The firſt were called *arma luſoria*, or *exercitoria*; the ſecond, *decretoria*, as being given by decree or ſentence of the prætor, or of him at whoſe expence the ſpectacle was exhibited.

They began to fence or ſkirmiſh with the firſt, which was to be the prelude to the battle; and from theſe, when well warmed, they advanced to the ſecond, with which they fought naked. The firſt part of the engagement was called *ventilare*, *preludare*; and the ſecond *dimicare ad certum*, or *verſis armis pugnare*.

When any received a remarkable wound, either his adverſary or the people uſed to cry out, *Habet*, or *Hoc habet*. If the vanquiſhed ſurrendered his arms, it was not in the victor's power to grant him life: it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone empowered to grant this boon. The two ſigns of favour and diſlike given by the people were, *premere pollicem*, and *vertere pollicem*; the former of which M. Dacier takes to be a clenching of the fingers of both hands between one another, and ſo holding the two thumbs upright cloſe together, was a ſign of the people's admiration of the courage ſhewn by both combatants; and at the ſame time for the conqueror to ſpare his antagoniſt's life: but the contrary motion, or bending back of the thumbs, ſignified the diſſatiſfaction of the ſpectators, and authoriſed the victor to kill the other combatant downright for a coward. The emperor ſaved whom he liked, if he was preſent at the ſolemnity, in the ſame manner.

After the engagement, ſeveral marks of favour were conferred on the victor, particularly a branch of palm-tree; and oftentimes a ſum of money, perhaps gathered up among the ſpectators: but the moſt common rewards were the pileus and the rudis. The former was given only to ſuch gladiators as were ſlaves, for a token of obtaining their freedom. But the rudis ſeems to have been beſtowed both on ſlaves and freemen; with this difference, that it procured the former no more than a diſcharge from any further performance in public, upon which they commonly turned laniſta: but the rudis, when given to ſuch perſons as, being free, had hired themſelves out for theſe ſhows, reſtored them to a full enjoyment of their liberty. See PILEUS, RUDIS, and LANISTA.

GLADIOLUS, CORN-FLAG; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ten ſpecies, of which the moſt remarkable is the communis, or common gladiolus. This hath a round, compreſſed, tuberous root; long ſword-ſhaped leaves; an erect flower-ſtalk, two or three feet high; the top garniſhed with ſeveral pretty large flowers of a red or white colour, having each ſix petals. They appear in May and June, and are ſucceeded by plenty of ſeed in Auguſt. The plants are very hardy, and will thrive in any ſoil or ſituation. They are propagated by offſets from the roots.

GLAMORGANSHIRE, by the Welſh called *Gwlad Morganwg* or *Vorganwg*, i. e. the county of *Morganwg*; a county of South Wales, bounded on the ſouth by the Severn ſea, on the north by Brecknockſhire, on the eaſt by Monmouthſhire, and on the weſt by Caermarthenſhire. It extends in length 48 miles, in breadth 27; and in circumference about 116. On the north ſide, where there are mountains covered with ſnow a great part of the year, the air is ſharp, and the ſoil very indifferent; but, on the ſouth ſide, as the country approaches nearer to a level, the ſoil grows better, producing plenty both of corn and graſs. Its commodities are black cattle, ſheep, coals, lead, fiſh, and butter. The chief rivers of this country are the Rhymney or Remny, the Taff, the Ogmore, the Avon, the Cledaugh, and the Tavye. This country was formerly full of caſtles, moſt of which are now fallen to decay. It hath many ſmall harbours on the coaſt for exporting coals and proviſions. Of the former it ſends large quantities both to England and Ireland; but of the latter, to England almoſt ſolely, eſpecially butter. It ſends two members to parliament, one for the ſhire, and one for the borough of Cardiff the capital.

GLAND, in anatomy, may be defined a circumſcribed apparatus of the ſoft parts, whoſe office is to ſecern a certain juice, and throw it out of the immediate circulation.

The glands are roundiſh bodies, ſeated in the cellular membrane, generally near the large veſſels; their ſubſtance is firm, and of various colours. Sylvius was the firſt who divided the glands into conglobate and conglomerate. Malpighi added what he calls the folliculus or ſimple gland; inſtances of which are the ſmall glands behind the ears, but the moſt remarkable are thoſe in the fauces.

Dr Nicholls divides the glands into ſinuous, tubular, and equal. What he means by *ſinuous* gland is, when each little gland hath its own excretory duct, through which it tranſmits its liquor to a common baſin, as the kidneys; his *tubular* is the ſame as the conglobate gland of Sylvius, of which the teſtes are an inſtance. By an *equal* gland be means where the veſſels are branched, as in the liver.

Ruyſch proves by ſubtle injections, that the ſubſtance of the glands is vaſcular, conſiſting of a rameſying artery, partly terminating in a vein, and partly in an excretory duct.

Mr Hewſon ſays, that the little corpora globoſa, which moſt modern anatomiſts call cryptæ and folliculæ, are nothing but convoluted arteries.

The glands are often diſordered by becoming large and indurated. When they are ſwelled and hard, they are ſaid to be *indurated*; if they grow harder, they are ſaid to be *ſcirrhous*: if, when hard, they become painful, they are *incipient* or *occult* cancers; if their hardneſs and pain continue long, they are called *carcinomata*, or *inveterate occult* cancers; and if the ſkin breaks, they are called *ulcerated* cancers *.

GLANDERS. See FARRIERY, § xii.

GLANDORP (Matthias), a learned phyſician, born in 1595, at Cologn, in which town his father was a ſurgeon. After receiving a doctor's degree at Padua, and viſiting the principal towns of Italy, he ſettled at Bremen in 1618, where he practiſed phyſic and ſurgery with ſo much ſucceſs, that he was made phyſician to the republic, and to the archbp. He publiſhed at Bremen, *Speculum chirurgorum*, *Methodus medendæ paronychiæ*, *Tractatus de polypo narium affectu graviſſimo*, and *Gazophylacium polypuſium fontiviſſimo*; which four pieces were collected and publiſhed, with his life prefixed, at London, in 4to. 1729. Glandorp died young; and it muſt ſuggeſt a high opinion of his abilities, that, notwithſtanding the great improvements in all branches of ſcience, his works ſhould be deemed worthy a republication 100 years after his death.

GLANVIL (Joſeph), a learned, ingenious, but fanciful and credulous, writer in the 17th century, was born at Plymouth in 1636, and bred at Oxford. He became a great admirer of Mr Baxter, and a zealous perſon for a commonwealth. After the reſtoration, he publiſhed *The vanity of dogmatizing*; was choſen a fellow of the Royal Society; and, taking orders in 1662, was preſented to the vicarage of Frome-Selwood in Somerſetſhire. This ſame year he publiſhed his *Lux Orientalis*; in 1665, his *Scepſis Scientifica*; and in the year following, *Some philoſophical conſiderations touching the being of witches and witchcraft*, and other pieces on the ſame ſubject. In 1660, he publiſhed *Plus ultra; or, The progreſs and advancement of knowledge ſince the days of Ariſtotle*. He likewiſe publiſhed *A ſeaſonable recommendation and defence of reaſon*; and *Philoſophia Pia*; or, *A diſcourſe of the religious temper and tendencies of the experimental*

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* See *Surgery*.

philoſophy. In 1678 he was made a prebendary of Worceſter, and died in 1680.

GLARIS, one of the cantons of Swiſſerland, is bounded on the eaſt, partly by the Griſons, and partly by the territory of Sargans; on the north, by the bailiwick of Gaſter, and by the lake Wahleſtatt; on the eaſt, by the canton of Schwits; and on the ſouth, by part of the canton of Uri, and part of the league of the Griſons. It is a mountainous country, being entirely within the Alps. Near the village Ober-Urnen there is a famous mineral ſpring, which is ſometimes hot and ſometimes cold. The lake Wahleſtatt is bounded by high rocks and mountains, through one of which a road is cut. Towards the top of one of theſe there is a large hole, through which the ſky may be ſeen.

Glaris, a town of Swiſſerland, capital of the canton of the ſame name. It is ſeated in a plain, at the foot of high craggy mountains. The ſtreets are large, and the houſes kept in good repair. It has ſome public buildings; among which are two churches, one in the middle of the town, and the other without, upon an eminence. On this eminence there is a cavern, with groteſque figures formed by the water that drops therein. The general aſſemblies of the country are held here on the firſt Sundays in May, where all the males above the age of ſixteen are obliged to appear. Both the Calviniſts and the Roman-Catholics are tolerated in this town, and they have divine ſervice by turns in the ſame church. It is ſeated on the river Lint, E. Long. 9° 13′. N. Lat. 47° 6′.

GLASGOW, a large city of Lanerkſhire or Clydeſdale in Scotland, ſituated in W. Long. 4° 30′. N. Lat. 55° 50′.

Concerning the foundation of this city we have no authentic records. The word in the Gaelic language ſignifies a *gray-ſmith;* from whence it may perhaps be inferred, that ſome ſpot in the moſt ancient part of the city was originally the reſidence of ſome blackſmith, who had become eminent in his profeſſion, ſo that the place went by his name.

1 Biſhopric of Glaſgow, when founded.

In the year 560, a biſhopric is ſaid to have been founded here by Saint Mungo, or Kentigern, ſuppoſed to be the ſon of Thamates, daughter of Loth king of the Picts; but in what ſtate the town at that time was, is altogether uncertain. Moſt probably the prieſts and diſciples who attended St Kentigern, would contribute conſiderably towards its advancement: the aged and infirm, who were unfit for the purpoſes of war, or ſuch as were religiouſly inclined, would come and ſettle round the habitation of the holy man, in order to have the benefit of his prayers; and as a number of miracles were ſaid to have been wrought at his tomb, the ſame cauſes would ſtill contribute to the increaſe of the town.

Hiſtory has not informed us of the name of the prince who founded and endowed the biſhopric of Glaſgow in favour of St Kentigern. But from an abſtract of the life of Kentigern (contained in Mr Innes's Critical Eſſay on the Ancient Inhabitants of Scotland) which was written in the 12th century, we learn, that the ſaint being ill uſed by Marken or Marcus, one of the kings of the Britons, retired into Wales. On the invitation of Roderic, however, one of Marken's ſucceſſors, he returned to Glaſgow, and enjoyed the ſee till 601, when he died. He was buried in the church of Glaſgow, where his monument is ſtill to be ſeen; and we find him marked among the ſaints of the Roman calendar, January 13th 578.

The immediate ſucceſſors of Kentingern were Baldrede and Conwal. The firſt eſtabliſhed a religious houſe at Inchinnan, the ſecond went into Lothian to preach to the Saxons; and both of them are ranked as ſaints in the Roman calendar, Baldrede on the 6th of March 608, and Conwal on the 18th of May 612. From this time, however, till the 1115 we have no diſtinct accounts concerning the city or biſhopric of Glaſgow. We find then, that David I. king of Scotland made an attempt to retrieve the people from a ſtate of groſs barbarity into which they were fallen, and reſtored to the church thoſe lands of which ſhe had been robbed. The only account we have of the tranſactions with regard to Glaſgow, during that period, is in the inquiſition made by David concerning the church-lands of Glaſgow, and is as follows.—"This church, by the divine appointment, admitted St Kentigern into the biſhopric, who furniſhed large draughts of knowledge to thoſe thirſting after heavenly things, &c. But a fraudulent deſtroyer, employing his common wiles, brought in, after a long ſeries of time, unaccountable ſcandals into the Cumbrian church. For after St Kentigern and many of his ſucceſſors were removed to heaven, various diſturbances every where ariſing, not only deſtroyed the church and her poſſeſſions, but, waſting the whole country, drove the inhabitants into exile. Theſe good men being deſtroyed, various tribes of different nations flocking in from ſeveral quarters, poſſeſſed the foreſaid deſerted country; but being of different origins, and varying from each other in their language and cuſtoms, and not eaſily agreeing among themſelves, they followed the manners of the Gentiles, rather than thoſe of the true faith. The inhabitants of which unhappy and abandoned country, though living like brutes, the Lord, who chooſes that none ſhould periſh, vouchſafed to viſit in mercy, &c."

From the year 1116 to the reformation, the records of the biſhopric are tolerably complete. The moſt remarkable particulars furniſhed by them are the following.

In 1136, John Achaius, choſen biſhop of Glaſgow by David I. built and adorned a part of the cathedral, which he ſolemnly conſecrated on the 9th of July. The king was preſent at the ceremony; and beſtowed on the church the lands of Perdeyc, now Patrick. This prelate alſo divided the dioceſe into the two archdeanries of Glaſgow and Teviotdale; and eſtabliſhed the offices of dean, ſubdean, chancellor, treaſurer, ſacriſt, chantor, and ſucceſſor; and ſettled a prebendary upon each of them, out of the donatives he received from the king.

In 1174, Joceline, abbot of Melroſe, was elected biſhop, and conſecrated by Eſkilus, biſhop of Lunden in Denmark, the Pope's legate for that kingdom, on the 1ſt of June 1175. He rebuilt the cathedral, or rather made an addition to the church already built by John Achaius. He alſo procured a charter from William, king of Scotland, erecting Glaſgow into a royal borough, and likewiſe a charter for a fair to be held there annually for eight days.

In 1335, John Lindſay, biſhop of Glaſgow, was killed in an engagement at ſea with the Engliſh, as he was returning home from Flanders. His ſucceſſor, William Rae, built the ſtone bridge over the Clyde. In the time of Matthew Glendoning, who was elected biſhop in 1387, the great ſpire of the church, which had been built only of wood, was conſumed by lightning. The biſhop intended to have built another of ſtone; but was prevented by death, in 1408, from accompliſhing his purpoſe. His ſucceſſor, William Lauder, laid the foundation of the veſtry of the cathedral, and built the great tower of ſtone, as far as the firſt battlement. The great tower of the epiſcopal palace was founded about the year 1437, on which biſhop Cameron expended a great deal of money.

In 1447, William Turnbull, a ſon of the family of Bedrule in Roxburgh-ſhire, was choſen biſhop. He obtained from king James II. in 1450, a charter erecting the town and the patrimony of the biſhops into a regality. He alſo procured a bull from pope Nicholas V. for erecting an univerſity within the city, which he endowed, and on which he alſo beſtowed many privileges. He died in 1454, leaving behind him a moſt excellent character. The eſtabliſhment of the college contributed more than any thing that had been formerly done towards the enlargement of the town. Before this time the town ſeems to have been inconſiderable. Mr Gibſon * is of opinion, that the number of its inhabitants did not exceed 1500. But though the eſtabliſhment of the univerſity greatly increaſed the number of inhabitants, it in fact deſtroyed the freedom of the town. Biſhop Turnbull ſeems to have made a point of it with king James II. that the city of Glaſgow, with the biſhops foreſt, ſhould be erected into a regality in his favour; which was accordingly done at the time above-mentioned; and this at once took away all power from the citizens, and transferred it to the biſhop. As the powers of the biſhop, however, were reckoned by Turnbull inſufficient to convey to the members of the univerſity all that freedom which he wiſhed to beſtow upon them, he therefore obtained from the king a great many privileges for them; and afterwards he himſelf, with the conſent of his chapter, granted them many more.

The good effects of the eſtabliſhment of the college were very ſoon obvious in Glaſgow. The number of inhabitants increaſed exceedingly; the high ſtreet, from the convent of the black friars, to where the croſs is now placed, was very ſoon filled up; the ancient road which led to the common, being too far diſtant for the conveniency of the new inhabitants, the Gallows-gate was begun to be built. Soon after, the collegiate church of the bleſſed Mary (now the Tron-church) being founded by the citizens, occaſioned the Trongate ſtreet to be carried to the weſtward as far as the church. The reſt of the city increaſed gradually towards the bridge, by the building of the Salt-market ſtreet. The burrough-roods, and the cattle that grazed on the commons, were now found inſufficient to maintain the increaſed number of inhabitants; for which reaſon a greater degree of attention than formerly was paid to the fiſhing in the river. Many poor people ſubſiſted themſelves by this occupation: they were incorporated into a ſociety; and in order that they might be at hand to proſecute their buſineſs, they built a conſiderable part of the ſtreet now called the *Bridge-gate*, but at that time *Fiſhers-gate*.

Notwithſtanding all this, however, the city of Glaſgow did not for a long time attain the rank among the other towns of Scotland, which it holds at preſent. In 1556, it held only the 11th place among them, as appears by queen Mary's taxation. The introduction of the reformed religion proved for ſome time prejudicial to the opulence of the city. The money which had formerly been expended among the citizens by the biſhop and his clergy, was now diverted into other channels: the advantages reſulting from the univerſity were alſo for a time loſt; for as the reformers generally deſpiſed human learning, the college was in a manner deſerted.

7 Great part of the town deſtroyed by a fire.

In the time of the civil wars, Glaſgow ſuffered ſeverely. To the miſchiefs attending inteſtine diſcord, were added a peſtilence and famine; and to complete their misfortunes, a violent fire broke out in June, which deſtroyed the greateſt part of the Saltmarket, Trongate, and High-ſtreet. The fronts of the houſes at that time were moſtly of wood, ſo that they became an eaſy prey to the flames, The fire continued with great violence for the ſpace of 18 hours; by which, a great many of the inhabitants were ruined, the habitations of almoſt 1000 families being totally deſtroyed. On this account collections were made through different parts of the country; and to prevent ſuch accidents for the future, the fronts were built with free ſtone, which abounds in the neighbourhood.

8 Glaſgow declared free by William and Mary.

By the charter given to biſhop Turnbull in 1450, the citizens had been deprived of the power of electing their own magiſtrates, which was thenceforth exerciſed by the biſhop; which, however, was not done without ſome reſiſtance on the part of the inhabitants. After the reformation was introduced into Scotland, we find this power exerciſed by the citizens, the biſhop, the earl of Lennox, and others. The idea that the town was a biſhop's burgh, and not a royal free burgh, gave occaſion to this unſettled manner of appointing the magiſtracy; and though, in 1633, they were declared to be a royal free burgh by the parliament, yet their freedom of election was afterwards diſturbed by the privy-council, by Cromwell, and the duke of York. But on the 4th of June 1690, the town was declared free by a charter of William and Mary; and in confirmation of this charter it was inſerted in the act of parliament, dated June 14th the ſame year, that they ſhould have power to elect their own magiſtrates as fully and freely, in all reſpects, as the city of Edinburgh, or any other royal burgh within the kingdom; which freedom of election ſtill continues.

9 Great increaſe of its wealth.

By the aſſeſſment of the burghs in 1695, we find the city of Glaſgow reckoned the ſecond in Scotland in point of wealth, which place it ſtill continues to hold. To account for this great increaſe of wealth, we muſt obſerve, that for a long time, even before the reſtoration of Charles II. the inhabitants of Glaſgow had been in poſſeſſion of the ſale both of raw and refined ſugars for the greateſt part of Scotland; they had a privilege of diſtilling ſpirits from their molaſſes, free of all duty and exciſe; the herring-fiſhery was alſo carried on to what was at that time thought a very conſiderable extent; they were the only people in Scotland who made ſoap; and they ſent annually ſome hides, linen, &c. to Briſtol, from whence they brought back in exchange, a little tobacco, ſugar, and goods of the manufacture of England, with which they ſupplied a conſiderable part of the kingdom. From the year 1707, however, in which the union between Scotland and England took place, we may date the proſperity of Glaſgow. By the union, the American trade was laid open to the inhabitants: and ſo ſenſible were they of their advantageous ſituation, that they began almoſt inſtantly to proſecute that commerce; an aſſiduous application to which, ever ſince, hath greatly contributed to raiſe the city to that pitch of affluence and ſplendor which it now enjoys. The city was now greatly enlarged; and as the community were ſenſible of the inconvenience that attended the want of a ſufficiency of water in the river, for carrying on their commerce, they reſolved to have a port of their own, nigher the mouth of the river. At firſt, they thought of making their harbour at Dumbarton: but as this is a royal borough, the magiſtrates oppoſed it; becauſe they thought that the influx of ſailors and others, occaſioned by the harbour, would be ſo great, that a ſcarcity of proviſions would be occaſioned. The magiſtrates and town-council of Glaſgow, therefore, purchaſed ſome lands on the ſouth ſide of the river Clyde for this purpoſe; and ſo expeditious were they in making their harbour, and rearing their town, that in 1710 a baillie was appointed for the government of Port-Glaſgow. It is now a very conſiderable pariſh, and lies 14 miles nigher the mouth of Clyde than Glaſgow.

1
Erection of Port-Glaſgow.

In 1725, Mr Campbell, the member of parliament for Glaſgow, having given his vote for having the malt-tax extended over Scotland, a riot enſued among the lower claſs of people. In this diſturbance, Mr Campbell's furniture was deſtroyed, and ſome exciſemen were maltreated for attempting to take an account of the malt. General Wade, who commanded the forces in Scotland, had ſent two companies of ſoldiers, under the command of Captain Buſhell, to prevent any diſturbance of this kind. Captain Buſhell drew up his men in the ſtreet, where the multitude pelted them with ſtones. Them he endeavoured to diſperſe, by firing with powder only: but this expedient failing, he ordered his men to load their pieces with ball; and, without the ſanction of the civil authority, commanded them to fire four different ways at once. By this diſcharge about 20 perſons were killed and wounded; which enraged the multitude to ſuch a degree, that having procured ſome arms, they purſued Buſhel and his men to the caſtle of Dumbarton, about five miles diſtant.

11
Diſturbance about the exciſe-bill.

General Wade being informed of this tranſaction, aſſembled a body of forces, and being accompanied by Duncan Forbes, lord advocate, took poſſeſſion of the town: the magiſtrates were apprehended, and carried priſoners to Edinburgh; but on an examination before the lords, their innocence clearly appeared, upon which they were immediately diſmiſſed. Buſhell was tried for murder, convicted, and condemned; but, inſtead of ſuffering the penalties of law, he was indulged with a pardon, and promoted in the ſervice. Mr Campbell petitioned the Houſe of Commons for an indemniſication of his loſſes: a bill was paſſed in his favour; and this, together with ſome other expences incurred in the affair, coſt the town 9000 l. ſter.

During the time of the rebellion in 1745, the citizens of Glaſgow gave proof of their attachment to revolution principles, by raiſing two battalions, of 600 men each, for the ſervice of government. This piece of loyalty, however, had like to have coſt them dear. The rebels, in their journey ſouth, took a reſolution to plunder and burn the city; which would probably have been done, had not Mr Cameron of Lochiel threatened, in that caſe, to withdraw his clan. A heavy contribution, however, was laid on. The city was compelled to pay 5000 l. in money, and 500 l. in goods; and on the return of the rebels from England, they were obliged to furniſh them with 12,000 linen ſhirts, 6000 cloth coats, 6000 pairs of ſhoes, 6000 pairs of hoſe, and 6000 bonnets. Theſe goods, with the money formerly paid them, the expence of raiſing and ſubſiſting the two city-battalions, and the charge of maintaining the rebel army in free quarters for ten days, coſt the community about 14,000 l. ſterling; 10,000 l. of which they recovered in 1749, by an application to parliament.

About the year 1750, a very conſiderable change took place in the manner of living among the inhabitants of Glaſgow. Till this time, an attentive induſtry, and a frugality bordering upon parſimony, had been their general characteriſtic; the ſeverity of the ancient manners prevailed in its full vigour; But now, when an extenſive commerce and increaſed manufactures had produced wealth, the ideas of the people were enlarged, and ſchemes of trade and improvement were adopted, which people would formerly have been denominated madmen if they had undertaken; a new ſtile was introduced in living, dreſs, building, and furniture; wheel-carriages were ſet up, public places of entertainment were frequented, and an aſſembly-room, ball-room, and playhouſe, were built by ſubſcription; and from this time we may date all the improvements that have taken place, not only in Glaſgow, but all over the weſt of Scotland. The beſt method, however, of eſtimating the growing improvement of any town, is by the frequency of their applications for aſſiſtance to parliament; we ſhall therefore enumerate the acts of parliament which have been paſſed in favour of the city of Glaſgow ſince the year 1750. In 1753, an act paſſed for repairing ſeveral roads leading into the city of Glaſgow.—In 1756, an act for erecting and ſupporting a lighthouſe in the iſland of Little Cumray, at the mouth of the Clyde, and for rendering the navigation of the frith and river more ſafe and commodious.—In 1759, an act for improving the navigation of the river Clyde to the city of Glaſgow, and for building a bridge acroſs the river from the city to the village of Gorbells.—In 1767, the people of Glaſgow having propoſed to make a ſmall cut or canal from the frith of Forth to that of Clyde, for the conveniency of their trade to the eaſtern ſide of the iſland, ſeveral gentlemen at Edinburgh, and throughout different parts of the kingdom, propoſed that this canal ſhould be executed upon a much larger ſcale than what had been originally projected. An act was accordingly obtained, and the canal executed in the manner deſcribed under the article CANAL.—In 1770, another act was obtained for improving the navigation of the river, and for building the bridge from the city to the village of Gorbells, being an amendemnt of the former act for that purpoſe.—In 1771, an act for making and widening a paſſage from the Salt-market to St Andrew's church; for enlarging and completing the church-yard of that church, and likewiſe for building a convenient exchange or ſquare in the city; alſo for amending and explaining the former act relative to the navigation of the Clyde.—An act for making and maintaining a navigable canal and waggon-way from the collieries in the pariſhes of Old and New Monkland, to the city of Glaſgow.

This laſt canal, which was undertaken with a view to reduce the price of coals, has not been attended with the deſired effect. The other improvements have been productive of very great advantages: and it may be confidently aſſerted, that ſince the year 1750 a total change has been effected in the city of Glaſgow and all round it; the manners of the people have undergone an alteration greatly for the better; a ſpirit of induſtry and activity has been raiſed, and now pervades every order of men; commerce has been increaſed; manufactures carried on to a conſiderable extent, and ſtill increaſing; every perſon is employed; not a beggar is to be ſeen in the ſtreets; the very children are buſy.

Such is the preſent flouriſhing ſtate of the city of Glaſgow, which for its beauty and elegance exceeds every other city in Scotland. The moſt ancient part of it ſtands on a riſing ground. The foundation of the cathedral is 104 feet higher than the bed of the river; and the deſcent from the high ground reaches to about 100 yards below the college. The reſt of the city is built upon a plain. The city reaches from north to ſouth, *i. e.* from the Stablegreen port, to the ſouth end of the Gorbells, 2000 yards; from eaſt to weſt, *i. e.* from the Gallowgate toll-bar to Grahameſtown toll-bar, 3160 yards. The ſtreets are clean and well paved; the medium breadth of the principal ones is 52 feet; and ſeveral of them interſecting one another at right angles, produce a very fine effect. The houſes, excepting a very few, are built of free-ſtone well hewed; few of them exceed four floors in height; and many of them are in an exceeding good taſte, inſomuch that Mr Pennant pronounces Glaſgow to be the beſt ſecond-rate city he had ever ſeen. The moſt remarkable public buildings are,

1. *The Cathedral, or High Church*, is a magnificent building, and its ſituation greatly to its advantage, as it ſtands higher than any part of the city. It has been intended to form a croſs, though the traverſe part has never been finiſhed. The great tower is founded upon four large maſſy pillars, each of them about 30 feet in circumference. The tower itſelf is 25½ feet ſquare within; and is ſurrounded by a balluſtrade, within which riſes an octangular ſpire terminated by a fane. The tower upon the weſt end is upon the ſame level, but appears not to have been finiſhed, though it is covered over with lead. In this tower is a very large bell 11 feet 4 inches in diameter. The principal entry was from the weſt; the gate 11 feet broad at the baſe, and 17 feet in height. The weſt end of the choir is now appropriated for a place of divine worſhip; and is divided from the remaining part by a ſtone-partition, which is incloſed by another ſtone-wall parting it from the nave. It is impoſſible to form an adequate idea of the awful ſolemnity of the place occaſioned by the loftineſs of the roof and the range of pillars by which the whole is ſupported.

The nave of the church riſes four ſteps higher than the choir; and on the weſt ſide ſtood the organ-loft, formerly ornamented with a variety of figures, but now defaced. The pillars here are done in a better taſte than thoſe in the choir, and their capitals are ornamented with fruits. The arched roof of the altar is ſupported by five pillars, over which was a fine terrace walk, and above it a large window of curious workmanſhip, but now ſhut up. On the north ſide of the altar is the veſtry, being a cube of 28 feet, the roof arched and vaulted at top, and ſupported by one pillar in the centre of the houſe. Arched pillars from every angle terminate in the grand pillar, which is 19 feet high. The lower part of the ſouth croſs is made uſe of as a burying place for the clergy of the city; and is by much the fineſt piece of workmanſhip in the whole building. It is 55 feet long, 28 broad, and 15 high; arched and vaulted at top, and ſupported by a middle range of pillars, with their capitals highly ornamented; correſponding to which are columns adjoining to the walls, which as they riſe, ſpring into ſemi-arches, and are every where met at acute angles by their oppoſites, and are ornamented with carvings at the cloſing and croſſing of the lines. At the eaſt end of the choir you deſcend by flights of ſteps upon each ſide into paſſages which, in former times, were the principal entries to the burying vault which is immediately under the nave. It is now made uſe of as a pariſh-church for the barony of Glaſgow; and is full of pillars, ſome of them very maſſy, which ſupport the arched roof: but it is a very uncomfortable place for devotion. The ſpace under the altar and veſtry, though now made uſe of as a burying place by the heritors of the barony, was formerly, according to tradition, employed for keeping of the relics; and indeed, from the beautiful manner in which this place is finiſhed, one would imagine that it had not been deſtined for common uſe. Here is ſhewn the monument of St Mungo, or Kentigern, with his figure lying in a cumbent poſture.

The whole length of the cathedral within the walls is 284 feet, its breadth 65; the height of the choir, from the floor to the canopy, 90 feet; the height of the nave, 85 feet; the height of the middle tower, 220 feet. This fabric was begun by John Achaius in 1123, and conſecrated in 1136; and continued by ſucceeding biſhops till ſuch time as it was finiſhed in the manner in which it ſtands at preſent. The wealth of the ſee of Glaſgow, however, was not ſufficient for ſo great an undertaking, ſo that they were obliged to have recourſe to all the churches of Scotland for aſſiſtance in it. Near the cathedral is the ruin of the caſtle or biſhop's palace.

16
St. Andrew's church.

2. *St Andrew's Church* was begun by the community in 1739, and finiſhed in 1756. It is the fineſt piece of modern architecture in the city; and is built after the model of St Martins in the fields, London,

Glaſgow. whoſe architect was the famous Gibbs. The length of the church is 104 feet, and its breadth 66. It has a fine arched roof, well ornamented with figures in ſtucco, and ſuſtained by ſtone-columns of the Corinthian order. Correſpondent to the model, it has a place for the altar on the eaſt, in which is a very ancient Venetian window; but the altar-place being ſeated makes this end appear to no great advantage. The fronts of the galleries and the pulpit are done in mahogany in a very elegant manner. The ſpire by no means correſponds with the reſt of the building; and, inſtead of being an ornament, diſgraces this beautiful fabric. Its height is 170 feet.

17 The college. 3. *The College.* The front of this building extends along the eaſt ſide of the high ſtreet, and is upwards of 330 feet long. The gate at the entrance is decorated with ruſtics, and over it are the king's arms. The firſt court is 88 feet long and 44 broad. The weſt ſide is elevated upon ſtone pillars, on which are placed pilaſters ſupporting the Doric entablature, and ornamented with arches forming a piazza. Above theſe is the public hall; the aſcent to which is by a double flight of ſteps incloſed by a handſome ſtone balluſtrade, upon the right of which is placed a lion, and on the left an unicorn, cut in free ſtone. The ſpire ſtands on the eaſt ſide, is 135 feet high, and has a very good clock. Under this is the gateway into the inner and largeſt court, which is 103 feet long and 79 broad. Over the entry, in a niche, is a ſtatue of Mr Zacharias Boyd, who was a benefactor to the univerſity. On the eaſt ſide of the court is a narrow paſſage leading into a handſome terrace walk, gravelled, 122 feet long by 64 feet broad. This walk is incloſed to the eaſt by an iron palliſade, in the centre of which is a gate leading into the garden. This laſt conſiſts of ſeven acres of ground, laid out in walks for the recreation of the ſtudents. On the ſouth ſide of the walk ſtands the library; a very neat edifice, well conſtructed for the purpoſe intended, and containing a very valuable collection of books.

18 Town-houſe, &c. 5. *The Town-Houſe and Aſſembly-Hall.* This is a magnificent and extremely elegant building. The front is adorned with a range of Ionic pilaſters; the top of the building is ornamented with a balluſtrade and handſome vaſes; the front is elevated on ſtrong ruſticated pillars adorned with arches, forming a piazza for merchants and others to ſhelter themſelves from the weather when met upon buſineſs. The aſſembly-hall is a neat room, and is finiſhed in a good taſte, though too ſmall for the city; its length is 47 feet, its breadth and height 24. The town-hall is a very ſpacious and lofty apartment, 52 feet long by 27 broad, and 24 in height. It is finiſhed in a very grand manner; the ceiling is divided into different compartments well ornamented. In it are full-length portraits of king James VI. and VII. Charles I. and II. William and Mary, queen Anne, king George I. II. and III. and Archibald duke of Argyle in his juſticiary robes. The two laſt are by Ramſay. Oppoſite to the front of this building is the exchange, which is well paved with free ſtone, and incloſed from the ſtreet by ſtone pillars. Upon it is an equeſtrian ſtatue of king William III. placed upon a lofty pedeſtal, and ſurrounded with an iron rail.

19 Guild-hall. 5. *The Guild-Hall, or Merchants Houſe.* This building is ſituated upon the ſouth ſide of Bridgegateſtreet; and is in length 82 feet, in breadth 31. The great hall, which is the whole length and breadth of the building, is ſo capacious, that it is better adapted for the reception of great and numerous aſſemblies than any other in the city. This houſe is adorned with a very elegant ſpire 200 feet high. Glaſg

20 Town' ſpital. 6. *The Town's Hoſpital* is a very neat building, conſiſting of two wings and a large front: the length 156 feet, the breadth of the centre 30 feet, and the depth of the wings 68 feet. Behind the building is an infirmary 127 feet long by 25 feet broad, the aſcent to which is by a flight of ſteps. The lower part of this building is appointed for the reception of lunatics. The area between the buildings is large, which, with the agreeable open ſituation of the hoſpital on the river, muſt conduce to the health of the inhabitants.

21 New b 7. *The New Bridge* is built in an elegant manner. It is 32 feet wide; with a commodious foot-way for paſſengers, five feet broad on each ſide, raiſed above the road made for carriages, and paved with free ſtone. This bridge is about 500 feet in length; and conſiſts of ſeven arches, the faces of which are wrought in ruſtic, with a ſtrong block cornice above. The arches ſpring but a little way above low-water mark; which, tho' it renders the bridge ſtronger than if they ſprung from taller piers, diminiſhes its beauty. Between every arch there is a ſmall circular one: theſe break the force of the water when the river riſes to a flood, and add to the ſtrength of the whole. The parapet-wall or breaſt-work is cut out in the Chineſe taſte; and the two ends are finiſhed off with a ſweep.

22 Marke &c. 8. *The Markets in King's Street* are juſtly admired, as being the completeſt of their kind in Britain. They are placed on both ſides of the ſtreet. That on the eaſt ſide, appropriated entirely for butcher-meat, is 112 feet in length, and 67 in breadth. In the centre is a ſpacious gateway, decorated on each ſide with coupled Ionic columns ſet upon their pedeſtals, and ſupporting an angular pediment. At the north end is a very neat hall belonging to the incorporation of butchers, the front ornamented with ruſtics and a pediment. The markets upon the weſt ſide of the ſtreet conſiſt of three courts, ſet apart for fiſh, mutton, and cheeſe. The whole of the front is 173 feet, the breadth 46 feet; in the centre of which, as on the oppoſite ſide, is a very ſpacious gateway of the Doric order, ſupporting a pediment. This is the entry to the mutton-market. Each of the other two has a well-proportioned arch faced with ruſtics for their entrance. All theſe markets are well paved with free ſtone; have walks all round them; and are covered over for ſhelter by roofs ſtanding upon ſtone piers, under which the different commodities are expoſed to ſale. They have likewiſe pump-wells within, for cleaning away all the filth; which render the markets always ſweet and agreeable.

9. *The Guard-Houſe* is a very handſome building, with a piazza formed by arches, and columns of the Ionic order ſet upon their pedeſtals. The entablature ſupports at Attic courſe, in which are oval port-holes ornamented with palm-branches.

10. *The Herb-Market*, is neat and commodious; in length 130, and in breadth 41 feet. The principal entry is decorated with coupled Ionic columns, ſupporting an angular pediment. It is laid out in the ſame manner with the markets in King's-ſtreet.

The moſt remarkable public charities in Glaſgow are,

1. *Muirhead's or St Nicholas's Hoſpital.* This was originally appointed to ſubſiſt 12 old men and a chaplain: but its revenues have, from ſome unknown cauſes, been loſt; ſo that no more of them now remains than the paltry ſum of 139 l. 2 s. 5 d. Scots money, 128 l. of which is annually divided among four old men annually, at the rate of 2 l. 13 s. 4 d. each.

2. *Hutcheſon's Hoſpital,* was founded and endowed in 1639 by George Hutcheſon of Lamb-hill, notary-public, and Mr Thomas Hutcheſon his brother, who was bred a preacher, for the maintenance of old men and orphans. The funds of this hoſpital were afterwards increaſed by James Blair merchant in Glaſgow, in 1710; and by ſubſequent donations, the managers now have it in their power to give away above 900 l. Sterling in penſions, from 5 l. 10 s. to 10 l. per penſioner.

3. *The Town's Hoſpital* was opened for the reception of the poor on the 15th of November 1733. The funds from whence this hoſpital is ſubſiſted are, the general ſeſſion, the town-council, the trades houſe and merchants houſe, the intereſt of money belonging to their funds, which are ſums that have been mortified for the uſe of the houſe. Theſe ſupplies, however, are found inſufficient to defray the expences of the houſe; for which reaſon an aſſeſſment is annually made upon the inhabitants in the following manner. The magiſtrates nominate 12, 14, or ſometimes more gentlemen of known integrity and character, who have a liſt laid before them of all the inhabitants in town. This liſt they divide into 16 or 18 columns. Each of theſe columns contains the names of ſuch inhabitants as carry on trade to a certain extent, or are ſuppoſed to be well able to pay the ſum affixed to the particular column in which their names are inſerted. If it is neceſſary to raiſe 500 l. for inſtance, then each name, in every ſeparate column, is valued at as much as the fortunes of the perſons in each particular column are ſuppoſed to be. If 1000 l. or more is to be raiſed, it is only continuing a proportional increaſe through the whole of the columns. The higheſt ſum that ever was thus raiſed, was 12 s. 6 d. upon every thouſand pounds that each perſon was ſuppoſed to be worth. The number of people maintained in this hoſpital are about 620.

The univerſity of Glaſgow owes its origin, as we have already obſerved, to biſhop Turnbull. The inſtitution conſiſted at firſt of a rector, a dean of faculty, a principal who taught theology, and three profeſſors of philoſophy; and, ſoon after this, the civil and canon laws were taught by ſome clergymen. From the time of its eſtabliſhment in 1450 to the reformation in 1560, the college was chiefly frequented by thoſe who were intended for the church; its members were all eccleſiaſtics, and its principal ſupport was derived from the church. The reformation brought the univerſity to the verge of deſtruction: maſters, ſtudents, and ſervants, all forſook it. The magiſtrates were ſo ſenſible of the loſs which the community had ſuſtained by this deſertion, that they endeavoured to reſtore it in 1572, by beſtowing upon it conſiderable funds, and preſcribing a ſet of regulations for its management. Theſe, however, proved inſufficient; for which reaſon king James VI. erected it anew, by a charter called the *Nova Erectio*, in 1577, and beſtowed upon it the teinds of the pariſh of Govan. The perſons who were to compoſe the new univerſity were, a principal, three profeſſors of philoſophy, four ſtudents burſars, one œconomus, a principal's ſervant, a janitor, and cook.

Since the year 1577, the funds of the univerſity have been conſiderably increaſed by the bounty of kings and the donations of private perſons. The profeſſors have therefore alſo been increaſed; ſo that at preſent the univerſity of Glaſgow conſiſts of a chancellor, rector, dean of faculty, principal, and 13 profeſſors, together with burſars, &c. The archbiſhop of Glaſgow was formerly chancellor of the univerſity *ex officio*; at preſent, the chancellor is choſen by the rector, dean of faculty, principal, and maſters.

The chancellor, as being the head of the univerſity, is the fountain of honour, and in his name are all academical degrees beſtowed. The office of rector is to exerciſe that academical juriſdiction in diſputes among the ſtudents themſelves, or between the ſtudents and citizens, which is beſtowed upon the greater part of the univerſities in Europe. He is choſen annually in the *comitia*; that is, in a meeting in which all the ſtudents, as well as the other members of the univerſity, have a voice. Immediately after his admiſſion, he has been in uſe to chooſe certain perſons as his aſſeſſors and counſellors in his capacity of judge: and, in former periods, it was cuſtomary to name the miniſters of Glaſgow, or any other gentlemen who had no connection with the univerſity; but, for a great while paſt, the rector has conſtantly named the dean of faculty, the principal, and maſters for his aſſeſſors; and he has always been, and ſtill is, in the daily practice of judging in the cauſes belonging to him, with the advice of his aſſeſſors. Beſides theſe powers as judge, the rector ſummons and preſides in the meetings of the univerſity for the election of his ſucceſſor; and he is likewiſe in uſe to call meetings of the profeſſors for drawing up addreſſes to the king, electing a member to the general aſſembly, and other buſineſs of the like kind.

The dean of faculty has, for his province, the giving directions with regard to the courſe of ſtudies; the judging, together with the rector, principal, and profeſſors, of the qualifications of thoſe who deſire to be created maſters of arts, doctors of divinity, &c.; and he preſides in meetings which are called by him for theſe purpoſes. He is choſen annually by the rector, principal, and maſters.

The principal and maſters, independent of the rector and dean, compoſe a meeting in which the principal preſides; and, as they are the perſons for whoſe behoof chiefly the revenue of the college was eſtabliſhed, the adminiſtration of that revenue is therefore committed to them.

The revenue ariſes from the teinds of the pariſh of Govan, granted by king James VI. in 1557; from the tiends of the pariſhes of Renfrew and Kilbride, granted by the ſame monarch in 1617, and confirmed by king Charles I. on the 28th of June 1630; from the tiends of the pariſhes of Calder, Old and New Monkland, conveyed to them by a charter from Charles II. in 1670; from a tack of the archbiſhopric; and from ſeveral donations received from private perſons.

The college of Glaſgow, for a very conſiderable time after its erection, followed the mode of public teaching which is common even to this day in Oxford and Cambridge, and in many other univerſities throughout Europe; that is, each profeſſor gave a few lectures every year, *gratis*, upon the particular ſcience which he profeſſed: but, in place of this, the profeſſors have, for a great while paſt, adopted the mode of private teaching; that is, they lecture and examine two hours every day during the ſeſſion, viz. from the 10th of October to the 10th of June; a method which comes much cheaper to the ſtudent, as he has it in his power, if he is attentive, to acquire his education without being under the neceſſity of employing a tutor. They have alſo private claſſes, in which they teach one hour *per* day. The fixed fee for a public claſs is 1 l. 11 s. 6d. *per* ſeſſion; the fixed fee for a private one is 1 l. 1 s. *per* d°. The number of ſtudents who have attended this college for ſeveral years paſt, has been upwards of 500 each ſeaſon.

25
Hiſtory of the trade of Glaſgow.

The trade of Glaſgow is ſaid to have been firſt promoted by one Mr William Elphinſtone in 1420. This trade was moſt probably the curing and exporting of ſalmon; but the firſt authentic document concerning Glaſgow as a trading city is in 1546. Complaints having been made by Henry VIII. king of England, that ſeveral Engliſh ſhips had been taken and robbed by veſſels belonging to Scotland, an order of council was iſſued, diſcharging ſuch captures for the future; and among other places made mention of in this order is the city of Glaſgow. The trade which at that time they carried on could not be great. It probably conſiſted of a few ſmall veſſels to France loaded with pickled ſalmon; as this fiſhery was, even then, carried on to a conſiderable extent, by Glaſgow, Renfrew, and Dumbarton. Between the year 1630 and 1660, a very great degree of attention ſeems to have been paid to inland commerce by the inhabitants of Glaſgow. Principal Baillie informs us, that the increaſe of Glaſgow ariſing from this commerce was exceedingly great. The exportation of ſalmon and of herrings was alſo continued and increaſed. In the war between Britain and Holland during the reign of Charles II. a privateer was fitted out in Clyde to cruiſe againſt the Dutch. She was called the *Lion of Glaſgow*, Robert M‘Allan commander; and carried five pieces of cannon, and 60 hands.

A ſpirit of commerce appears to have ariſen among the inhabitants of Glaſgow between the year 1660 and 1707. The citizens who diſtinguiſhed themſelves moſt during this period were Walter Gibſon and John Anderſon. Gibſon cured and packed in one year 300 laſts of herrings, which he ſent to St Martins in France on board of a Dutch veſſel, called the *St Agate*, of 450 tons burthen; his returns were brandy and ſalt. He was the firſt who imported iron from Stockholm into Clyde. Anderſon is ſaid to have been the firſt who imported white-wines.

Whatever their trade was at this time, it could not be conſiderable: the ports to which they were obliged to trade lay all to the eaſtward: the circumnavigation of the iſland would therefore prove an almoſt unſurmountable bar to the commerce of Glaſgow; and of conſequence the people on the eaſt coaſt would be poſſeſſed of almoſt all the commerce of Scotland. The union with England opened a field for commerce for which the ſituation of Glaſgow was highly advantageous. Since that time the commerce of the eaſt coaſt has declined, and that of the weſt increaſed to an amazing degree. No ſooner was the treaty of union ſigned, than the inhabitants of Glaſgow began to proſecute the trade to Virginia and Maryland; they chartered veſſels from Whitehaven, ſent out cargoes of goods, and brought back tobacco in return. The method in which they at firſt proceeded in this trade, was certainly a very prudent one. A ſupercargo went out with every veſſel. He bartered his goods for tobacco, until ſuch time as he had either ſold all his goods, or procured as much tobacco as was ſufficient to load his veſſel. He then immediately ſet out on his return; and if any of his goods remained unſold, he brought them home with him. While they continued to trade in this way, they were of great advantage to the country, by the quantity of manufactures which they exported; their own wealth began to increaſe; they purchaſed ſhips of their own; and, in 1718, the firſt veſſel of the property of Glaſgow croſſed the Atlantic. Their imports of tobacco were now conſiderable, and Glaſgow began to be looked upon as a conſiderable port; the tobacco-trade at the ports of Briſtol, Liverpool, and Whitehaven, was obſerved to dwindle away; the people of Glaſgow began to ſend tobacco to theſe places, and to underſell the Engliſh even in their own ports. Thus the jealouſy of the latter was ſoon excited, and they took every method in their power to deſtroy the trade of Glaſgow. The people of Briſtol preſented remonſtrances to the commiſſioners of the cuſtoms at London againſt the trade of Glaſgow, in 1717. To theſe remonſtrances the merchants of Glaſgow ſent ſuch anſwers to the commiſſioners as convinced them that the complaints of the Briſtol merchants were without foundation. But in 1721, a moſt formidable confederacy was entered into by almoſt all the tobacco-merchants in South Britain againſt the trade of Glaſgow. Thoſe of London, Liverpool, and Whitehaven, preſented ſeverally to the Lords of the Treaſury, petitions, arraigning the Glaſgow merchants of frauds in the tobacco trade. To theſe petitions the Glaſgow people gave in replies; and the lords of the treaſury, after a full and impartial hearing, were pleaſed to diſmiſs the cauſe with the following ſentence: "That the complaints of the merchants of London, Liverpool, and Whitehaven, were groundleſs; and that they proceeded from a ſpirit of envy, and not from a regard to the intereſt of trade, or of the king's revenue."

But the malice of theſe gentlemen did not ſtop here. They brought their complaints into the houſe of commons. Commiſſioners were ſent to Glaſgow in 1722, who gave in their reports to the houſe in 1723. The merchants ſent up diſtinct and explicit anſwers to theſe reports; but ſuch was the intereſt of their adverſaries, that theſe anſwers were diſregarded. New officers were appointed at the ports of Greenock and Port-Glaſgow, whoſe private inſtructions ſeem to have been, to ruin the trade if poſſible, by putting all imaginable hardſhips upon it. In ſhort, every ſpecies of perſecution, which malice aſſiſted by wealth and intereſt could invent, were put in practice to deſtroy the trade of Glaſgow; and they in part ſucceeded. It languiſhed till the year 1735; but after that began to revive, though even after its revival it was carried on but ſlowly for a conſiderable ſpace of time.

With regard to the manufactures of Glaſgow, Mr Gibſon is of opinion that the commerce to America firſt ſuggeſted the idea of introducing them, in any conſiderable degree at leaſt. The firſt attempts in this way were about the year 1725, and their increaſe for ſome time was very ſlow, nor did they begin to be conſiderable till great encouragement was given by the legiſlature to the linen manufacture in Scotland. The firſt cauſes of the ſucceſs of this manufacture were the act of parliament in 1748, whereby the wearing of French cambrics was prohibited under ſevere penalties; that of 1751, allowing weavers in flax or hemp to ſettle and exerciſe their trades any where in Scotland free from all corporation-dues; and the bounty of three-halfpence per yard on all linens exported at and under 18d. per yard. Since that time a ſpirit of manufacture has been excited among the inhabitants of Glaſgow; and great variety of goods, and in very great quantity, have been manufactured. Checks, linen, and linen and cotton, are manufactured to a great extent. Printed linens and cottons were begun to be manufactured in 1738; but they only made garments till 1754, when handkerchiefs were firſt printed. There is no manufacture more upon the increaſe in Glaſgow than this; nor can any branch be more beneficial to the country, as the cloths on which they print are all made in Scotland; whereas at London, and through the greateſt part of England, the cloths they print upon are all imported from Germany.

A manufactory of ribbons has been very lately introduced into Glaſgow; and though this branch of buſineſs is yet in its infancy, they are made equal in quality to thoſe in England, and rather cheaper.

Incles were firſt made here about the year 1732. The engine-looms uſed at that time were ſo inconvenient, and took up ſo much time in making the goods, that the Dutch, who were the only people poſſeſſed of the large incle looms, were almoſt ſolely in poſſeſſion of this manufacture. Mr Hervey, who began this branch in Glaſgow, was ſo ſenſible of the diſadvantages under which it laboured, that he went over to Holland; and, in ſpite of the care and attention which the Dutch took to conceal their methods of manufacturing, he brought over with him from Harlem two of their looms, and one of their workmen. This Dutchman remained ſome years in Glaſgow; but on ſome diſguſt he went to Mancheſter, and inſtructed the people there in the method of carrying on the manufacture.

In 1757, carpets were begun to be made, and are now carried on to a conſiderable extent. Hunters cloths, Engliſh blankets, and other goods of the ſame kind, are alſo made; and, with proper attention, theſe manufactures certainly will ſucceed.

Beſides theſe, a great variety of articles are manufactured at Glaſgow, of which our limits will not permit us to enter into a detail, ſuch as ſoap, refining of ſugar, iron-mongery, braſs, jewellery, &c.—Types for printing are made in this city by Dr Wilſon and Sons, perhaps ſuperior to any others in Europe. Printing of books was firſt begun here by George Anderſon about the year 1638. But there was no good printing in Glaſgow till the year 1735; when Robert Urie printed ſeveral books in a very elegant manner. The higheſt perfection, however, to which printing hath yet been carried in this place, or perhaps in any other, was by the late Robert and Andrew Foulis, (who began in the year 1740;) as the many elegant and ſplendid editions of books printed by them in different languages ſufficiently teſtify. The ſame gentlemen alſo eſtabliſhed an academy of painting; but the wealth of Scotland being unequal to the undertaking, it hath been ſince given up.

27 Government, revenue, &c. of the city.

The government of the city of Glaſgow is veſted in a provoſt and three baillies, a dean of guild, deacon-conveener, and a treaſurer, with a common council of 13 merchants and 12 mechanics. The provoſt and two of the bailies muſt, by the ſet of the burgh, be elected from the merchant rank, and the other bailie from the trades rank, *i. e.* the mechanics. The provoſt is, from courteſy and cuſtom, ſtyled *lord provoſt*. He is properly lord of the police of the city, preſident of the community, and is *ex officio* a juſtice of the peace for both the burgh and county.

The revenue of Glaſgow amounts to about L. 6000 Sterling *per annum*. It ariſes from a duty upon all grain and meal brought into the city, (this tax is denominated *the ladles*); from the rents of lands and houſes the property of the community; from an impoſt of two pennies Scots upon every Scots pint of ale or beer brewed, inbrought, or ſold, within the city; from certain dues payable out of the markets; from the rents of the ſeats in churches; from the dues of cranage at the quay, at the weigh-houſe, tonnage on the river, pontage on the bridge, ſtatute-work within the burgh, &c. The number of inhabitants is computed to be about 43,000.

GLASS, a tranſparent, brittle, factitious body, produced from ſand melted in a ſtrong fire with fixed alkaline ſalts, lead, ſlags, &c. till the whole becomes perfectly clear and fine. The word is formed of the Latin *glaſtum*, a plant called by the Greeks *iſatis*, by the Romans *vitrum*, by the ancient Britons *guadum*, and by the Engliſh *woad*. We find frequent mention of this plant in ancient writers, particularly Cæſar, Vitruvius, Pliny, &c. who relate, that the ancient Britons painted or dyed their bodies with glaſtum, guadum, vitrum, &c. i. e. with the blue colour procured from this plant. And hence, the factitious matter we are ſpeaking of came to be called *glaſs*; as having always ſomewhat of this bluiſhneſs in it.

1 Hiſtory of glaſs-making.

At what time the art of glaſs-making was firſt invented, is altogether uncertain. Some imagine it to have been invented before the flood: but of this we have no direct proof, though there is no improbability in the ſuppoſition; for we know, that it is almoſt impoſſible to excite a very violent fire, ſuch as is neceſſary in metallurgic operations, without vitrifying part of the bricks or ſtones wherewith the furnace is built, This indeed might furniſh the firſt hints of glaſs-making; tho' it is alſo very probable, that ſuch imperfect vitrifications would be obſerved a long time before people thought of making any uſe of them.

Neri traces the antiquity of glaſs as far back as the time of Job. That writer, ſpeaking of the value of wiſdom, chap. xxviii. verſe 17. ſays, that gold and *cryſtal* cannot equal it. But this word, which Neri will have to ſignify factitious glaſs, is capable of a great many different interpretations, and properly ſignifies only whatever is beautiful or tranſparent. Dr Merret will have the art to be as ancient as that of pottery or the

Glaſs.

the making of bricks, for the reaſons already given, viz. that by all vehement heats ſome imperfect vitrifications are produced. Of this kind undoubtedly was the foſſile glaſs mentioned by Ferant. Imperator. to have been found under-ground where great fires had been. But it is evident, that ſuch imperfect vitrifications might have paſſed unnoticed for ages; and conſequently we have no reaſon to conclude from thence, that the art of glaſs-making is of ſuch high antiquity.

The Egyptians boaſt, that this art was taught them by their great Hermes. Ariſtophanes, Ariſtotle, Alexander, Aphrodiſeus, Lucretius, and St John the divine, put it out of all doubt that glaſs was uſed in their days. Pliny relates, that it was firſt diſcovered accidentally in Syria, at the mouth of the river Belus, by certain merchants driven thither by a ſtorm at ſea; who being obliged to continue there, and dreſs their victuals by making a fire on the ground, where there was great plenty of the herb kali; that plant, burning to aſhes, its ſalts mixed and incorporated with the ſand, or ſtones fit for vitrification, and thus produced glaſs; and that this accident, being known, the people of Sidon, in that neighbourhood, eſſayed the work, and brought glaſs into uſe; ſince which time the art has been continually improving. Be this as it will, however, the firſt glaſs-houſes mentioned in hiſtory were erected in the city of Tyre, and here was the only ſtaple of the manufactory for many ages. The ſand which lay on the ſhore for about half a mile round the mouth of the river Belus was peculiarly adapted to the making of glaſs, as being neat and glittering; and the wide range of the Tyrian commerce gave an ample vent for the productions of the furnace. It appears, however, that before the conqueſt of Britain by the Romans, glaſs-houſes had been erected in this iſland, as well as in Gaul, Spain, and Italy. Hence, in many parts of the country are to be found annulets of glaſs, having a narrow perforation and thick rim, denominated by the remaining Britons *gleineu naidreedh*, or *glaſs adders*, and which were probably in former times uſed as amulets by the druids *. It can ſcarcely be queſtioned that the Britons were ſufficiently well verſed in the manufacture of glaſs, to form out of it many more uſeful inſtruments than the glaſs-beads. Hiſtory indeed aſſures us, that they did manufacture a conſiderable quantity of glaſs veſſels. Theſe, like their annulets, were moſt probably green, blue, yellow, or black, and many of them curiouſly ſtreaked with other colours. The proceſs in the manufacture would be nearly the ſame with that of the Gauls or Spaniards. The ſand of their ſhores being reduced to a ſufficient degree of fineneſs by art, was mixed with three fourths of its weight of their nitre (much the ſame with our kelp), and both were melted together. The metal was then poured into other veſſels, where it was left to harden into a maſs, and afterwards replaced in the furnace, where it became tranſparent in the boiling, and was afterwards figured by blowing, or modelling in the lath, into ſuch veſſels as they wanted.

It is not probable that the arrival of the Romans would improve the glaſs manufacture among the Britons. The taſte of the Romans at that time was juſt the reverſe of that of the inhabitants of this iſland. The former preferred ſilver and gold to glaſs for the compoſition of their drinking veſſels. They made indeed great improvements in their own at Rome, during the government of Nero. The veſſels then formed of this metal rivalled the bowls of porcelain in their dearneſs, and equalled the cups of cryſtal in their tranſparency. But theſe were by far too coſtly for common uſe; and therefore, in all probability, were never attempted in Britain. The glaſs commonly made uſe of by the Romans was of a quality greatly inferior; and, from the fragments which have been diſcovered at the ſtations or towns of either, appear to have conſiſted of a thick, ſometimes white, but moſtly blue-green, metal.

With regard to the theory of vitrification, we are almoſt totally in the dark. In general, it ſeems to be that ſtate, in which ſolid bodies are, by the vehement action of fire, fitted for being diſſipated, or carried off in vapour. In all vitrifications, there is a plentiful evaporation; and if any ſolid ſubſtance is carried off in vapour by the intenſe heat of a burning ſpeculum, a vitrification is always obſerved previouſly to take place. The difference, then, between the ſtate of fuſion and vitrification of a ſolid body we may conceive to be, that in the former the element of fire acts upon the parts of the ſolid in ſuch a manner as only to disjoin them, and render the ſubſtance fluid; but, in vitrification, the fire not only disjoins the particles, but combines with them in a latent ſtate, into a third ſubſtance; which, having now as much fire as it can contain, can receive no further change from that element, except being carried off in vapour.

But, though we are unable to effect this change upon ſolid bodies without a very violent heat, it is otherwiſe in the natural proceſſes. By what we call *cryſtalization*, nature produces more perfect glaſſes than we can make with our furnaces. Theſe are called *precious ſtones*; but in all trials they diſcover the eſſential properties of glaſs, and not of ſtones. The moſt diſtinguiſhing property of glaſs is its reſiſting the force of fire, ſo that this element cannot calcine or change it as it does other bodies, but can only melt it, and then carry it off in vapours. To this laſt all the precious ſtones are ſubject. The diamond (the hardeſt and moſt ponderous of them all) is diſſipable in a leſs degree of heat than what would diſſipate common glaſs. Nor can it be any objection to this idea, that ſome kinds of glaſs are capable of being converted into a kind of porcelain by a long-continued cementation with certain materials. This change happens only to thoſe kinds of glaſs which are made of alkaline ſalt and ſand; and Dr Lewis hath ſhewn that this change is produced by the diſſipation of the ſaline principle, which is the leaſt fixed of the two. Glaſs, therefore, we may ſtill conſider as a ſubſtance upon which the fire has no other effect than either to melt, or diſſipate it in vapour.

The other properties of glaſs are very remarkable, ſome of which follow.

1. It is one of the moſt elaſtic bodies in nature. If the force with which glaſs-balls ſtrike each other be reckoned 16, that wherewith they recede by virtue of their elaſticity will be nearly 15.

2. When glaſs is ſuddenly cooled, it becomes exceedingly brittle; and this brittleneſs is ſometimes attended with very ſurpriſing phenomena. Hollow bells made of unnealed glaſs, with a ſmall hole in them, ſilver

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* See *Anguinum Ovum*.

will fly to pieces by the heat of the hand only, if the hole by which the internal and external air communicate be ſtopped with a finger. Lately, however, ſome veſſels made of ſuch unnealed glaſs have been diſcovered, which have the remarkable property of reſiſting very hard ſtrokes given from without, though they ſhiver to pieces by the ſhocks received from the fall of very light and minute bodies dropped into their cavities. Thoſe glaſſes may be made of any ſhape; all that needs be obſerved in making them is, that their bottoms be thicker than their ſides. The thicker the bottom is, the eaſier do the glaſſes break. One whoſe bottom is three fingers breadth in thickneſs, flies with as much eaſe at leaſt as the thinneſt glaſs. Some of theſe veſſels have been tried with ſtrokes of a mallet ſufficient to drive a nail into wood tolerably hard, and have held good without breaking. They have alſo reſiſted the ſhock of ſeveral heavy bodies let fall into their cavities, from the height of two or three feet; as muſket-balls, pieces of iron, or other metal, pyrites, jaſper, wood, bone, &c. But this is not ſurpriſing, as other glaſſes of the ſame ſhape and ſize will do the ſame: but the wonder is, that taking a ſhiver of flint of the ſize of a ſmall pea, and letting it fall into the glaſs only from the height of three inches, in about two ſeconds the glaſs flies, and ſometimes at the very moment of the ſhock; nay, a bit of flint no larger than a grain, dropped into ſeveral glaſſes ſucceſſively, though it did not immediately break them, yet when ſet by, they all flew in leſs than three quarters of an hour. Some other bodies produce the ſame effect with flint; as ſapphire, diamond, porcelain, hard tempered ſteel; alſo marbles ſuch as boys play with, and likewiſe pearls.

Theſe experiments were made before the Royal Society; and ſucceeded equally when the glaſſes were held in the hand, when they were reſted on a pillow, put in water, or filled with water. It is alſo remarkable, that the glaſſes broke upon having their bottoms ſlightly rubbed with the finger, though ſome of them did not fly till half an hour after the rubbing. If the glaſſes are every where extremely thin, they do not break in theſe circumſtances.

Some have pretended to account for theſe phenomena, by ſaying, that the bodies dropped into the veſſels cauſe a concuſſion which is ſtronger than the coheſive force of the glaſs, and conſequently that a rupture muſt enſue. But why does not a ball of iron, gold, ſilver, or copper, which are perhaps a thouſand times heavier than the flint, produce the ſame effect? Is it becauſe they are not elaſtic? But ſurely iron is more elaſtic than the end of one's finger.—Mr Euler has endeavoured to account for theſe appearances from his principles of percuſſion. He thinks that this experiment entirely overthrows the opinion of thoſe who meaſure the force of percuſſion by the *vis viva*, or abſolute apparent ſtrength of the ſtroke. According to his principles, the great hardneſs and angular figure of the flint, which makes the ſpace of contact with the glaſs extremely ſmall, ought to cauſe an impreſſion on the glaſs vaſtly greater than lead, or any other metal; and this may account for the flint's breaking the veſſel, though the bullet, even falling from a conſiderable height, does no damage.—Hollow cups made of green bottle-glaſs, ſome of them three inches thick at the bottom, were inſtantly broken by a ſhiver of flint, weighing about two grains, though they had reſiſted the ſhock of a muſket-ball from the height of three feet.

That Mr Euler's theory cannot be concluſive more than the other, muſt appear evident from a very ſlight conſideration. It is not by angular bodies alone that the glaſſes are broken. The marbles with which children play are round, and yet they have the ſame effect with the angular flint. Beſides, if it was the mere force of percuſſion which broke the glaſſes, undoubtedly the fracture would always take place at the very inſtant of the ſtroke; but we have ſeen, that this did not happen ſometimes till a very conſiderable ſpace of time had elapſed. It is evident, therefore, that this effect is occaſioned by the putting in motion ſome ſubtile fluid with which the ſubſtance of the glaſs is filled; and that the motions of this fluid, when once excited in a particular part of the glaſs, ſoon propagate themſelves through the whole or greateſt part of it, by which means the coheſive power becomes at laſt too weak to reſiſt them. There can be little doubt that the fluid juſt now mentioned is that of electricity. It is known to exiſt in glaſs, in very great quantity; and it alſo is known to be capable of breaking glaſſes, even when annealed with the greateſt care, if put into too violent a motion. Probably the cooling of glaſs haſtily may make it more electric than is conſiſtent with its coheſive power, ſo that it is broken by the leaſt increaſe of motion in the electric fluid by friction or otherwiſe. This is evidently the caſe when it is broken by rubbing with the finger; but why it ſhould alſo break by the mere contact of flint and the other bodies abovementioned, has not yet been ſatisfactorily accounted for.

6
Rotation of glaſs-tubes before a fire.

A moſt remarkable phenomenon alſo is produced in glaſs tubes placed in certain circumſtances. When theſe are laid before a fire in an horizontal poſition, having their extremities properly ſupported, they acquire a rotatory motion round their axis, and alſo a progreſſive motion towards the fire, even when their ſupports are declining from the fire, ſo that the tubes will move a little way uphill towards the fire. When the progreſſive motion of the tubes towards the fire is ſtopped by any obſtacle, their rotation ſtill continues. When the tubes are placed in a nearly upright poſture, leaning to the right hand, the motion will be from eaſt to weſt; but if they lean to the left hand, their motion will be from weſt to eaſt; and the nearer they are placed to the perfectly upright poſture, the leſs will the motion be either way.

If the tube is placed horizontally on a glaſs plane, the fragment, for inſtance, of coach window-glaſs, inſtead of moving towards the fire, it will move from it, and about its axis in a contrary direction to what it had done before; nay, it will recede from the fire, and move a little up-hill when the plane inclines towards the fire.—Theſe experiments are recorded in the philoſophical tranſactions †. They ſucceeded beſt with tubes about 20 or 22 inches long, which had in each end a pretty ſtrong pin fixed in cork for an axis.

7
Attempts to account for it.

The reaſon given for theſe phenomena, is the ſwelling of the tubes towards the fire by the heat, which is known to expand all bodies. For, ſay the adopters of this hypotheſis, granting the exiſtence of ſuch a ſwelling, gravity muſt pull the tube down when ſupported near its extremities, and a freſh part being expoſed to the fire, it muſt alſo ſwell out and fall down, and ſo on.—But, without going farther in the explanation of this hypotheſis, it may be here remarked, that the fundamental principle on which it proceeds is falſe: for though fire indeed makes bodies expand, it does not increaſe them in weight; and therefore the ſides of the tube, though one of them is expanded by the fire, muſt ſtill remain *in equilibrio;* and hence we muſt conclude, that the cauſes of theſe phenomena remain yet to be diſcovered.

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† No 476. §. 1.

4. Glaſs is leſs dilatable by heat than metalline ſubſtances, and ſolid glaſs-ſticks are leſs dilatable than tubes. This was firſt diſcovered by Col. Roy, in making experiments in order to reduce barometers to a greater degree of exactneſs than hath hitherto been found practicable; and ſince his experiments were made, one of the tubes 18 inches long, being compared with a ſolid glaſs-rod of the ſame length, the former was found by a pyrometer, to expand four times as much as the other, in a heat approaching to that of boiling oil. —On account of the general quality which glaſs has of expanding leſs than metal, M. de Luc recommends it to be uſed in pendulums: and he ſays it has alſo this good quality, that its expanſions are always equable, and proportioned to the degrees of heat; a quality which is not to be found in any other ſubſtance yet known.

Phil. Tranſ. vol. lxvii. p. 663.

Ibid. vol. lxviii. p. 474.

5. Glaſs appears to be more fit for the condenſation of vapours than metallic ſubſtances. An open glaſs filled with water, in the ſummer-time, will gather drops of water on the outſide, juſt as far as the water in the inſide reaches; and a perſon's breath blown on it, manifeſtly moiſtens it. Glaſs alſo becomes moiſt with dew, when metals do not. See Dew.

6. A drinking-glaſs partly filled with water, and rubbed on the brim with a wet finger, yields muſical notes, higher or lower as the glaſs is more or leſs full; and will make the liquor friſk and leap. See Harmonica.

7. Glaſs is poſſeſſed of very great electrical virtues. See Electricity, *paſſim.*

8 Materials for glaſs.

Materials for Making of Glass. The materials whereof glaſs is made, we have already mentioned to be ſalt and ſand or ſtones. The ſalt here uſed, is procured from a ſort of aſhes, brought from the Levant, called *polverine,* or *rochetta;* which aſhes are thoſe of a ſort of water-plant called *kali* *, cut down in ſummer, dried in the ſun, and burnt in heaps, either on the ground, or on iron gates; the aſhes falling into a pit, grow into a hard maſs, or ſtone, fit for uſe. It may alſo be procured from common kelp, or the aſhes of the *fucus veſiculoſus.* See Kelp, and Fucus in *The* APPENDIX.

To extract the ſalt, theſe aſhes, or polverine, are powdered and ſifted, then put into boiling water, and there kept till one third of the water be conſumed; the whole being ſtirred up from time to time, that the aſhes may incorporate with the fluid, and all its ſalts be extracted: then the veſſel is filled up with new water, and boiled over again, till one half be conſumed; what remains is a ſort of lee, ſtrongly impregnated with ſalt. This lee, boiled over again in freſh coppers, thickens in about twenty-four hours, and ſhoots its ſalt; which is to be ladled out, as it ſhoots, into earthen pans, and thence into wooden vats to drain and dry. This done, it is groſly pounded, and thus put in a ſort of oven, called *calcar,* to dry. It may be added, that there are other plants, beſides kali, and fucus, which yield a ſalt fit for glaſs: ſuch are the common way-thiſtle, bramble, hops, wormwood, woad, tobacco, fern, and the whole leguminous tribe, as peaſe, beans, &c. In ſome kinds of glaſs, however, litharge, common pearl-aſhes, and nitre, are uſed in great quantity.

The ſand or ſtone, called by the artiſts *tarſo,* is the ſecond ingredient in glaſs, and that which gives it the body and firmneſs. Theſe ſtones, Agricola obſerves, muſt be ſuch as will fuſe; and of theſe ſuch as are white and tranſparent are beſt; ſo that cryſtal challenges the precedency of all others.

At Venice they chiefly uſe a ſort of pebble, found in the river Teſino, reſembling white marble, and called *cuogolo.* Indeed Ant. Neri aſſures us, that all ſtones which will ſtrike fire with ſteel, are fit to vitrify: but Dr Merret ſhews, that there are ſome exceptions from this rule. Flints are admirable; and when calcined, powdered, and ſearched, make a pure white cryſtalline metal: but the expence of preparing them makes the maſters of our glaſs-houſes ſparing of their uſe. Where proper ſtones cannot be ſo conveniently had, ſand is uſed; which ſhould be white, and ſmall, and well waſhed, before it be applied: ſuch is uſually found in the mouths and ſides of rivers. Our glaſs-houſes are furniſhed with a fine ſand for cryſtal, from Maidſtone; the ſame with that uſed for ſand-boxes, and in ſcouring; and with a coarſer for green glaſs, from Woolwich. For cryſtal glaſs, to 200 lb of tarſo, pounded fine, they put 130 lb of ſalt of polverine; then mix them together, and put them into the calcar, a ſort of reverberatory furnace, being firſt well heated. Here they remain baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate: when taken out, the mixture is called *frit,* or *bollito.*

It may be further obſerved, that glaſs might be made by immediately melting the materials without thus calcining and making them frit; but the operation would be much more tedious.

A glaſs much harder than any prepared in the common way may be made by means of borax, in the following manner. Take four ounces of borax, and an ounce of fine white ſand, reduced to powder, and melt them together in a large cloſe crucible ſet in a wind-furnace, keeping a ſtrong fire for half an hour; then take out the crucible, and, when cold, break it; and there will be found at the bottom, a hard, pure glaſs, capable of cutting common glaſs almoſt like a diamond. This experiment duly varied, ſays Dr Shaw, may lead to ſome conſiderable improvements in the art of making glaſs, enamels, and artificial gems. It ſhews us an expeditious method of making glaſs without the uſe of fixed ſalts, which has generally been thought an eſſential ingredient in glaſs, and which is the ingredient that gives common glaſs its ſoftneſs; and it is not yet known, whether calcined cryſtal, or other ſubſtances being added to this ſalt, inſtead of ſand, it might not make a glaſs approaching to the nature of a diamond.

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* See *Salſola.*

Kinds of GLASS. Of theſe materials we have many ſorts of glaſs made, which may principally be diſtinguiſhed according to their beauty: as the cryſtal flint-glaſs, the cryſtal white-glaſs, the green-glaſs, and the bottle-glaſs. Again, theſe ſeveral ſorts are diſtinguiſhed by their ſeveral uſes: as plate or coach glaſſes, looking-glaſſes, optic-glaſſes, &c. which are made of the firſt ſort. The ſecond ſort includes crown-glaſs, toys, phials, drinking glaſſes, &c. The third ſort is well known by its colour, and the ſecond by its form.

Balas-coloured GLASS is made thus: Put into a pot cryſtal frit, thrice waſhed in water; tinge this with mangaueſe prepared into a clear purple: to this add alumen cativum ſifted fine in ſmall quantities, and at ſeveral times; this will make the glaſs grow yellowiſh, and a little reddiſh, but not blackiſh, and always diſſipates the manganeſe. The laſt time you add manganeſe, give no more of the alumen cativum, unleſs the colour be too full. Thus will the glaſs be exactly of the colour of the balas-ruby.

Red GLASS. A blood-red glaſs may be made in the following manner: Put ſix pounds of glaſs of lead, and ten pounds of common glaſs, into a pot glazed with white glaſs: when the whole is boiled and refined; add, by ſmall quantities, and at ſmall diſtances of time, copper calcined to a redneſs, as much as, on repeated proofs, is found ſufficient: then add tartar in powder by ſmall quantities at a time, till the glaſs is become as red as blood; and continue adding one or other of the ingredients till the colour is quite perfect.

A much finer red, however, may be communicated to glaſs by means of gold, of which Dr Lewis gives the following account. "The tinging of glaſs and enamels by preparations of gold appears to have been firſt attempted about the beginning of the laſt century. Libavius, whoſe works compoſe a valuable body of the chemical knowledge of his own time, conjectures, in one of his tracts entitled *Alchymia*, printed in 1606, that the colour of the ruby proceeds from gold, and that gold diſſolved and brought to redneſs might be made to communicate a like colour to factitious gems or glaſs. Neri, in his *Art of Glaſs* dated 1611, gives a proceſs on this principle, which he ſays was found to ſucceed: he directs the gold to be diſſolved in aqua regia, the menſtruum to be evaporated or drawn off by diſtillation, more aqua regia added, and the abſtraction repeated five or ſix times: the remaining matter is to be calcined till it becomes purple, and then mixed with a proper quantity of the fineſt white or cryſtal glaſs. But though this proceſs may be ſuppoſed to have ſometimes proved ſucceſsful, it doubtleſs very often miſcarried; inſomuch that the introduction of this deſirable colour into the glaſs was very little known for many years after.

"Glauber, in the ſecond part of his *Philoſophical Furnaces* publiſhed in 1648, gives another method of producing a red colour by gold in a matter which is of the vitreous kind, though not perfect glaſs. When powdered flint or ſand is well ground with four times its weight of fixt alkaline ſalt, the mixture melts in a moderately ſtrong fire, and when cold looks like glaſs, but on account of its over-proportion of alkaline ſalt it runs into a liquid ſtate on being expoſed to the air: on adding this liquor to ſolution of gold in aqua regia, the acid, which held the gold diſſolved, unites with the alkali which held the flint diſſolved, and the gold and flint precipitate together in form of a yellow powder, which by calcination becomes purple: this powder being mixed with three or four times its weight of the alkaline ſolution of flint, the mixture dried, and kept melted in a ſtrong fire for an hour, a maſs is obtained, of a tranſparent ruby colour, and of a vitreous appearance; though ſtill ſoluble in water, or by the moiſture of the air, on account of the redundance of ſalt.

"Boyle, in his treatiſe on the Poroſity of Bodies, and in the appendix to his *Sceptical Chemiſt* publiſhed in 1680, mentions an experiment, in which a like colour was introduced into glaſs without fuſion. A mixture of gold and mercury having been kept in digeſtion for ſome months, the fire was at laſt immoderately increaſed, inſomuch that the glaſs burſt with a violent exploſion: the lower part of the glaſs was found tinged throughout of a tranſparent red colour, which ſeemed, he ſays, to emulate that of a not common ruby.

"About the ſame time Caſſius diſcovered the precipitation of gold by tin, and that glaſs might be tinged of a ruby colour by melting it with this precipitate. I can give no further account of his experiments, having never had the good fortune to meet with his treatiſe.

"The proceſs was ſoon after brought to perfection by Kunckel, who ſays he prepared the ruby glaſs in large quantity, and ſold it for about forty ſhillings an ounce; and that he made a chalice of it for the elector of Cologn, weighing no leſs than 24 pounds, a full inch thick, and of an uniform fine colour throughout. He has nowhere communicated the proceſs he followed, but ſome uſeful obſervations relating to it are diſperſed through his writings: he ſays, that one part of the precipitate by tin is ſufficient to give a ruby colour to twelve hundred and eighty parts of glaſs, and a ſenſible redneſs to upwards of nineteen hundred parts: that the ſucceſs is by no means conſtant, and that, after long practice, he ſtill frequently failed: that oftentimes the glaſs comes out of the fire colourleſs as cryſtal, and receives its ruby colour on being afterwards expoſed to a ſmoky flame, inſomuch that he imagines the diſcovery of the ruby glaſs did not ariſe from ſimply melting the gold precipitate with glaſs, but from the ſubſequent ſoftening and working of the glaſs in the flame of a lamp, in the uſe of which Caſſius was very converſant: that the addition of nitre and ſal ammoniac calls forth the colour, and that the colour produced by ſal ammoniac is more beautiful than that by nitre, but quickly diſappears on a continuance of the fire.

"Orſchal, in a treatiſe entitled *ſol ſine veſte*, gives a proceſs, by which he ſays he obtained a very fine ruby. He directs the purple precipitate, made by tin, to be ground with ſix times its quantity of Venice glaſs in a very fine powder, and this compound to be exquiſitely mingled with the fritt or vitreous compoſition to be tinged: his fritt conſiſts of equal parts of borax, nitre, and fixt alkaline ſalt, and four times as much calcined flint as of each of the ſalts; but in what proportion the gold precipitate is to be mixed with the fritt, and in what manner the fuſion is to be performed, he does not mention. He reports that he had found the muddy matter, obtained in poliſhing gold by a pumice ſtone, to impart likewiſe a ruby colour to glaſs.

"Grummet, who had been operator to Kunckel in making the red glaſs, publiſhed a tract in oppoſition both to him and Orſchal, under the title of *Sol non ſine veſte;* in which he obſerves, that the furnace ought to be ſo conſtructed, that the operator may have full liberty of examining the glaſs in the fire, and of removing it as ſoon as it appears to have acquired the proper colour: he ſays the enamellers obtain a ruby colour, by melting, with a large proportion of Venice glaſs, the browniſh powder precipitated from ſolution of gold in aqua regia by fixt alkaline ſalts. But he imagines that the gold is nowiſe concerned in the production of the colour. Venice glaſs, and moſt of the finer colourleſs kinds of glaſs, have an addition of manganeſe, without which it would be very difficult to render them perfectly void of colour: the manganeſe communicates at firſt a purpliſh hue, which on continuing the fire diſappears, and at the ſame time ſuppreſſes or diſcharges any other tinge that the glaſs may be impregnated with: the addition of a little nitre revives the purpliſh colour of the manganeſe; and Grummet is of opinion that the colour with which glaſs becomes tinged, by the admixture of preparations of gold, is no other than that of the manganeſe extricated by the nitrous ſalt which the gold has retained in its precipitation. He affirms, that the ſame purpliſh red colour will be obtained on melting Venice glaſs with an eighth part of nitre, without any gold; that in a hundred repetitions of this experiment, it ſcarcely fails once; and that neither nitre nor the gold-precipitate were found to give any thing of the admired colour to thoſe kinds of glaſs which have no manganeſe in their compoſition.

"The colours which manganeſe imparts to glaſs, it belongs not to this place to examine: but that precipitates of gold will communicate, in certain circumſtances, a purpliſh red colour, I have ſeveral times experienced; having myſelf tinged of this colour fritts compoſed of calcined flint, nitre and borax, without the addition of manganeſe or of glaſſes containing it. Though gold, diſſolved in common aqua regia, exhibits its own yellow colour; yet, when the menſtruum is ſeparated by fire to a certain point, or when the gold is precipitated by tin, or when it is precipitated by alkaline ſalts and afterwards moderately heated, or when gold is barely divided by mechanical means into ſubtile powder, and expoſed for ſome time, in mixture with earthy bodies, to a ſlight heat, it aſſumes, in different circumſtances, a violet colour, a purple, or a red verging to purple: in a ſtrong fire, theſe colours vaniſh, and the gold melts into a maſs of its original appearance. All theſe colours I have introduced into glaſs by preparations of gold; and I have found them to be nearly as periſhable in the fire when the coloured gold-powder was thus diffuſed through the glaſs, as when expoſed to the fire by itſelf: when the fire was raiſed to any great degree, and the glaſs made to flow thin, there was generally a button of revived gold collected at the bottom.

"A ſolution of gold in aqua regia being inſpiſſated to dryneſs in the bottom of a Florence flaſk, and the heat further increaſed till the gold reſumed its proper colour, the lower part of the glaſs was by this ſimple proceſs tinged purpliſh: pieces of it being expoſed to the flame of a lamp, they became in ſome parts violet coloured, in ſome of a bright purple, and in others purpliſh red; and the parts which in one poſition looked violet or purpliſh, in another appeared red.

"A colour nearly of the ſame kind is impreſſed on glaſs by gold-leaf in ſome electrical experiments; a fact which we are obliged to Mr Franklin for the firſt knowledge of. A narrow ſtrip of gold-leaf being placed between two ſlips of glaſs, with both the ends hanging out a little, and the glaſs well tied round with ſilk thread, a ſtrong electrical exploſion is made to paſs through the gold-leaf. On examining the glaſs, the gold-leaf, he obſerves, will be found miſſing in ſeveral places, and inſtead of it a reddiſh ſtain on both the glaſſes, exactly ſimilar on both in the minuteſt ſtroke, though ſometimes ſpread a little wider than the breadth of the leaf: the ſtain appears to have penetrated into the ſubſtance of the glaſs, ſo as to be protected by it from the action of aqua regia. I have had this experiment ſeveral times repeated with plate-glaſs; and found it tinged, as above deſcribed, in ſome parts violet, in ſome purpliſh, and in ſome reddiſh: the colours could not be ſcraped off, and reſiſted aqua regia and ſpirit of ſalt. If the electric exploſion is made very ſtrong, the glaſs commonly flies in pieces, with ſuch force, that it is neceſſary for the operator to have his face ſkreened from them.

"The preparation of gold which has been principally recommended for tinging glaſs is Caſſius's precipitate by ſolution of tin. To obtain this precipitate of the due colour, a good deal of care is neceſſary both in diſſolving the tin and in diluting the ſolutions. A mixture of two parts of aqua fortis and one of ſpirit of ſalt, is ſuppoſed to be the beſt menſtruum for the tin: into this mixture ſome fine block-tin, granulated, is to be let fall, grain by grain, waiting till one grain is diſſolved before another is dropt in, that the diſſolution may go on ſlowly, without any heat or diſcharge of fumes. The gold is diſſolved in common aqua regia; and a few drops of this ſolution being mixed with ſome ounces of pure water, as many drops of the ſolution of tin are added. If the mixture changes immediately to a clear bright purpliſh red colour, the due degree of dilution has been hit; if the colour appears dull, a greater quantity of water muſt be added for the reſt of the ſolutions. After the mixture has depoſited its red matter, and become clear, a little more of the tin-ſolution is to be dropt in, for diſcovering, and precipitating, any gold that may ſtill remain in it: the liquor being then poured off, the precipitate is waſhed and dried.

"Kunckel mentions another purple gold-powder, made nearly like that of Neri already mentioned, by inſpiſſating ſolution of gold to dryneſs, abſtracting from it freſh aqua regia three or four times till the matter looks almoſt like oil, then precipitating with ſtrong alkaline ley, and waſhing the precipitate with water. By diſſolving this powder in ſpirit of ſalt, and precipitating again, it becomes, he ſays, extremely ly fair, and in this ſtate he directs it to be mixed with a due proportion of Venice glaſs.

"Hellot deſcribes a preparation which in mixture with Venice glaſs was found to give a beautiful purple enamel. Equal parts of ſolution of gold, and of ſolution of zinc in aqua regia, are mixed together; and a volatile ſpirit, prepared from ſal ammoniac by quicklime, added to the mixture in ſufficient quantity to precipitate the two metals. The precipitate is to be gradually heated, till it acquires a violet colour: it does not fulminate, making only a ſlight dull decrepitation without any of its particles flying about.

"Though a purple, or a red colour approaching to that of the ruby, may by the foregoing means be baked upon glaſs or enamels, and introduced into the maſs by fuſion, the way of equally diffuſing ſuch a colour through a quantity of fluid glaſs is ſtill a ſecret.

"I was once, many years ago, fortunate enough to ſucceed, at a glaſs-houſe, in a ſmall pot of glaſs, of which a ſalver was blown of a fine ruby red: the tinging matter was the precipitate of gold by tin; the particulars of the proceſs cannot now be recollected. I have ſince tried the remainder of the ſame preparation, with common flint glaſs, with green glaſs, with various fritts compoſed of flint, borax, pure fixt alkaline ſalt, nitre, ſal ammoniac. When flint was uſed, it was ſeveral times made red-hot, and quenched in water, to render it more eaſily pulverable: both the flint and glaſſes were powdered in an iron mortar, and the powders well waſhed with diluted oil of vitriol, to extract ſuch particles of iron as they might have worn off in the trituration; the gold precipitate was ground with the other ingredients, in agate or glaſs mortars; its proportion was varied from an eighth part to an eight hundredth of the vitreous materials; and the fire was continued, in a wind furnace, from ſix to thirty hours. All the glaſſes came out conſiderably coloured; ſome of a deep duſky yellow; ſome of a fine pale tranſparent yellow; ſome of a brown colour, greatly reſembling that which the glaſs mentioned below acquired under a muffle; ſome appeared yellowiſh or browniſh when looked down upon, and of a purple-violet or reddiſh purple when held between the eye and the light: ſome had ſpecks and veins of a fine red; no one was either red or purple throughout. Several of theſe glaſſes were melted again and again, by themſelves, and with the addition of more vitreous matter: ſome were worked in the flame of a lamp: ſome were laid in a mixture of powdered charcoal and ſoot, and made red-hot in a cloſe crucible; and others being laid in the ſame manner, the fire was increaſed till they melted. The colours were by theſe means altered; but did not become uniform, or more approaching to the ruby colour than before: ſome pieces, which had at firſt very conſiderabie ſpecks of a ruby luſtre, loſt them on a repetition of the fuſion.

"At the ſame time that theſe experiments were tried, the ſame kinds of vitreous compoſitions, mixed with different metallic preparations, were expoſed to the fire in different parts of the ſame furnace, and were all found to receive beautiful and uniform colours. To what cauſe the miſcarriage of thoſe with gold was owing; whether the ſucceſs, in regard to this metal, is influenced by the quantity of the matter, by the unſteadineſs of the heat in a ſmall furnace, by the fuſibility of the vitreous compoſition, by the metallic matter being ground with the ingredients before their expoſure to the fire, or added to them in fuſion, by the continuance of the fire, by the fluid matter being kept unmoved or ſtirred with an iron rod, by the crucible being covered or open, or other like circumſtances; or whether the admixture of a little mangaueſe, though gold will certainly give a ruby colour without it, does not contribute to ſecure the ſucceſs; I have not yet diſcovered. The proportion of the gold precipitate to the vitreous matter is perhaps of principal importance. Solution of gold, as we have ſeen already, produces no redneſs with tin unleſs diluted with a very large quantity of water, in which circumſtance the whole mixture acquires that beautiful colour which we here want to transfer from the watery fluid into fluid glaſs. It ſhould ſeem, therefore, that the quantity of gold precipitate, for communicating the admired colour to a certain volume of glaſs, ought to be the ſame with that which communicated a like colour to an equal volume of water in the precipitation: a quantity extremely minute, and much leſs than that employed in any of my experiments.

"I have lately been favoured with ſome pieces of glaſs, in greateſt part colourleſs, with one or two large red ſpots, ſeveral ſmall ſtreaks of violet, and ſome of a light browniſh yellow. The perſon from whom I received them informs me, "that he had "found, that in a heat not very ſtrong, under a "muffle, the glaſs becomes of an opake brown, and, "if then poliſhed, appears variegated like a fine "pebble." I expoſed a colourleſs piece to the flame of a lamp, impelled by a blow-pipe; and on working it about, ſometimes in the ſmoke, and ſometimes in the flame, found it change to a true ruby-red, perfectly tranſparent, and free from veins of any other colour. Another piece, kept for two hours under a cloſe muffle, in ſuch a heat as made it juſt ſoft enough to bend and receive an impreſſion, became on the ſurface green, brown, and pale yellow in different parts, greatly reſembling the coat of ſome pebbles: in this ſtate, looked through againſt the ſun, it appeared of a beautiful ruby-colour, and on breaking it, the internal part was found throughout of an uniform dark-red when looked down upon, and of the ruby-red when placed between the eye and the light. A large piece being continued under the muffle for four hours, its figure was found ſcarcely altered, the coat was much thicker, and beautifully veined with various colours, which were all loſt in a glorious red when the piece was viewed between the light.

"All I have been able to learn in regard to the preparation of this glaſs is, that the quantity made at once is about ſix cwt.; that the tinging matter is mixed with the vitreous materials before they are put into the melting-pot, the mixture being brought to the glaſs-houſe in tubs; that the matter is not ſtirred in fuſion; and that it is kept no longer in the fire than is neceſſary for perfecting the glaſs, which, as ſoon as fine, is caſt into a kind of bricks. Some imagine that this glaſs has no mixture of calx of lead, of which a large proportion is uſed in the compoſition of the common flint-glaſs, and that the principal vitrefying ingredient is nitre: others judge it to be compoſed of the ſame materials as the common ſort; its weight ſeeming to be a proof of its containing lead; for it is found to be nearly of the ſame ſpecific gravity with flint-glaſs, which is greater than that of the glaſſes made without lead in the proportion of above ſix to five. This point we have determined in a more ſatiſfactory manner: 400 grains of the glaſs, made red-hot and quenched in water, were reduced into powder, and mingled with about twice as much black flux and a little alkaline ſalt: the mixture being melted in a crucible, and the veſſel ſuffered to cool, a lump of metal was found at the bottom, weighing 90 grains. The metal appeared to be ſomewhat ſtiffer than pure lead, and experiments convinced me that it contained ſome tin and a little gold."—The ſame author, however, afterwards informs us, that he has reaſon to believe, that his experiments would have ſucceeded better if the *ſolution* of gold, inſtead of its precipitate, had been mixed with the materials.

Yellow GLASS. It is neceſſary to remark in glaſs-making, that the cryſtal glaſs made with ſalt that has an admixture of tartar will never receive the true gold yellow, though it will all other colours: for yellow glaſs, therefore, a ſalt muſt be prepared from polverine, or pot-aſhes alone, to make the glaſs.

Furnace for the Making of GLASS. In this manufacture, there are three ſorts of furnaces; one, called *calcar*, is for the frit; the ſecond is for working the glaſs; the third ſerves to anneal the glaſs, and is called the *leer*. See Plate CXL. fig. 1.

The calcar reſembles an oven ten feet long, ſeven feet broad, and two deep: the fuel, which in Britain is ſea-coal, is put into a trench on one ſide of the furnace; and the flame reverberating from the roof upon the frit calcines it. The *glaſs-furnace*, or working furnace, is round, of three yards diameter, and two high; or thus proportioned. It is divided into three parts, each of which is vaulted. The lower part is properly called the *crown*, and is made in that form. Its uſe is to keep a briſk fire, which is never put out. The mouth is called the *bocca*. There are ſeveral holes in the arch of this crown, through which the flame paſſes into the ſecond vault or partition, and reverberates into the ports filled with the ingredients above-mentioned. Round the inſides are eight or more pots placed, and piling pots on them. The number of pots is always double that of the boccas or mouths, or of the number of workmen, that each may have one pot refined to work out of, and another for metal to refine in while he works out of the other. Thro' the working holes the metal is taken out of the pots, and the pots are put into the furnace; and theſe holes are ſtopped with moveable covers made of lute and brick, to ſcreen the workmens eyes from the ſcorching flames. On each ſide of the bocca, or mouth, is a bocarella, or little hole, out of which coloured glaſs, or finer metal, is taken from the piling pot. Above this oven, there is the third oven, or *leer*, about five or ſix yards long, where the veſſels, or glaſs, are annealed, or cooled: this part conſiſts of a tower, beſides the leer, into which the flame aſcends from the furnace. The tower has two mouths, through which the glaſſes are put in with a fork, and ſet on the floor or bottom: but they are drawn out on iron pans, called *fraches*, thro' the leer, to cool by degrees; ſo that they are quite cold by the time they reach the mouth of the leer, which enters the ſaroſel, or room where the glaſſes are to be ſtowed.

But the green glaſs-furnace is ſquare; and at each angle it has an arch for annealing or cooling glaſſes. The metal is wrought on two oppoſite ſides, and on the other two they have their colours, into which are made linnet holes, for the fire to come from the furnace to bake the frit, and to diſcharge the ſmoke. Fires are made in the arches to anneal the work, ſo that the whole proceſs is done in one furnace.

Theſe furnaces muſt not be of brick, but of hard ſandy ſtones. In France, they build the outſide of brick; and the inner part, to bear the fire, is made of a ſort of fuller's earth, or tobacco-pipe clay, of which earth they alſo make their melting-pots. In Britain the pots are made of Sturbridge clay.

Mr Blancourt obſerves, that the worſt and roughest work in this art, is the changing the pots, when they are worn out or cracked. In this caſe, the great working hole muſt be uncovered; the faulty pot muſt be taken out with iron hooks and forks, and a new one muſt be ſpeedily put in its place, through the flames, by the hands only. For this work, the man guards himſelf with a garment made of ſkins, in the ſhape of a pantaloon, that covers him all but his eyes, and is made as wet as poſſible: the eyes are defended with a proper ſort of glaſs.

Inſtruments for Making of GLASS. The inſtruments made uſe of in this work, may be reduced to theſe that follow. A blowing pipe, made of iron, about two feet and a half long, with a wooden handle. An iron rod to take up the glaſs, after it is blown, and to cut off the former. Sciſſars to cut the glaſs when it comes off from the firſt hollow iron. Shears to cut and ſhape great glaſſes, &c. An iron ladle, with the end of the handle caſed with wood, to take the metal out of the refining pot, to put it into the workmens pots. A ſmall iron ladle, caſed in the ſame manner, to ſkim the alkalic ſalt that ſwims at top. Shovels, one like a peel, to take up the great glaſſes; another, like a fire-ſhovel, to feed the furnace with coals. A hooked iron fork, to ſtir the matter in the pots. An iron rake for the ſame purpoſe, and to ſtir the frit. An iron fork, to change or pull the pots out of the furnace, &c.

Working or Blowing Round GLASS. The tools thus provided, the workman dips his blowing pipe into the melting-pot; and by turning it about, the metal ſticks to the iron more firmly than turpentine. This he repeats four times, at each time rolling the end of his inſtrument, with the hot metal thereon, on a piece of plate-iron; over which is a veſſel of water which helps to cool, and ſo to conſolidate and to diſpoſe that matter to bind more firmly with what is to be taken next out of the melting-pot. But after he has dipt a fourth time, and the workman perceives there is metal enough on the pipe, he claps his mouth immediately to the other end of it, and blows gently thro' the iron tube, till the metal lengthens like a bladder about a foot. Then he rolls it on a marble ſtone, a little while, to poliſh it; and blows a ſecond time, by which he brings it to the ſhape of a globe of about 18 or 20 inches diameter. Every time he blows into the pipe, he removes it quickly to his cheek; otherwiſe he would be in danger, by often blowing, of drawing the flame into his mouth: and this globe may be flattened by returning it to the fire; and brought into any form by ſtamp-irons, which are always ready. When the glaſs is thus blown, it is cut off at the collet, or neck; which is the narrow part that ſtuck to the iron. The method of performing this is as follows: the pipe is reſted on an iron bar, cloſe by the collet; then a drop of cold water being laid on the collet, it will crack about a qnarter of an inch, which, with a ſlight blow, or cut of the ſhears, will immediately ſeparate the collet.

After this is done, the operator dips the iron rod into the melting-pot, by which he extracts as much metal as ſerves to attract the glaſs he has made, to which he now fixes this rod at the bottom of his work, oppoſite to the opening made by the breaking of the collet. In this poſition the glaſs is carried to the great bocca, or mouth of the oven, to be heated and ſcalded; by which means it is again put into ſuch a ſoft ſtate, that, by the help of an iron inſtrument, it can be pierced, opened, and widened without breaking. But the veſſel is not finiſhed till it is returned to the great bocca; where being again heated thoroughly, and turned quickly about with a circular motion, it will open to any ſize, by the means of the heat and motion.

If there remain any ſuperfluities, they are cut off with the ſhears; for till the glaſs is cool, it remains in a ſoft, flexible ſtate. It is therefore taken from the bocca, and carried to an earthen bench, covered with brands, which are coals extinguiſhed, keeping it turning; becauſe that motion prevents any ſettling, and preſerves an evenneſs in the face of the glaſs, where, as it cools, it comes to its conſiſtency; being firſt cleared from the iron rod by a ſlight ſtroke by the hand of the workman.

If the veſſel conceived in the workman's mind, and whoſe body is already made, requires a foot, or a handle, or any other member or decoration, he makes them ſeparately; and now eſſays to join them with the help of hot metal, which he takes out of the pots with his iron rod: but the glaſs is not brought to its true hardneſs, till it has paſſed the leer, or annealing oven, deſcribed before.

Working, or Blowing, of Window or Table Glass. The method of working round glaſs, or veſſels of any ſort, is in every particular applicable to the working of window or table glaſs, till the blowing iron has been dipt the fourth time. But then, inſtead of rounding it, the workman blows, and ſo manages the metal upon the iron plate, that it extends two or three feet in the form of a cylinder. This cylinder is put again to the fire, and blown a ſecond time, and is thus repeated till it is extended to the dimenſions required, the ſide to which the pipe is fixed diminiſhing gradually till it ends in a pyramidal form; ſo that, to bring both ends nearly to the ſame diameter, while the glaſs is thus flexible, he adds a little hot metal to the end oppoſite the pipe, and draws it out with a pair of iron pincers, and immediately cuts off the ſame end with the help of a little cold water, as before.

The cylinder being now open at one end, is carried back to the bocca; and there, by the help of cold water, it is cut about eight or ten inches from the iron pipe or rod; and the whole length at another place, by which alſo it is cut off from the iron rod. Then it is heated gradually on an earthen table, by which it opens in length; while the workman, with an iron tool, alternately lowers and raiſes the two halves of the cylinder; which at laſt will open like a ſheet of paper, and fall into the ſame flat form in which it ſerves for uſe; in which it is preſerved by heating it over again, cooling it on a table of copper, and hardening it 24 hours in the annealing furnace, to which it is carried upon forks. In this furnace an hundred tables of glaſs may lie at a time, without injury to each other, by ſeparating them into tens, with an iron ſhiver between, which diminiſhes the weight by dividing it, and keeps the tables flat and even.

This was the method formerly made uſe of for blowing plate-glaſs, looking-glaſſes, &c.; but the workmen, by this method, could never exceed 50 inches in length, and a proportional breadth, becauſe what were larger were always found to warp, which prevented them from reflecting the objects regularly, and wanted ſubſtance to bear the neceſſary grinding. Theſe imperfections have been remedied by an invention of the Sieur Abraham Thevart, in France, about the year 1688, of caſting or running large plates of glaſs in the following manner.

*Caſting or Running of Large Looking-*Glass *Plates.* The furnace (fig. 2.) is of a very large dimenſion, environed with ſeveral ovens, or annealing furnaces, called *carquaſſes*, beſides others for making of frit and calcining old pieces of glaſs. This furnace, before it is fit to run glaſs, coſts 3500l. It ſeldom laſts above three years, and even in that time it muſt be refitted every ſix months. It takes ſix months to rebuild it; and three months to refit it. The melting pots are as big as large hogſheads, and contain about 2000 weight of metal. If one of them burſts in the furnace, the loſs of the matter and time amounts to 250l. The heat of this furnace is ſo intenſe, that a bar of iron laid at the mouth thereof becomes red hot in leſs than half a minute. The materials in theſe pots are the ſame as deſcribed before. When the furnace is red-hot, theſe materials are put in at three different times, becauſe that helps the fuſion; and in twenty-four hours they are vitrified, refined, ſettled, and fit for caſting. A is the bocca, or mouth of the furnace; B is the ciſtern that conveys the liquid glaſs it receives out of the melting-pots in the furnace to the caſting table. Theſe ciſterns are filled in the furnace, and remain therein ſix hours after they are filled; and then are hooked out by the means of a large iron chain, guided by a pully, placed upon a carriage with four wheels marked C, by two men. This carriage has no middle piece; ſo that when it has brought the ciſtern to the caſting-table D, they ſlip off the bottom of the ciſtern, and out ruſhes a torrent of flaming matter upon the table: this matter is confined to certain dimenſions by the iron rulers EE, which are moveable, retain the fluid matter, and determine the width of the glaſs; while a man, with the roller F reſting on the edge of the iron rulers, reduceth it as it cool, to an equal thickneſs, which is done in the ſpace of a minute. This table is ſupported on a wooden frame, with truſtles for the convenience of moving to the annealing furnace; into which, ſtrewed with ſand, the new plate is ſhoved, where it will harden in about ten days. After this, the glaſs needs only to be ground, poliſhed, and foliated for uſe.

Grinding and Poliſhing of Plate-Glass. Glaſs is made tranſparent by fire; but it receives its luſtre by the ſkill and labour of the grinder and poliſher, the former of whom takes it rough out of the hands of the maker.

In order to grind plate-glaſs, they lay it horizontally upon a flat ſtone table (fig. 3.) made of a very fine-grained free-ſtone: and for its greater ſecurity they plaſter it down with lime or ſtucco; for otherwiſe the force of the workmen, or the motion of the wheel with which they grind it, would move it about.

This ſtone table is ſupported by a ſtrong frame A, made of wood, with a ledge quite round its edges, riſing about two inches higher than the glaſs. Upon this glaſs to be ground, is laid another rough glaſs not above half ſo big, and ſo looſe as to ſlide upon it; but cemented to a wooden plank, to guard it from the injury it muſt otherwiſe receive from the ſcraping of the wheel to which this plank is faſtened, and from the weights laid upon it to promote the grinding or triture of the glaſſes. The whole is covered with a wheel, B, made of hard light wood, about ſix inches in diameter; by pulling of which backwards and forwards alternately, and ſometimes turning it round, the workmen, who always ſtand oppoſite to each other, produce a conſtant attrition between the two glaſſes, and bring them to what degree of ſmoothneſs they pleaſe, by firſt pouring in water and coarſe ſand; after that, a finer ſort of ſand, as the work advanceth, till at laſt they muſt pour in the powder of ſmalt. As the upper or incumbent glaſs poliſhes and grows ſmoother, it muſt be taken away, and another from time to time put in its place.

This engine is called a *mill* by the artiſts, and is uſed only in the largeſt-ſized glaſſes; for in the grinding of the leſſer glaſſes, they are content to work without a wheel, and to have only four wooden handles faſtened to the four corners of the ſtone which loads the upper plank, by which they work it about.

When the grinder has done his part, who finds it very difficult to bring the glaſs to an exact plainneſs, it is turned over to the poliſher; who, with the fine powder of tripoli-ſtone, or emery, brings it to a perfect evenneſs and luſtre. The inſtrument made uſe of in this branch is a board, *c c*, furniſhed with a felt, and a ſmall roller, which the workman moves by means of a double handle at both ends. The artiſt in working this roller, is aſſiſted with a wooden hoop or ſpring, to the end of which it is fixed: for the ſpring, by conſtantly bringing the roller back to the ſame points, facilitates the action of the workman's arm.

Painting in Glass. The ancient manner of painting in glaſs was very ſimple: it conſiſted in the mere arrangement of pieces of glaſs of different colours in ſome ſort of ſymmetry, and conſtituted what is now called *Moſaic work*. See Mosaic.

In proceſs of time they came to attempt more regular deſigns, and alſo to repreſent figures heightened with all their ſhades: yet they proceeded no farther than the contours of the figures in black with water-colours, and hatching the draperies after the ſame manner on glaſſes of the colour of the object they deſigned to paint. For the carnation, they uſed glaſs of a bright red colour; and upon this they drew the principal lineaments of the face, &c. with black.

But in time, the taſte for this ſort of painting improving conſiderably, and the art being found applicable to the adorning of churches, baſilics, &c. they found out means of incorporating the colours in the glaſs itſelf, by heating them in the fire to a proper degree; having firſt laid on the colours.

This art, however, has frequently met with much interruption, and ſometimes been almoſt totally loſt; of which Mr Walpole gives us the following account, in his Anecdotes of Painting in England.

“The firſt interruption given to it was by the reformation, which baniſhed the art out of churches; yet it was in ſome meaſure kept up in the eſcutcheons of the nobility and gentry, in the windows of their ſeats. Towards the end of queen Elizabeth's reign it was omitted even there; yet the practice did not entirely ceaſe. The chapel of our Lady at Warwick was ornamented anew by Robert Dudley earl of Leiceſter, and his counteſs, and the cipher of the glaſs-painter's name yet remains, with the date 1574: and in ſome of the chapels at Oxford the art again appears, dating itſelf in 1622, by the hand of no contemptible maſter.

“I could ſupply even this gap of 48 years by many dates on Flemiſh glaſs; but nobody ever ſuppoſed that the ſecret was loſt ſo early as the reign of James I. and that it has not periſhed ſince, will be evident from the following ſeries reaching to the preſent hour.

“The portraits in the windows of the library at All Souls, Oxford. In the chapel at Queen's college there are twelve windows dated 1518. P. C. a cipher on the painted glaſs in the chapel at Warwick, 1574. The windows at Wadham-college; the drawing pretty good, and the colours fine, by Bernard Van Linge, 1622. In the chapel at Lincoln's-Inn, a window, with the name of *Bernard*, 1623. This was probably the preceding Van Linge. In the church of St Leonard, Shoreditch, two windows by Baptiſta Sutton, 1634. The windows in the chapel at Univerſity-college, Hen. Giles *pinxit*, 1687. At Chriſt-church, Iſaac Oliver, aged 84, 1700. Window in Merton-chapel, William Price, 1700. Windows at Queen's New-college, and Maudlin, by William Price, the ſon, now living, whoſe colours are fine, whoſe drawing is good, and whoſe taſte in ornaments and moſaic is far ſuperior to any of his predeceſſors; is equal to the antique, to the good Italian maſters, and only ſurpaſſed by his own ſingular modeſty.

“It may not be unwelcome to the curious reader to ſee ſome anecdotes of the revival of taſte for painted glaſs in England. Price, as we have ſaid, was the only painter in that ſtyle for many years in England. Afterwards one Rowell, a plumber at Reading, did ſome things, particularly for the late Henry earl of Pembroke; but Rowel's colours ſoon vaniſhed. At laſt he found out a very durable and beautiful red; but he died in a year or two, and the ſecret with him. A man at Birmingham began the ſame art in 1756 or 1757, and fitted up a window for lord Lyttelton, in the church of Hagley; but ſoon broke. A little after him, one Peckitt at York began the ſame buſineſs, and has made good proficiency. A few lovers of that art collected ſome diſperſed panes from ancient buildings, particularly the late lord Cobham, who erected a Gothic temple at Stowe, and filled it with arms of the old nobility, &c. About the year 1753, one Aſciotti, an Italian, who had married a Flemiſh woman, brought a parcel of painted glaſs from Flanders, and ſold it for a few guineas to the honourable Mr Bateman, of Old Windſor. Upon that I ſent Aſciotti again to Flanders, who brought me 450 pieces, for which, including the expence of his journey, I paid him 36 guineas. His wife made more journeys for the ſame purpoſe; and ſold her cargoes to one Palmer, a glazier in St Martin's lane, who immediately raiſed the price to one, two, or five guineas for a ſingle piece, and fitted up entire windows with them, and with moſaics of plain glaſs of different colours. In 1761, Paterſon, an auctioneer at Eſſex-houſe in the Strand, exhibited the two firſt auctions of painted glaſs, imported in like manner from Flanders. All this manufacture conſiſted in rounds of ſcripture-ſtories, ſtained in black and yellow, or in ſmall figures of black and white; birds and flowers in colours, and Flemiſh coats of arms."

The colours uſed in painting or ſtaining of glaſs are very different from thoſe uſed in painting either in water or oil colours.

For black, take ſcales of iron, one ounce; ſcales of copper, one ounce; jet, half an ounce: reduce them to powder, and mix them. For blue, take powder of blue, one pound; ſal nitre, half a pound; mix them and grind them well together. For carnation, take red chalk, eight ounces; iron ſcales, and litharge of ſilver, of each two ounces; gum arabic, half an ounce; diſſolve in water; grind all together for half an hour as ſtiff as you can; then put it in a glaſs and ſtir it well, and let it ſtand to ſettle fourteen days. For green, take red-lead, one pound; ſcales of copper, one pound; and flint, five pounds: divide them into three parts; and add to them as much ſal nitre; put them into a crucible, and melt them with a ſtrong fire; and when it is cold, powder it, and grind it on a porphyry. For gold colour, take ſilver, an ounce; antimony, half an ounce; melt them in a crucible; then pound the maſs to powder; and grind it on a copper plate; add to it yellow oker, or brick-duſt calcined again, fifteen ounces; and grind them well together with water. For purple, take minium, one pound; brown ſtone, one pound; white flint, five pounds: divide them into three parts, and add to them as much ſal nitre as one of the parts; calcine, melt, and grind it as you did the green. For red, take jet, four ounces; litharge of ſilver, two ounces; red chalk, one ounce; powder them fine, and mix them. For white, take jet, two parts; white flint, ground on a glaſs very fine, one part; mix them. For yellow, take Spaniſh brown, ten parts; leaf-ſilver, one part; antimony, half a part; put all into a crucible, and calcine them well.

In the windows of ancient churches, &c. there are to be ſeen the moſt beautiful and vivid colours imaginable, which far exceed any of thoſe uſed by the moderns, not ſo much becauſe the ſecret of making thoſe colours is entirely loſt, as that the moderns will not go to the charge of them, nor be at the neceſſary pains, by reaſon that this ſort of painting is not now ſo much in eſteem as formerly. Thoſe beautiful works which were made in the glaſs-houſes were of two kinds.

In ſome, the colour was diffuſed through the whole ſubſtance of the glaſs. In others, which were the more common, the colour was only on one ſide, ſcarce penetrating within the ſubſtance above one third of a line; though this was more or leſs according to the nature of the colour, the yellow being always found to enter the deepeſt. Theſe laſt, though not ſo ſtrong and beautiful as the former, were of more advantage to the workmen, by reaſon that on the ſame glaſs, though already coloured, they could ſhew other kind of colours where there was occaſion to embroider draperies, enrich them with foliages, or repreſent other ornaments of gold, ſilver, &c.

In order to this, they made uſe of emery, grinding or wearing down the ſurface of the glaſs, till ſuch time as they were got through the colour to the clear glaſs. This done, they applied the proper colours on the other ſide of the glaſs. By theſe means, the new colours were hindered from running and mixing with the former, when they expoſed the glaſſes to the fire, as will appear hereafter.

When indeed the ornaments were to appear white, the glaſs was only bared of its colour with emery, without tinging the place with any colour at all; and this was the manner by which they wrought their lights, and heightnings, on all kinds of colour.

The firſt thing to be done, in order to paint or ſtain glaſs, in the modern way, is to deſign, and even colour the whole ſubject on paper. Then they chooſe ſuch pieces of glaſs as are clear, even, and ſmooth, and proper to receive the ſeveral parts; and proceed to diſtribute the deſign itſelf, or papers it is drawn on, into pieces ſuitable to thoſe of the glaſs; always taking care that the glaſſes may join in the contours of the figures and the folds of the draperies; that the carnations, and other finer parts, may not be impaired by the lead with which the pieces are to be joined together. The diſtribution being made, they mark all the glaſſes as well as papers, that they may be known again: which done, applying every part of the deſign upon the glaſs intended for it, they copy, or transfer, the deſign upon this glaſs with the black colour diluted in gum-water, by tracing and following all the lines and ſtrokes as they appear through the glaſs with the point of a pencil.

When theſe ſtrokes are well dried, which will happen in about two days, the work being only in black and white, they give a ſlight waſh over with urine, gum arabic, and a little black; and repeat it ſeveral times, according as the ſhades are deſired to be heightened; with this precaution, never to apply a new waſh till the former is ſufficiently dried.

This done, the lights and riſings are given by rubbing off the colour in the reſpective places with a wooden point, or the handle of the pencil.

As to the other colours above-mentioned, they are uſed with gum-water, much as in painting in miniature; taking care to apply them lightly, for fear of effacing the outlines of the deſign; or even, for the greater ſecurity, to apply them on the other ſide; eſpecially yel-

Glaſs, Glaſton-bury.

low, which is very pernicious to the other colours, by blending therewith. And here too, as in pieces of black and white, particular regard muſt always be had not to lay colour on colour, or lay on a new lay, till ſuch time as the former are well dried.

It may be added, that the yellow is the only colour that penetrates through the glaſs, and incorporates therewith by the fire; the reſt, and particularly the blue, which is very difficult to uſe, remaining on the ſurface, or at leaſt entering very little. When the painting of all the pieces is finiſhed, they are carried to the furnace, or oven, to anneal, or bake the colours.

The furnace here uſed is ſmall, built of brick, from 18 to 30 inches ſquare. At ſix inches from the bottom is an aperture to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three ſquare bars of iron, which traverſe the furnace, and divide it into two parts. Two inches above this partition, is another little aperture, through which they take out pieces to examine how the coction goes forward. On the grate is placed a ſquare earthen pan, ſix or ſeven inches deep, and five or ſix inches leſs every way than the perimeter of the furnace. On the one ſide hereof is a little aperture, through which to make trials, placed directly oppoſite to that of the furnaces deſtined for the ſame end. In this pan are the pieces of glaſs to be placed, in the following manner: Firſt, the bottom of the pan is covered with three ſtrata, or layers, of quicklime pulveriſed; thoſe ſtrata being ſeparated by two others of old broken glaſs, the deſign whereof is to ſecure the painted glaſs from the too intenſe heat of the fire. This done, the glaſſes are laid horizontally on the laſt or uppermoſt layer of lime.

The firſt row of glaſs they cover over with a layer of the ſame powder, an inch deep; and over this they lay another range of glaſſes, and thus alternately till the pan is quite full; taking care that the whole heap always end with a layer of the lime-powder.

The pan being thus prepared, they cover up the furnace with tiles, on a ſquare table of earthen ware, cloſely luted all round; only leaving five little apertures, one at each corner, and another in the middle, to ſerve as chimneys. Things thus diſpoſed, there remains nothing but to give the fire to the work. The fire for the firſt two hours muſt be very moderate, and muſt be increaſed in proportion as the coction advances, for the ſpace of ten or twelve hours; in which time it is uſually compleated. At laſt the fire, which at firſt was charcoal, is to be of dry wood, ſo that the flame covers the whole pan, and even iſſues out at the chimneys.

During the laſt hours, they make eſſays, from time to time, by taking out pieces laid for the purpoſe through the little aperture of the furnace and pan, to ſee whether the yellow be perfect, and the other colours in good order. When the annealing is thought ſufficient, they proceed with great haſte to extinguiſh the fire, which otherwiſe would ſoon burn the colours, and break the glaſſes.

Glass *of Antimony*. See Chemistry, n° 454.

Glass *of Lead*. See Glazing.

GLASTONBURY, a town of Somerſetſhire in England; ſeated in W. Lon. 2. 46. N. Lat. 51. 15. —It is noted for a famous abbey, ſome magnificent ruins of which are ſtill remaining; but they are every day diminiſhing for the ſake of the ſtones. However, the curious ſtructure called *the Abbot's kitchen* is ſtill pretty entire, and is of a very unuſual contrivance. The monks pretend that it was the reſidence of Joſeph of Arimathea, and of St Patrick; but for this aſſertion they produce no good authority. The king of the Weſt Saxons erected a church here, which he and the ſucceeding kings enriched to ſuch a degree, that the abbot lived like a prince, had the title of *lord*, and ſat among the barons in parliament; and no perſon, not even a biſhop or prince, durſt ſet foot on the iſle of Avalon, in which the abbey ſtands, without his leave. The revenue of the abbey was above 40,000 l. per ann. beſides ſeven parks well ſtocked with deer. The laſt abbot, (Richard Whiting,) who had 100 monks, and 300 domeſtics, was hanged in his pontificals, with two of his monks, on the Tor, a high hill in the neighbourhood, for refuſing to take the oath of ſupremacy to Henry VIII. and ſurrender his abbey when required. Edgar and many other Saxon kings were buried here; and, as ſome will have it, Arthur the Britiſh king.——The ſtory of the Glaſtonbury thorn, and of its budding always upon Chriſtmas-day, is well known: however, that circumſtance is falſe; though, if the winter is mild, it always buds about the latter end of December, but later if the weather is ſevere.

Glaſto bur ‖ Glauco

GLATZ, a handſome and ſtrong town of Bohemia, and capital of a county of the ſame name. It is ſeated on the river Neiſſe; and has ſtrong fortifications, with a caſtle built upon a mountain. The county was ceded to the king of Pruſſia by the queen of Hungary in 1742; and is about 45 miles in length, and 25 in breadth. It has mines of pit-coal, ſilver, and iron; good quarries, plenty of cattle, and fine ſprings of mineral water. The town is ſituated in E. Lon. 15. 16. N. Lat. 50. 25.

GLAUBER (John Rhodolphus), a celebrated German chemiſt, who flouriſhed about the year 1646. He wrote a great number of different treatiſes on chemiſtry, ſome of which have been tranſlated into Latin and French. All his works have been collected into one volume, entitled, *Glauberus concentratus*, which has been tranſlated into Engliſh, and was printed at London, in folio, in 1689.

Glauber's *Salt*. See Chemistry, n° 124.

GLAUCUS, a marine god, or deity of the ſea. There are a great many fabulous accounts of this divinity: but the poetical hiſtory of him is, that, before his deification, he was a fiſherman of the town of Anthedon, who, having one day taken a conſiderable number of fiſhes, which he laid upon the bank, on a ſudden perceived, that theſe fiſhes, having touched a kind of herb that grew on the ſhore, received new ſtrength, and leaped again into the ſea: upon the ſight of which extraordinary accident, he was tempted to taſte of the herb himſelf, and preſently leaped into the ſea after them, where he was metamorphoſed into a Triton, and became one of the ſea-gods.

GLAUCOMA, or Glaucosis, from γλαύκος, a *ſky-blue colour*. Mr Sharp, in his *Operations of Surgery*, p. 158—163, ſays, that the *glaucoma* of the ancient Greeks is the *ſuffuſio* of the Latins, and the *cataract* of the preſent times. See (Index ſubjoined to) MEDICINE and SURGERY. Mr St Yves ſays, it is a *cataract* accompanied with a *gutta ſerena;* according to which nothing need be added, except that, in ſuch a caſe, the operation and all other means are uſeleſs, except to eaſe pain, and to mend the figure of the eye.

GLAUCUS, in ichthyology. See SQUALUS.

GLAZIER, an artificer who works in glaſs.—The principal part of a glazier's buſineſs conſiſts in fitting panes of glaſs to the ſaſhes and window-frames of houſes, pictures, &c. and in cleaning the ſame.

GLAZING, the cruſting over earthen ware by a vitreous ſubſtance, the baſis of which is lead.

For making a pure glaſs of lead, the following receipt will be found to anſwer: Put a large quantity of lead into a potter's kiln, and keep it in a ſtate of fuſion with a moderate fire, till it is calcined to a grey looſe powder; then ſpread it in the kiln, and give it a greater heat, continually ſtirring it to keep it from running into lumps. Continue this for ſeveral hours, till the powder becomes of a fair yellow; then take it out and ſift it fine. This is called *calcined lead.*—Take of this calcined lead, 15 pounds; and cryſtalline or other fritt, 12 pounds: mix theſe as well as poſſible together; put them into a pot, and ſet them in a furnace for 10 hours; then caſt the whole, which will now be perfectly melted, into water; ſeparate the looſe lead from it, and return the metal into it; and after ſtanding in fuſion 12 hours more, it will be fit for uſe.

The workers of common earthen ware, however, are not at the trouble of thus previouſly making a pure glaſs of lead. Their uſual compoſition for glazing their ware is formed of ſand, wood-aſhes, lead-aſhes, and ſalt. The ware, after being turned on the wheel, and dried in the open air, is covered over with this compoſition by means of a bruſh; and when ſet in the furnace the violent heat ſoon reduces it to a perfect glaſs, covering the whole internal and external ſurface of the veſſel.

The various colours for glazing are the ſame with thoſe for tinging glaſs, which we have already deſcribed. A black colour is given with manganeſe or iron. The proportions, however, are not exactly aſcertained, nor are there any receipts publiſhed concerning theſe things on which we can much depend. In the Philoſophical Tranſactions we have the following receipt for a fine gold-coloured glazing, communicated to the Royal Society by Mr Heinſius of Peterſburg. Take of litharge three parts, of ſand or calcined flint one part; mix theſe very well together, then run them into a yellow glaſs with a ſtrong fire. Pound this glaſs, and moiſten it when in ſubtile powder with a well-ſaturated ſolution of ſilver, which make into a paſte. Put this paſte into a crucible, and cover it. Give at firſt a gentle degree of fire, then increaſe and continue it till you have a perfect glaſs which will be green. Pound this glaſs again, and reduce it to a fine powder: moiſten this powder with ſome beer, ſo that by means of an hair-pencil you may apply it upon the veſſels. Thoſe that are painted or covered over with this glazing muſt be firſt well heated, then put under a muffle; and as ſoon as the glaſs runs you muſt ſmoke them, and take out the veſſels. This preparation owes its colour to the ſilver in it; the precipitates of which, ſpread upon a glaſs plate, have the property of ſtaining it yellow by ignition, without fuſion. When uſed in glazing veſſels, however, they muſt be held over the ſmoke of burning vegetables, in order to call forth the beautiful colour.

A red or green tinge may be given to glazings by means of copper. The red colour appears firſt; but by a continuation of the fire, it is changed into a green. The fineſt red colour, however, that can be given to glazings, is that prepared from the ſolution of gold in aqua regia, as mentioned under the article GLASS.—The fineſt blue is always given by means of zaffre or ſmalt. A purpliſh colour, as well as a brown or black, may alſo be given by manganeſe; but a mixture of the materials for red and blue will undoubtedly produce the fineſt colour. The colouring materials for glazings, therefore, in ſhort are the following.

Red—Gold or copper.
Yellow—Silver, iron.
Green—Copper.
Blue—Zaffre or ſmalt.
Black—Manganeſe.
White—Calx of tin.

Each of theſe materials mixed up in a proper quantity with any compoſition that readily vitrifies, will form a glazing of the deſired colour upon any kind of earthen ware. The proportions in which they are to be uſed may eaſily be determined by a few trials.—Stone ware is glazed by another method, viz. the vitrification of a ſmall part of the ſubſtance of the ware itſelf, by the fumes of ſalt thrown into the furnace when the veſſels are intenſely heated. See STONE WARE.—The application of different colours to it, however, is equally eaſy with the former.

The Romans had a method of glazing their earthen veſſels, which in many reſpects appears to have been ſuperior to ours. The common brown glazing eaſily ſcales off, cracks, and in a ſhort time becomes diſagreeable to the eye. Beſides, it is very eaſily deſtroyed by acids; nor can veſſels glazed in this manner be even employed to hold water, without part of it oozing through their pores. Lead is alſo very deſtructive to the human body; and if acids are unwarily put into veſſels glazed with lead, the liquors will receive a very dangerous impregnation from the metal. The Roman glazing, which is yet to be ſeen upon urns dug up in ſeveral places, appears to have been made of ſome kind of varniſh; and Pliny gives us a hint that it was made of bitumen. He tells us that it never loſt its beauty, and that at length it became cuſtomary to glaze over ſtatues in this manner. As this varniſh ſunk deep into the ſubſtance of the ware, it was not ſubject to thoſe cracks and flaws which diſfigure our veſſels; and as it was not liable to be corroded by acids, it could not be liable to any of the accidents which may enſue from the uſe of veſſels glazed with lead.

GLEANING, the act of gathering or picking up the ears of corn left behind after the field has been reaped and the crop carried home. By the cuſtoms of ſome countries, particularly thoſe of Melun and Eſtampes, all farmers and others are forbid, either by themſelves or ſervants, to put any cattle into the fields, or prevent the gleaning in any manner whatever for the ſpace of 24 hours after the carrying off the corn, under penalty of confiſcation.

GLEBE, among miners, ſignifies a piece of earth in which is contained ſome mineral ore.

Glebe, in law, the land belonging to a pariſh-church beſides the tithes.

GLECHOMA, Ground-ivy; a genus of the angioſpermia order, belonging to the didynamia claſs of plants. There are three ſpecies; the moſt remarkable of which is the hederacea, or common ground-ivy, which is ſo well known that it requires no deſcription. Many virtues were formerly attributed to this plant, which it is now found not to be poſſeſſed of. Some, however, it has. The leaves are thrown into the vat with ale to clarify it and give it a flavour. Ale thus prepared is often drank as an antiſcorbutic. The expreſſed juice mixed with a little wine, and applied morning and evening, deſtroys the white ſpecks upon horſes eyes. The plants that grow near it do not flouriſh. It is ſaid to be hurtful to horſes if they eat much of it. Sheep eat it, horſes are not fond of it; cows, goats, and ſwine, refuſe it.

GLEDITSIA, triple-thorned Acacia; a genus of the diœcia order, belonging to the polygamia claſs of plants. There is but one ſpecies, which riſes with an upright trunk 30 or 40 feet high, branching out regularly with many long triple thorns, and cloſely garniſhed with doubly pinnated leaves, each leaf conſiſting often of near 200 ſmaller leaves or foliola. The flowers are amentaceous, and of a greeniſh colour proceeding from the ſides of the branches, and ſucceeded by broad ſeed-pods near a foot and an half long.—This plant is a native of South America, but will thrive in this country in any ſituation. They are propagated by ſeeds, which are annually procured from America by the ſeedſmen.

GLEET, in medicine, the flux of a thin limpid humour from the urethra. See (the *Index* ſubjoined to) Medicine.

GLICAS, or Glycas, (Michael), a Greek hiſtorian about the middle of the 15th century, lived in Sicily, and wrote Annals of what paſſed from the creation of the world to the death of Alexis Comnenus, in 1118. Leunclavius added to it a fifth part, which carries it down to the taking of Conſtantinople. Glicas was alſo the author of ſeveral uſeful and curious letters.

GLENOIDES, the name of two cavities, or ſmall depreſſions, in the inferior part of the firſt vertebra of the neck.

GLIRES, the name of Linnæus's fourth order of mammalia. See Zoology.

GLIS, in zoology. See Sciurus.

GLISSON (Francis), a learned Engliſh phyſician in the 17th century, was educated at Cambridge, and was made regius profeſſor of that univerſity. In 1634, he was admitted a fellow of the college of phyſicians in London. During the civil wars, he practiſed phyſic at Colcheſter, and afterwards ſettled in London. He greatly improved phyſic by his anatomical diſſections and obſervations, and made ſeveral new diſcoveries of ſingular uſe towards eſtabliſhing a rational practice. He wrote, 1. *De rachitide*, &c. 2. *De lymphæductis nuper repertis*; with the *Anatomica prolegomena, & Anatomia hepatis*. 3. *De natura ſubſtantia energetica; ſeu de via vitæ naturæ, ejuſque tribus primis facultatibus*, &c. quarto. 4. *Tractatus de ventriculo & inteſtinis*, &c. The world is obliged to him for the *capſula communis*, or *vagina portæ*.

GLISTER, in ſurgery. See Clyster.

GLOBE, in geometry, a round or ſpherical body, more uſually called a *ſphere*. See Sphere.

Globe, is more particularly uſed for an artificial ſphere of metal, plaſter, paper, or other matter; on whoſe convex ſurface is drawn a map, or repreſentation, either of the earth, or heavens, with the ſeveral circles conceived thereon. See Geography.

Globes are of two kinds, *terreſtrial* and *celeſtial*; each of very conſiderable uſe, the one in aſtronomy, and the other in geography; to perform many of the operations thereof, in an eaſy, ſenſible manner, ſo as to be conceived without any knowledge of the mathematical grounds of thoſe arts.

The fundamental parts, common to both globes, are an axis, repreſenting that of the world; and a ſpherical ſhell, or cover, which makes the body of the globe, on whoſe external ſurface the repreſentation is drawn. See Axis, Pole, &c.

Globes, we have obſerved, are made of divers materials, viz. ſilver, braſs, paper, plaſter, &c. Thoſe commonly uſed, are of plaſter, and paper: The conſtruction whereof is as follows:

Conſtruction of Globes.—A wooden axis is provided, ſomewhat leſs than the intended diameter of the globe; and into the extremes hereof two iron wires are driven, for poles: this axis is to be the beam, or baſis of the whole ſtructure.

On the axis are applied two ſpherical, or rather hemiſpherical caps, formed on a kind of wooden mould or block.—Theſe caps conſiſt of paſteboard, or paper, laid one lay after another, on the mould, to the thickneſs of a crown-piece; after which, having ſtood to dry and embody, making an inciſion along the middle, the two caps thus parted are ſlipped off the mould.

They remain now to be applied on the poles of the axis, as before they were on thoſe of the mould: and to fix them in their new place, the two edges are ſewed together with pack-thread, &c.

The rudiments of the globe thus laid, they proceed to ſtrengthen and make it ſmooth and regular. In order to this, the two poles are haſped in a metalline ſemicircle, of the ſize intended; and a kind of plaſter, made of whiting, water, and glue, heated, melted, and incorporated together, is daubed all over the paper-ſurface. In proportion as the plaſter is applied, the ball is turned round in the ſemicircle, the edge whereof pares off whatever is ſuperfluous and beyond the due dimenſion, leaving the reſt adhering in places that are ſhort of it. After ſuch application of plaſter, the ball ſtands to dry; which done, it is put again in the ſemicircle, and freſh matter applied: thus they continue alternately to apply the compoſition, and dry it, till ſuch time as the ball every where accurately touches the ſemicircle; in which ſtate it is perfectly ſmooth, regular, firm, &c.

The ball thus finiſhed, it remains to paſte the map or deſcription thereon: in order to this, the map is projected in ſeveral gores, or guſſets; all which join accurately on the ſpherical ſurface, and cover the whole ball. To direct the application of theſe gores, lines are drawn by a ſemicircle on the ſurface of the ball, dividing it into a number of equal parts correſponding to thoſe of the gores, and ſubdividing thoſe again anſwerably to the lines and diviſions of the gores.

The papers thus paſted on, there remains nothing but to colour and illuminate the globe; and to varniſh it, the better to reſiſt duſt, moiſture, &c.—The globe itſelf thus finiſhed, they hang it in a braſs meridian, with an hour-circle, and a quadrant of altitude; and thus fit it into a wooden horizon.

For the uſes, *&c.* of the globes, ſee GEOGRAPHY, n° 33. 35, &c. ASTRONOMY, n° 168, 320. and Plate XLVIII. fig. 2.

GLOBULARIA, GLOBULAR BLUE DAISY; a genus of the monogynia order, belonging to the tetrandria claſs of plants. There are ſeveral ſpecies; but only one is commonly to be met with in our gardens, viz. the vulgaris, or common blue daiſy. It hath broad thick radical leaves, three parted at the ends, upright ſtalks from about ſix to ten or twelve inches high, garniſhed with ſpeared-ſhaped leaves, and the top crowned by a globular head of fine blue flowers compoſed of many florets in one cup. It flowers in June, and makes a good appearance; but thrives beſt in a moiſt ſhady ſituation. It is propagated by parting the roots in September.

GLOBULE, a diminutive of globe, frequently uſed by phyſicians in ſpeaking of the red particles of the blood. See BLOOD.

GLOCESTER, the capital of Gloceſterſhire in England. It is an ancient city, and by Antoninus is called *Clevum*, or *Glevum*, which Cambden thinks was formed from the Britiſh *Caer-Glowe*, ſignifying a fair city. It was built by the Romans to curb the Silures; and a colony was placed there, called *Colonia Glevum*. It ſtands upon the bank of the Severn; and, except on the ſide next the river, is ſurrounded by a wall. Towards the ſouth there was anciently a caſtle built in the time of William the Conqueror, the remains of which is now the common gaol for debtors and felons. Ceaulin, king of the Weſt Saxons, firſt took it from the Britons in 570; but it afterwards became ſubject to the Mercians. The preſent cathedral was erected by Aldred, archbiſhop of York, and biſhop of Worceſter, after the conqueſt, but hath been greatly improved and adorned ſince. In the ſouth iſle Edward II. lies intered in an alabaſter tomb; and not far from him, in the middle of the choir, Robert Curt-hoſe, eldeſt ſon of William the Conqueror. This city ſuffered much in the barons wars, was plundered by Edward the ſon of Henry III. and not long after almoſt entirely deſtroyed by an accidental fire. King John made it a borough; and Henry III. who was crowned here, a corporation. Richard III. made it a county of itſelf, adding two hundreds to it, and gave it his ſword and cap of maintenance. It had once eleven pariſh-churches; but five of them were demoliſhed when it was beſieged by Charles I. againſt whom it had ſhut its gates. In the reign of Charles II. its walls were pulled down, and two hundreds taken from its county by act of parliament. It was erected into an epiſcopal ſee by Henry VIII. on the ſuppreſſion of the abbey of St Peter, with a dean and ſix prebends. About the time of the conqueſt, its chief buſineſs ſeems to have been forging of iron; for in Doomſday book it is ſaid, that the only tribute required of it was ſo many icres, or bars of iron. At preſent it has ten incorporated companies, a ſtone-bridge over the river, with a key and wharf; but though it is well ſituated for trade, yet its traffic is not conſiderable, having been much impaired by the neighbourhood of Briſtol. One of its chief manufactures now is pin-making. Several parliaments were anciently held here, particularly by Richard II. and III.; and in the town are many croſſes and ſtatues of the kings of England. By a charter from Charles II. it is governed by a ſteward, mayor, recorder, twelve aldermen, a town-clerk, two ſheriffs choſen yearly out of twenty-ſix common-council men, a ſword bearer, and four ſerjeants at mace. Cambden ſays, the Roman way, that extends from St David's in Wales to Southampton, paſſes through this city. It gives title of duke to the ſecond brother of his preſent majeſty George III.

Gloceſter-ſhire.

GLOCESTERSHIRE, a county of England, is bounded on the weſt by Monmouthſhire and Herefordſhire, on the north by Worceſterſhire, on the eaſt by Oxfordſhire and Warwickſhire, and on the ſouth by Wiltſhire and part of Somerſetſhire. It is ſixty miles in length, twenty-ſix in breadth, and one hundred and ſixty in circumference; containing eight hundred thouſand acres, twenty-nine hundreds, one city, twenty-five market-towns; and ſends eight members to parliament, viz. two for the county, two for the city of Gloceſter, two for Cirenceſter, and two for Tewkſbury. It lies in the dioceſe that takes its name from the capital, and in the Oxford circuit. The air of the county is very wholeſome, but the face of it is very different in different parts: for the eaſtern part is hilly, and is called *Cotteſwold*; the weſtern woody, and called the *Foreſt of Dean*; and the reſt is a fruitful valley, through which runs the river Severn. This river is in ſome places between two and three miles broad; and its courſe through the country, including its windings, is not leſs than ſeventy miles. The tide of flood, called the *Boar*, riſes very high, and is very impetuous. It is remarkable, that the greateſt tides are one year at the full-moon, and the other at the new; one year the night-tides, and the next the day. This river affords a noble conveyance for goods and merchandiſe of all ſorts, to and from the county; but it is watered by ſeveral others, as the Wye, the Avon, the Iſis, the Leden, the Frome, the Strond, and Windruſh, beſides leſſer ſtreams, all abounding with fiſh, the Severn in particular with ſalmon, conger-eels, and lampreys. The ſoil is in general very fertile, though pretty much diverſified, yielding plenty of corn, paſture, fruit, and wood. In the hilly part of the county, or Cotteſwold, the air is ſharper than in the lowlands; and the ſoil, though not ſo fit for grain, produces excellent paſture for ſheep; ſo that of the four hundred thouſand that are computed to be kept in the county, the greater part are fed here. Of theſe ſheep the wool is exceeding fine; and hence it is that this ſhire is ſo eminent for its manufacture of cloth, of which fifty thouſand pieces are ſaid to have been made yearly, before the practice of clandeſtinely exporting Engliſh wool became ſo common. In the vale, or lower part of the county, through which the Severn paſſes, the air and ſoil are very different from thoſe of the Cotteſwold: for the former is much warmer, and the latter richer, yielding the moſt luxuriant paſtures; in conſequence of which, numerous herds of black cattle are kept, and great quantities of that excellent cheeſe, for which it is ſo much celebrated, made in it. The remaining part of the county, called the *Foreſt of Dean*, was formerly almoſt entirely over-run with wood, and extended twenty miles in length, and ten in breadth. It was then a neſt of robbers, eſpecially towards the Severn; but now it contains many towns and villages, conſiſting chiefly of miners, employed in the coal-pits, or in digging for or forging iron ore, with both which the foreſt abounds. Theſe miners have their particular laws, cuſtoms, courts, and judges; and the king, as in all royal foreſts, has a ſwain-mote, for the preſervation of the vert and veniſon. This foreſt was anciently, and is ſtill noted for its oaks, which thrive here ſurpriſingly; but as there is a prodigious conſumption of wood in the forges, it is continually dwindling way. There were ſo many religious houſes in the county before the reformation, that it gave occaſion to the proverb, "As ſure as God is in Gloceſterſhire."

GLOGAW, a ſtrong and conſiderable town of Germany, in Sileſia, and capital of a duchy of the ſame name. It is not very large, but is well fortified on the ſide of Poland. It has a handſome caſtle, with a tower, in which ſeveral counſellors were condemned by Duke John, in 1498, to periſh with hunger. Beſides the Papiſts, there are a large number of Proteſtants and Jews. It was taken by aſſault, by the king of Pruſſia, in 1741, and the garriſon made priſoners. After the peace in 1742, the king of Pruſſia ſettled the ſupreme court of juſtice here, it being, next to Breſlaw, the moſt populous place in Sileſia. It is ſeated on the river Oder, in E. Lon. 15. 13. N. Lat. 51. 40.

Glogaw *the* Less, a town of Sileſia, in the duchy of Opelen, now in poſſeſſion of the king of Pruſſia. It is two miles S. E. of Great Glogaw, and forty-five N. W. of Breſlaw. E. Lon. 16. 15. N. Lat. 51. 38.

GLORIA patri, among eccleſiaſtical writers. See Doxology.

GLORIOSA, superb lily; a genus of the monogynia order, belonging to the hexandria claſs of plants. There is but one ſpecies, a native of Malabar. It hath a thick, fleſhy, tuberous root, ſending forth from its centre declinated round ſtalks growing eight or ten feet long, and garniſhed with very long narrow leaves running out into a point, terminated by a long tendril. From the upper part of the ſtalks proceed large flame-coloured drooping flowers, conſiſting of ſix widely-ſpreading reflexed petals. It flowers in June and July, and is of admirable beauty whence; its name of *Glorioſa*, or Superb Lily.—This plant being a native of a very warm climate, requires the protection of a hot-houſe in this country. The flower-ſtalks ſhoot forth in March or April; which being long and trailing, muſt have tall ſticks placed for their ſupport. The plants are propagated by offsets, which are produced in tolerable plenty, and may be ſeparated any time after the ſtalks decay, or in ſpring before new ones ariſe.

GLOSS, a comment on the text of any author, to explain his ſenſe more fully and at large, whether in the ſame language or any other. See the article Commentary. The word, according to ſome, comes from the Greek γλωσσα, "tongue;" the office of a *gloſs* being to explain the text, as that of the tongue is to diſcover the mind.

Gloss is likewiſe uſed for a literal tranſlation, or an interpretation of an author in another language word for word.

Gloss is alſo uſed in matters of commerce, &c. for the luſtre of a ſilk, ſtuff, or the like.

GLOSSARY, a ſort of dictionary, explaining the obſcure and antiquated terms in ſome old author; ſuch are Du Cange's Latin and Greek Gloſſaries, Spelman's Gloſſary, and Kennet's Gloſſary at the end of his Parochial Antiquities.

GLOSSOPETRA, in natural hiſtory, a genus of extraneous foſſils, ſo called from their having been ſuppoſed the tongues of ſerpents turned into ſtone; though they are really the teeth of ſharks, and daily found in the mouths of thoſe fiſhes, where-ever taken.

The ſeveral ſizes of teeth of the ſame ſpecies, and the ſeveral different ſpecies of ſharks, furniſh us with a vaſt variety of theſe foſſil-teeth. Their uſual colours are black, bluiſh, yellowiſh, or brown. In ſhape they are uſually ſomewhat approaching to triangular; ſome are ſimple, and others have a ſmaller point on each ſide the large one. Many of them are quite ſtraight; but they are frequently met with crooked and bent in all the different directions, ſome inwards, ſome outwards, and ſome ſideways. They are alſo of various ſizes; the larger ones being four or five inches long, and the ſmaller leſs than a quarter of an inch. They are found with us in the ſtrata of blue clay, and are very plentiful in the clay-pits of Richmond, and ſome other places; but they are nowhere ſo common as in the iſland of Malta.

GLOTTIS, in anatomy, the narrow ſlit at the upper part of the aſpera arteria, which is covered by the epiglottis when we hold our breath and when we ſwallow. The glottis, by its dilatation and contraction, modulates the voice. See Anatomy, n° 380.

GLOVE, a covering for the hand and wriſt.

Gloves, with reſpect to commerce, are diſtinguiſhed into leathern-gloves, ſilk-gloves, thread-gloves, cotton-gloves, worſted-gloves, &c. Leathern-gloves are made of chamois, kid, lamb, doe, elk, buff, &c.

To throw the glove, was a practice or ceremony very uſual among our forefathers; being the challenge, whereby another was defied to ſingle combat.—It is ſtill retained at the coronation of our kings; when the king's champion caſts his glove in Weſtminſter-hall. See Champion.

Favyn ſuppoſes the cuſtom to have aroſe from the eaſtern nations, who in all their ſales and deliveries of lands, goods, &c. uſed to give the purchaſer their glove by way of livery or inveſtiture. To this effect he quotes Ruth iv. 7. where the Chaldee paraphraſe calls *glove*, what the common verſion renders by *ſhoe*. He adds, that the Rabbins interpret by *glove*, that paſſage in the cviiith Pſalm, *In Idumæam extendam* *calceamentum meum,* " Over *Edom* will I caſt out my ſhoe."—Accordingly, among us, he who took up the *glove,* declared thereby his acceptance of the challenge; and as a part of the ceremony, continues Favyn, took the *glove* off his own right-hand, and caſt it upon the ground, to be taken up by the challenger. This had the force of a mutual engagement on each ſide, to meet at the time and place which ſhould be appointed by the king, parliament, or judges.—The ſame author aſſerts, that the cuſtom which ſtill obtains of bleſſing *gloves* in the coronation of the kings of France, is a remain of the eaſtern practice of giving poſſeſſion with the *glove,* l. xvi. p. 1017, &c.

Anciently it was prohibited the judges to wear gloves on the bench. And at preſent in the ſtables of moſt princes, it is not ſafe going in without pulling off the gloves.

GLOW-WORM, a ſmall inſect, remarkable for its ſhining in the dark. See CICINDELA.

The male and female of this ſpecies differ greatly from each other. The male has wings, and is a ſmall fly: the female has no wings, but is a large crawling worm.—The body of the male is oblong, and ſomewhat flatted; the wings are ſhorter than the body; the head is broad, dun, and flat; the eyes are large and black. This has no light iſſuing from it, and is not commonly ſuppoſed to be at all akin to the glow-worm. The female is what we expreſsly call by this name. This is a very ſlow-paced animal, ſomewhat reſembling a caterpillar: the head is ſmall, flat, hard, black, and ſharp towards the mouth. It has ſhort antennæ, and ſix moderately long legs. The body is flat, and is compoſed of twelve rings, whereas the body of the male conſiſts only of five. It is of a duſky colour, with a ſtreak of white down the back. It is often ſeen in the day-time, but is not known till dark; at which time it is eaſily diſtinguiſhed by the glowing light, or lambent flame, that is ſeen near the tail, iſſuing from the under part of the body. It is commonly met with under hedges; and if carefully taken up may be kept alive many days upon freſh turfs of graſs, all which time it will continue to ſhine in the dark.

The light of this little inſect is ſo ſtrong, that it will ſhew itſelf through ſeveral ſubſtances in which the creature may be put up; a thin pill-box eaſily ſhews it through, and even though lined with paper the light is not impeded by both. The creature is ſluggiſh, and appears dead in the day-time; and its light is not diſtinguiſhable even if carried into a darkened room, unleſs the creature be turned upon its back and diſturbed, ſo as to be put in motion, and then it is but very faint: after ſun-ſet the light returns, and with it the life and motion of the creature. The motion and light of this inſect indeed ſeem in ſome meaſure to depend upon one another: it never ſhines but when its body is in ſome ſort of motion; and when it ſhines moſt, the body is extended to one third more than its length in the day-time. In the time of brighteſt ſhining it will ſometimes of a ſudden turn its body about, and the light will not be longer than the head of a pin; and, on being touched, ſhe will then immediately extend herſelf, and the light will become as large and as bright as ever.

Flying GLOW-*Worm, (cicindela volans.)* In the warmer months of the year, this creature is ſometimes caught in our houſes flying to the flame of a candle; and examined in the dark is found to be luminous at theſe times, tho' perhaps leſs or not at all ſo at others; which may be a reaſon of its not being known though caught in the fields; and to this it may be owing, that many who have deſcribed this creature, have thought it not a native of Britain. Without wings, it is frequently enough found in form of the common glow-worm, and then always ſhines. Aldrovandus informs us, that it lays eggs which in a ſhort time hatch ſmall worms; and that theſe afterwards become flies, by the ſame ſort of change which happens to butterflies and other ſpecies of winged inſects. Mouffet, and Thomas Bartholine, give much the ſame deſcription with Aldrovandus, but allow the male only to have wings. Julius Scaliger, however, contradicts this, and affirms that he has caught them both winged in the act of generation; but this is not acknowledged even by all thoſe who have quoted the abovementioned paſſage from Scaliger. Mr Waller, in the philoſophical tranſactions, confirms Scaliger's account, having obſerved them in the ſame manner in the act of copulation both winged; only with this difference, that the female was the larger of the two, which is the caſe with many other inſects. The male and female in this winged ſtate both ſhine in hot weather, and their light is ſo vivid that it may eaſily be ſeen even when there is a candle in the room. The vibrations of this light are irregular, and its colour greeniſh. The luminous parts are two ſmall ſpecks under the tail at the end, and the light continues in theſe ſome time after the tail is cut off; but then gradually goes out. The parts of inſects continue alive in ſome degree for a conſiderable time after they are ſeparated from the reſt of the body; and probably the light of the tail of this animal continues juſt as long as this ſort of life remains in it.

The uſe of this light ſeems to be to direct the animal in its courſe, and in the taking of its prey; and to this purpoſe it is admirably placed. The tail is eaſily bent under the belly, and then throws the light full upon any object about or under the head of the animal; and the eyes are placed, not on the upper part, but on the under ſide of the head; ſo that they have all the advantages of it, while the light in this part is not offenſive to the eyes, as it naturally would have been if carried before the head. Upon occaſion the inſect can cover this light, ſo that its enemies cannot take the advantage in order to purſue it.

The inſect is of the beetle kind, of a brown or duſky colour. It has hard caſe or ſhell wings, as the other beetles have; and, when theſe are expanded, there appears a pair of very large membranaceous ones. Its head is covered with a ſort of ſhield or broad-brimmed hat; under this hat are placed the eyes, which are black and large, and are moveable, ſo that the creature can upon occaſion thruſt them forward to the ſides of the hat or covering of the head. It has two hairy antennæ; and its legs are like thoſe of the common fly, hard, ſhelly, and hairy. Its eyes afford an elegant object for the microſcope, being compoſed of an infinite number of lenſes, like thoſe of the libellæ and other inſects.

GLUKSTADT, a ſtrong and conſiderable town of Germany, Glue. Germany, in the circle of Upper Saxony, and duchy of Holſtein, with a ſtrong caſtle, and ſubject to Denmark. It is ſeated on the river Elbe, near is mouth; E. Long. 9. 15. N. Lat. 52. 53.

GLUE, among artificers, a tenacious viſcid matter, which ſerves as a cement to bind or connect things together.

Glues are of different kinds, according to the various uſes they are deſigned for, as the common glue, glove-glue, and parchment-glue; whereof the two laſt are more properly called *ſize*.

The common or ſtrong glue is chiefly uſed by carpenters, joiners, cabinet-makers, *&c.*

It is made of the ſkins of animals, as oxen, cows, calves, ſheep, *&c.*; and the older the creature is, the better is the glue made of its hide. Indeed whole ſkins are but rarely uſed for this purpoſe, but only the ſhavings, parings, or ſcraps of them; or the feet-ſinews, &c. That made of whole ſkins, however, is undoubtedly the beſt; as that made of ſinews is the very worſt.

The Method of Making Glue. In making glue of parings, they firſt ſteep them two or three days in water: then, waſhing them well out, they boil them to the conſiſtence of a thick jelly; which they paſs, while hot, through ozier-baſkets, to ſeparate the impurities from it; and then let it ſtand ſome time, to purify it further: when all the filth and ordures are ſettled to the bottom of the veſſel, they melt and boil it a ſecond time. They next pour it into flat frames or moulds; whence it is taken out pretty hard and ſolid, and cut into ſquares pieces or cakes. They afterwards dry it in the wind, in a ſort of coarſe net; and at laſt ſtring it, to finiſh its drying.

The glue made of ſinews, feet, &c. is managed after the ſame manner; only with this difference, that they bone and ſcour the feet, and do not lay them to ſteep.

Of this commodity there is a very great exportation from England; the Engliſh glue being univerſally allowed to be the beſt in Europe, partly from the excellency of the materials, and partly from the ſkill of the manufacturers. Next to this is the Flanders glue. In both countries it is made by the tanners from fragments of good ſkins dried with much care. In France it is a ſeparate trade: and the glue-makers pick up their materials as they can, from the ſeveral dealers in ſkins, and boiling theſe with cow-heels make their glue; which as they purchaſe every thing, muſt render it dear, as well as of an inferior quality. The duty on exportation is ten-pence, and on importation three ſhillings and ten-pence, on every hundred weight.

The beſt glue is that which is made from the ſkin of the oldeſt beaſt, eſpecially if a bull's hide is uſed. Experience likewiſe ſhews that glue is conſiderably improved in quality by keeping after it is made; and the ſureſt way to try its goodneſs is to lay a piece to ſteep three or four days, and if it ſwell conſiderably without melting, and when taken out reſumes its former drineſs, it is excellent.

A glue that will hold againſt fire or water, it is ſaid, may be made thus: Mix a handful of quicklime with four ounces of lintſeed oil; boil them to a good thickneſs; then ſpread it on tin-plates in the ſhade, and it will become exceeding hard, but may be eaſily diſſolved over a fire, as glue, and will effect the buſineſs to admiration.

Neumann obſerves, that glue diſſolved in a ſolution of lapis calaminaris in ſpirit of nitre, and afterwards inſpiſſated, forms an extremely ſlippery tenacious maſs, which might be of uſe for entangling flies, caterpillars, and other inſects, if it was not too expenſive.

Method of Preparing and Uſing Glue. Set a quart of water on the fire, then put in about half a pound of good glue, and boil them gently together till the glue be entirely diſſolved and of a due conſiſtence. When glue is to be uſed, it muſt be made thoroughly hot; after which, with a bruſh dipped in it, beſmear the faces of the joints as quick as poſſible: then clapping them together, ſlide or rub them lengthwiſe one upon another, two or three times, to ſettle them cloſe; and ſo let them ſtand till they are dry and firm.—Mr Boyle gives a receipt for preparing a fine ſtrong glue from iſinglaſs in the following manner: Steep the iſinglaſs for 24 hours in common brandy. When the menſtruum has opened and mollified the iſinglaſs, they muſt be gently boiled together, and kept ſtirring till they appear well mixed, and till a drop thereof, ſuffered to cool, turns into a ſtrong jelly. Then ſtrain it, whilſt hot, through a clean linen-cloth, into a veſſel to be kept cloſe ſtopped. A gentle heat ſuffices to diſſolve this glue into a tranſparent and almoſt colourleſs fluid, but very ſtrong; ſo that pieces of wood glued together with it will ſeparate elſewhere rather than in the place where they are joined. See Isinglass.

GLUME, *Gluma*, among botaniſts. See Botany, p. 1293.

GLUTÆUS, in anatomy. See there, *Table of the muſcles.*

GLYCINE, knobbed-rooted liquorice-vetch; a genus of the decandria order, belonging to the diadelphia claſs of plants. There is but one ſpecies commonly cultivated in our gardens, viz. the fruteſcens, or Carolina kidney-bean tree. This hath ſhrubby climbing ſtalks, twining round any ſupport, 15 or 20 feet high, adorned with pinnated leaves of three pair of follicles terminated by an odd one, and from the axillas cluſters of large bluiſh-purple flowers, ſucceeded by long pods like thoſe of the climbing kidney-bean. It flowers in June and July, but the ſeeds do not ripen in this country. It is eaſily propagated, either by ſeeds imported from America, where it is native, or by layers.—The ſtalks and roots of the abrus, another ſpecies of glycine which grows in Egypt and the Indies, are very ſweet to the taſte. Herman affirms that the juice obtained from them by decoction is little inferior to liquorice; whence its name of *wild-liquorice* in thoſe parts of America where it is native.

GLYCYRRHIZZA, Liquorice; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are two ſpecies. 1. The glabra, or common liquorice, hath a long, thick, creeping root, ſtriking ſeveral feet deep into the ground; upright, firm, herbaceous ſtalks annually, three or four feet high, garniſhed with winged leaves of four or five pair of oval lobes, terminated by an odd one; and from the axillas erect ſpikes of pale blue flowers in July, ſucceeded by ſhort ſmooth pods.

The root of this is the uſeful part, which is replete with a ſweet, balſamic, pectoral juice, much uſed in all compoſitions for coughs and diſorders of the ſtomach. 2. The echinata, or prickly-poded liquorice, is nearly like the common ſort, only the ſeed-pods are prickly.

Both theſe ſpecies are very hardy perennials; but the firſt is the ſort commonly cultivated for uſe, its roots being fuller of juice and ſweeter than the other.

The roots are perennial; but the ſtalks riſe in ſpring, and decay in autumn.

They delight in a deep light ſoil, in which the roots will run down three or four feet deep, and attain a large ſize, if permitted to ſtand three or four years. From the main root ſmaller ones run off horizontally; and from theſe horizontal roots, that run near the ſurface, cuttings for ſets or young plants are taken for propagation, which are generally procured at the time when the liquorice is taken up for uſe, being fit in three years after planting.

Where large quantities are required for ſale, they may be cultivated in fields, as practiſed in many parts of England; vaſt quantities are alſo raiſed in the kitchen-gardens about London, where, by the richneſs and depth of the ground, the roots attain their utmoſt perfection in length and bulk.

The length and thickneſs of the roots is a principal conſideration to the planter, as they are always ſold by weight.

Propagation and culture. Their propagation is, as above obſerved, effected by cuttings of the ſmall roots iſſuing from the ſides of the main ones, near the ſurface of the earth, dividing them into lengths of ſix or eight inches, each having one or more good buds or eyes; and the proper ſeaſon for procuring the ſets for planting is, any time, in open weather, from October till March, though from the middle of February till the middle of March is rather the moſt ſucceſsful ſeaſon for planting.

An open ſituation is the moſt ſuitable for a plantation of theſe plants.

Particular regard ſhould alſo be had to the ſoil: it ought to be of a light, looſe temperature, and three or four feet deep if poſſible; for the roots of the liquorice will arrive at that depth and more, and the longer the roots the more valuable they are for ſale by weight.

Having fixed on the ground, let it be trenched three ſpades deep, if the depth of proper ſoil will admit; then having your ſets ready, proceed to plant them by line and dibble, planting the ſets a foot diſtance in each row; putting them perpendicular into the ground, with the tops about an inch under the ſurface; and let the rows be a foot and a half aſunder; though the London gardeners ſeldom allow more than twelve inches between row and row. Theſe gardeners alſo ſow a crop of onions on the ſame ground the firſt year; which, as the onions root but ſlender, and ſpread but little at top, may be done without any detriment to the liquorice, nor that to the onions, as it does not riſe above ten or twelve inches high the firſt ſummer; obſerving to keep the ground clean from weeds during that ſeaſon by hoeing. If there is a crop of onions, uſe the ſmall hoe, cutting out the onions to four or five inches diſtance, clearing away ſuch as grow immediately cloſe to the liquorice plants; and when the onions are gathered, give the ground a thorough hoeing with a large hoe, to looſen the ſurface and deſtroy all weeds effectually; and in autmn cut down the decayed ſtalks of the liquorice, and nothing more is neceſſary to be done till ſpring; when, in February or March, give a ſlight digging between the rows; during ſpring and ſummer, keep down all weeds by broad-hoeing; and in autumn, when the ſtalks are in a decaying ſtate, cut them down to the ſurface of the earth.

In three years after planting, the roots of the liquorice will be fit to take up: and the proper ſeaſon for this is, any time from the beginning of November till February; for it ſhould neither be taken up before the ſtalks are fully decayed, nor deferred till late in ſpring, otherwiſe the roots will be apt to ſhrivel and diminiſh in weight.

In taking them up, the ſmall ſide-roots are trimmed off, and the beſt divided into lengths for freſh ſets, and the main roots are tied in bundles ready for ſale. It is of advantage to ſell them as ſoon as poſſible after they are taken up, before they looſe much of their weight. They are ſold to the druggiſts, from about twenty to thirty or forty ſhillings per hundred weight, and an acre of ground has produced three thouſand and upwards, which has been ſold for more than ſixty pounds; but the price is commonly in proportion to the goodneſs of the roots.

The common liquorice is cultivated in moſt countries of Europe for the ſake of its root. That which is cultivated in Britain is preferable to ſuch as comes from abroad; this laſt being generally mouldy, which this root is very apt to become, unleſs kept in a dry place. The powder of liquorice uſually ſold is often mingled with flour, and probably too often with ſubſtances not quite ſo wholeſome: the beſt ſort is of a browniſh yellow colour (the fine pale yellow being generally ſophiſticated), and of a very rich ſweet taſte, much more agreeable than that of the freſh root. Liquorice is almoſt the only ſweet that quenches thirſt; whence it was called by the Greeks *adipſon*. Galen takes notice, that it was employed in this intention in hydropic caſes, to prevent the neceſſity of drinking. Mr Fuller, in his *Medicina Gymnaſtica*, recommends this root as a very uſeful pectoral; and ſays it excellently ſoftens acrimonious humours, at the ſame time that it proves gently detergent: and this account is warranted by experience. An extract is directed to be made from it in the ſhops; but this preparation is chiefly brought from abroad, though the foreign extract is not equal to ſuch as is made with proper care among ourſelves.

GLYPH, in ſculpture and architecture, denotes any canal or cavity uſed as an ornament.

GNAPHALIUM, CUDWEED, GOLDY-LOCKS, ETERNAL FLOWER, &c. a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. There are 41 ſpecies; the moſt remarkable of which are, 1. The margaritaceum, or pearly white eternal flower, hath creeping, very ſpreading roots, crowned with broad, ſpear-ſhaped, white, hoary leaves; herbaceous, thick, woolly ſtalks, a foot and an half high, branching outward, garniſhed with long acute pointed white woolly leaves, and terminated by a corymboſe cluſter of yellowiſh flowers, which appear in June and July, and are very ornamental. 2. The plantaginifolium, hath large woolly radical leaves, decumbent running roots, and herbaceous ſimple ſtalks, riſing ſix or eight inches high, terminated by a corymbus of white flowers in June, July, &c. 3. The ſtæchas hath a ſhrubby ſtalk, dividing into ſlender branches three feet long, terminated by corymboſe cluſters of yellow flowers, appearing in May and June. 4. The orientale, or oriental goldilocks, hath three varieties, with yellow, gold-coloured, and white ſilvery flowers. They have ſhrubby ſtalks, riſing two or three feet high. 5. The odoratiſſimum, or ſweet-ſcented eternal flower, hath ſhrubby winged ſtalks, branching irregularly a yard high, with corymboſe cluſters of bright yellow flowers, changing to a dark yellow. 6. The arboreum, or tree gnaphalium, hath a woody ſtem, branching four or five feet high, narrow ſeſſile leaves, with revolute borders, ſmooth on their upper ſide, and roundiſh bunches of pale yellow flowers.

The firſt three ſorts are hardy, and will thrive in any ſoil or ſituation. The two firſt increaſe exceedingly by their roots; and the third is eaſily propagated by ſlips. The fourth, fifth, and ſixth ſorts are ſomewhat tender; and therefore ſhould be kept in pots, to be ſheltered in a green-houſe or garden-frame in winter. Others may be planted in the full ground, in a dry and warm ſituation, eſpecially the oriental kind and varieties, and likewiſe the ſweet-ſcented kind; for theſe two ſpecies will ſtruggle tolerably through an ordinary winter, and make a pretty appearance during the ſummer-months. All theſe are propagated by ſlips, or cuttings of their ſhoots.—The flowers of all theſe ſpecies are remarkable for retaining their beauty for years, if carefully gathered in a dry day, ſoon after they are blown.

GNAT, in zoology. See **Musca**.

There is no ſpecies of inſects ſo particularly troubleſome to mankind as the gnats. Others give more pain with their ſtings, but it is only by accident that we are ſtruck by them; but the gnats thirſt for our blood, and follow us about in whole companies for it. There are many marſhy places in our country where the legs and arms are all the ſummer ſwelled to an enormous ſize by the bitings of theſe inſects, and in many other countries they are yet more troubleſome than with us.

All the naturaliſts have of late years employed the microſcope to examine the parts of this little animal; and Swammerdam, Hooke, Bonanni, Lewenhoek, &c. have given very good accounts and very valuable drawings of the creature.

The trunk of the gnat, or the inſtrument with which it ſtrikes the fleſh and ſucks the blood from animal bodies, is of a very curious conſtruction. The piercer, or, more properly, the piercers of this inſtrument are all entirely hid in the ſheath of the inſtrument which makes what we call the *trunk*, and is the only part naturally offered to our view. This trunk appears to be cylindric in the greateſt part of its length; and is covered with ſcales not unlike thoſe on the nerves of the creature's wings, and reſembling ſmall leaves. Near its end it has a little ſwelling, where there is an oblong button broader at its inſertion than at its point: the end of this button is furniſhed with an aperture out of which the creature occaſionally thruſts a fine point. Many naturaliſts have obſerved this point. Swammerdam conſidered it as a ſingle pointed body formed to pierce the ſkin; but Lewenhoek diſcovered that it was made up of a vaſt number of pointed bodies. There is no occaſion, however, for all the accuracy of Swammerdam, nor all the power of the magnifying-glaſſes of Lewenhoek, to diſcover that this is a complex body; a common ſmall magnifying glaſs and a little attention will at any time diſcover it.

If a gnat is held by the corcelet between the fingers, and a little ſqueezed, the trunk will frequently be ſeen to open lengthwiſe on each ſide; ſometimes only a little way, at others almoſt its whole length; and a fine gloſſy reddiſh filament ſhews itſelf at the opening of this caſe. This filament is bent and turned inwards, and one very ſoon diſtinguiſhes that it is indeed a congeries of a great number of filaments: theſe one may eaſily ſeparate in ſome meaſure, from one another by any pointed inſtrument; and very often the filament of itſelf ſeparates into ſeveral in the bending. It is plain, therefore, that the inſtrument deſtined to pierce the ſkin and ſuck the blood is of a complex ſtructure; that what we might naturally take for this inſtrument, is only its caſe or ſheath; and that this caſe or ſheath, inſtead of a plain cylindric body is really a compoſition of two ſemi-cylindric ones, which the animal has the power of ſeparating from one another on proper occaſions.

The beſt way to get a regular ſight of the trunk of this creature and of the manner of uſing it, is to ſuffer a gnat to ſettle upon the hand, and not to diſturb him in the operation; but, with a magnifying glaſs in the other hand, to obſerve all his motions. In this caſe, we may firſt obſerve a ſmall and ſlender point thruſt out of the caſe, and the animal try ſeveral different parts of the ſkin with this ſharp inſtrument. When this is done, it chooſes that part which is moſt eaſily pierced, and where there lies a veſſel underneath capable of furniſhing as much blood as it will have occaſion to ſuck. As ſoon as it has made its choice, the wound is immediately given: and ſince the point of the compound piercer cannot be protruded ſo far out of the caſe as it is neceſſary it ſhould be to ſtrike to a proper depth, the uſe of the ſlit in this caſe is ſeen; for while the button at the end of this remains firmly applied to the orifice of the wound, where the piercer is introduced, and ſupports that feeble and delicate inſtrument from bending, the caſe opens at the ſlit, and its two ſides bend to give room to the piercer to penetrate; and, at length, when the piercer is ſunk to its utmoſt depth, the two extremities of each piece touch, and the two ſides are brought cloſe together.

The ſeveral ſpecies of gnats have great variety in their trunks. One of them deſerves to be remarked, as having no need of the button at the end of the caſe, common to all the reſt, to ſupport it while it enters the fleſh. This has a caſe on which it reſts itſelf as on a ſeventh leg; from which it darts a piercer, which without any ſupport is of ſufficient ſtrength to penetrate the fleſh, and do its office for the animal. This ſpecies of gnat has two very long beards placed above its trunk, and terminated by an end covered

Gnat.

vered with white ſcales. What remains of theſe beards is covered with brown ſcales, the body of the gnat alſo is brown, and the corcelet reddiſh.

Though it is eaſy to find that the trunk of a gnat is compoſed of ſeveral pieces, yet it is by no means ſo eaſy to ſay what the preciſe number of them is. The beſt microſcopes often ſhew the whole a ſingle body, its ſeveral parts being ſo extremely well joined; and when they have been found to be more than one, it is yet extremely difficult to ſay how many they are. Lewenhoeck believed them to be four in number; and Swammerdam, who at firſt believed the whole to be a ſingle filament, afterwards thought he diſcovered ſix pieces going to its compoſition.

After ſeparating the piercer of the gnat wholly from its ſheath, if it be cut tranſverſely near its baſe, or inſertion in the head, and the ſection laid upon the plate of a microſcope, and there touched with an extremely fine pointed inſtrument, it may be divided into four, and ſometimes into five ſeparate pieces. Two of theſe may be often ſeen to come out of a third as out of a canal or tube. The ſeeming neceſſity of a tube in this inſtrument for ſucking the blood, has made many ready to perſuade themſelves that they have actually ſeen one: but if we follow the analogy of nature in her other works, we ſhall find there is no abſolute neceſſity for ſuch an organization in this part; ſince, in the gad-fly, the ſeveral pieces of which the piercer is compoſed are of themſelves able to form a tube for the conveying of the blood.

Out of the immenſe number of gnats that one ſees in ſummer, few can have any chance, even once in their lives, of ſucking the blood of the larger animals; the reſt, however, are by no means doomed to perpetual famine: the herbs of the field afford them a ſufficient nouriſhment; for the gnats, like many other inſects, are partly carnivorous, and partly otherwiſe, feeding equally on fleſh and vegetables.

The wings of gnats are of a very curious ſtructure, and worthy of an attentive obſervation. It is well known, that, on touching the wings of butterflies, a coloured powder is left upon the fingers; which, tho' to the naked eye it appears a mere ſhapeleſs duſt, yet when examined by the microſcope is found to conſiſt of beautiful and very regularly figured bodies reſembling feathers and ſcales. The generality of flies have nothing of this kind; but a cloſe examination of the wings of the gnat will ſhew that they are not wholly deſtitute of them: they are beſtowed much more ſparingly indeed upon the gnat than on the butterfly; but they are arranged with great regularity.

The wings of the gnat, like thoſe of moſt other inſects, are of a cartilaginous ſubſtance, friable, and tranſparent like a flake of talc; and the circumference and many parts of the inner ſurface of the wing are ſtrengthened by ſlender but firm ribs, which are divaricated into ſeveral ramifications. Theſe appear to us to be mere ſtrait fibres; but they are probably hollow, and perform the office of veſſels for the carrying of fluids or air neceſſary to the ſupport of the wing, as well as to ſtrengthen it. In the wings of butterflies there are ſimilar ribs, but they are there all hid by the ſcales: but it is not ſo in the gnat; for in its wings, as in thoſe of the other flies, theſe ribs ſeem naked. The aſſiſtance of the microſcope, however, ſhews that they are not abſolutely ſo in the wings of gnats, but theſe nerves or ribs, with their ſeveral ramifications, look like as many ſtalks of a plant covered with ſmall oblong leaves. The ſeveral ſcales that are attached to theſe ribs make acute angles with them, and are directed towards the end of the wing. The number of theſe ſcales is very ſmall in compariſon with thoſe of the butterfly-claſs; but they make a ſlighter and more elegant ornament. There are ſome ſpecies which have the intermediate ſpaces of the wing alſo adorned with theſe ſcales; but they are in theſe only thinly ſcattered. The intermediate ſpaces of the wings, when they have no ſcales are finely wrought and pointed: the inner edges of the wings are always bordered with a row of ſcales in form of a fringe; which, in ſome ſpecies, is compoſed of ſcales all of the ſame ſize, and in others is made up of many various lengths: and the exterior edge of the wing, which is ſurrounded by a rib much thicker and ſtronger than the interior, is not fringed with a ſeries of ſcales, but is beſet at proper diſtances with a kind of prickles.

The ordinary ſhape of the wings of the gnats is that of an oblong battledoor, one end of which is broader and the other more pointed. The narrower end is that from which goes the ſtalk by which it adheres to the rib. The other end is ſometimes more, ſometimes leſs round, and is ſometimes a little hollowed in the middle. Some of theſe are much longer in proportion to their breadth than others; and ſome of them have their extremity formed into an open creſcent. All have a number of fine lines running longitudinally through the whole ſcale.

Gnat-*Worm*, in natural hiſtory, a ſmall aquatic inſect produced from the egg of a gnat, and which is after its ſeveral changes again transformed into a gnat.

Theſe worms do not frequent rivers, but ditches, ponds, and other ſtagnant waters; where they are found in vaſt abundance from the middle of May till towards the beginning of winter. This is the reaſon why watery and marſhy places are found moſt to abound with gnats, and why the wet ſummers are found to produce the greateſt numbers of them; becauſe in dry ſeaſons the ponds and ditches where they are to paſs their worm-ſtate are dried up, and the worms killed. Theſe are creatures, however, that one need not go far to ſeek; ſince one need only expoſe a veſſel of water in a garden, or any open place, in the ſummer time, and ſooner or later it will not fail to produce plenty of them.

Before they arrive at their full growth, though they are then but ſmall, they are eaſily found; becauſe they are under a neceſſity of coming often to the top of the water by having occaſion for frequent reſpiration; and to do this, they are obliged to keep the end of a ſmall pipe they are furniſhed with from the laſt ring of their body above water. The end of this pipe is hollow and indented, and forms a ſort of funnel upon the ſurface of the water. It is of the length of about three rings of the body, and is ſomewhat thicker at its inſertion than at its extremity.

The worm is of the third claſs of thoſe which are transformed into two-winged flies: that is, it has no legs, and has a head of a conſtant and invariable figure; and has no teeth or moveable jaws formed to play againſt one another. Their body is long, and their head is ſomewhat detached from the firſt ring, to which it is faſtened by a ſort of neck. This firſt ring is the longeſt and largeſt of all, and ſeems a ſort of corcelet to the worm. The creature has eight rings beſides this. Theſe grow ſmaller as they approach the hinder extremity.

While the worm is young, the body is whitiſh or greeniſh; but when it is at its full growth, and draws near the time of its change, it becomes greyiſh. The great tranſparency of the body of this worm gives a fine view of what paſſes within it; and it is at any time eaſy to ſee the motion of the inteſtines by which the food is puſhed on towards the anus. The two principal tracheæ are alſo ſeen very diſtinctly in this creature. They are two white tubes placed in a direction parallel to one another, and run from the firſt ring to the tube of reſpiration.

This worm ſeveral times changes its ſkin in the courſe of its life. After three changes of this kind, which uſually happen in the ſpace of three weeks, it undergoes a fourth, in which the old ſkin is as eaſily thrown off as before; but the animal now appears in a new form, viz. that of a nymph. It is now ſhorter and rounder than before; and the body is ſo bent, that the tail is now applied to the under part of the head: this, however, is only its form in a voluntary ſtate of reſt, for it can yet move; and, when it pleaſes, extends its tail, and ſwims as ſwiftly as before.

All the parts of the future gnat may be ſeen in this nymph; the ſkin of it is extremely thin and tranſparent, yet ſufficiently tough and firm for the uſe for which it is intended. It is uncertain how long the animal lives in this nymph ſtate; but after the time is accompliſhed, its change into the gnat is very quick, and attended with great danger to the animal, ſince multitudes of them are drowned in the act of getting out.

GNESNA, a large and ſtrong town of Great Poland, of which it is capital, and in the palatinate of Caliſh, with an archbiſhop's ſee, whoſe prelate is primate of Poland, and viceroy during the vacancy of the throne. It was the firſt town built in the kingdom, and formerly more conſiderable than at preſent. E. Lon. 18.20. N. Lat. 52.28.

GNOMES, *gnomi*, certain imaginary beings, who, according to the cabbaliſts, inhabit the inner parts of the earth. They are ſuppoſed ſmall in ſtature, and the guardians of quarries, mines, &c. See Fairy.

GNOMON, in dialling, the ſtyle, pin, or cock of a dial; which, by its ſhadow, ſhews the hour of the day. The gnomon of every dial repreſents the axis of the world. See Dial and Dialling. The word is Greek, γνωμων, which literally implies ſomething that makes a thing known; by reaſon that the ſtyle or pin indicates or makes the hour known.

Gnomon, in geometry. If, in a parallelogram ABCD (Pl. CXL. fig. 8. nº 1.) the diameter AC be drawn; alſo two lines EF, HI, parallel to the ſides of the parallelogram, and cutting the diameter in one and the ſame point G, ſo that the parallelogram is, by theſe parallels, divided into four parallelograms; then are the two parallelograms DG, BG, through which the diameter does not paſs, called *complements*; thoſe through which the diameters paſs, EH, FI, are called *the parallelograms about the diameter*; and a gnomon conſiſts of the two complements, and either of the parallelograms about the diameter, viz. GD+HE+EI, or GD+FI+GB.

Gnomon, in aſtronomy, a ſtyle erected perpendicular to the horizon, in order to find the altitude of the ſun. Thus, in the right-angled triangle ABC are given, AB the length of the ſtyle, BC the length of its ſhadow, and the right angle ABC. Hence, making CB the radius, we have this analogy for finding the angle ACB, the ſun's altitude, viz. BC:AB:: radius: tangent of the angle C.

By means of a gnomon, the ſun's meridian altitude, and conſequently the latitude of the place, may be found more exactly than with the ſmaller quadrants. See Quadrant.

By the ſame inſtrument the height of any object GH may be found: for as DF, the diſtance of the obſerver's eye from the gnomon, is to DE, the height of the ſtyle; ſo is FH, the diſtance of the obſerver's eye from the object, to GH, its height.

Gnomon *of a Globe*; the index of the hour-circle.

GNOMONICS, the art of dialling. See Dialling.

GNOSTICS, (from the Greek γινωσκω, *I know*,) in church-hiſtory, Chriſtian heretics ſo called; it being a name which almoſt all the ancient heretics affected to take, that they might expreſs the new knowledge and extraordinary light to which they made pretenſions.

St Epiphanius aſcribes the origin of the Gnoſtics to Simon Magus; and ſays, that they acknowledged two principles, a good and a bad. They ſuppoſed there were eight different heavens, each of which was governed by its particular prince. The prince of the ſeventh heaven, whom they named *Sabaoth*, created the heavens and the earth, the ſix heavens below him, and a great number of angels. In the eighth heaven they placed their *Barbelo* or *Barbero*, whom they ſometimes called *the father*, and ſometimes *the mother, of the univerſe*. All the Gnoſtics diſtinguiſhed the creator of the univerſe from God who made himſelf known to men by his ſon, whom they acknowledged to be the Chriſt. They denied that the Word was made fleſh; and aſſerted that Jeſus Chriſt was not born of the Virgin Mary; that he had a body only in appearance, and that he did not ſuffer in reality. They neither believed a reſurrection nor a judgment to come; but imagined that thoſe who had been inſtructed in their maxims would return into the world, and paſs into the bodies of hogs, and other like animals. They had ſeveral apocryphal books, as the *Goſpel of St Philip*; the *Revelation of Adam*; the *Goſpel of Perfection*, &c.

GOA, a large and ſtrong town of Aſia, in the peninſula on this ſide the Ganges, and on the Malabar coaſt. It was taken by the Portugueſe in 1508, and is the chief town of all the ſettlements the Europeans have in India. It ſtands in an iſland about 12 miles in length, and ſix in breadth; and the city is built on the north ſide of it, having the conveniency of a fine ſalt-water river, capable of receiving ſhips of the greateſt burthen, where they lie within a mile of the town. The banks of the river are beautified with a great number of handſome ſtructures; ſuch as churches, caſtles, and gentlemen's houſes. The air within the town is unwholeſome, for which reaſon it is not ſo well inhabited now as it was formerly. The viceroy's palace is a noble building; and ſtands at a ſmall diſtance from the river, over one of the gates of the city, which leads to a ſpacious ſtreet, terminated by a beautiful church. This city contains a great number of handſome churches, convents, and cloiſters, with a ſtately large hoſpital; all well endowed, and kept in good repair. The market-place takes up an acre of ground; and in the ſhops about it may be had the produce of Europe, China, Bengal, and other countries of leſs note. Every church has a ſet of bells, ſome of which are continually ringing. Their religion is the Roman Catholic, and they have a ſevere inquiſition. There are a great many Indian converts; but they generally retain ſome of their old cuſtoms, particularly they cannot be brought to eat beef. However, there are many Gentoos in the city, who are tolerated, becauſe they are more induſtrious than the Chriſtians, and better artiſts. The clergy are very numerous, and illiterate; but the churches are finely embelliſhed, and have great numbers of images. The houſes are large, and make a fine ſhew; but within they are but poorly furniſhed. The inhabitants are contented with greens, fruits, and roots; which, with a little bread, rice, and fiſh, is their principal diet, though they have hogs and fowls in plenty. However, they are very much addicted to women; and are generally weak, lean, and feeble. Captain Hamilton ſtood on a hill near the city, and counted above 80 churches, convents, and monaſteries; and he was told, that there were about 30,000 prieſts and monks. The body of St Francis Xavier is buried in St Paul's church; and, as they pretend, performs a great many miracles. It is remarkable, that none of the churches, except one, have glaſs windows; for they make uſe of clear oyſter-ſhells inſtead of glaſs, and all their fine houſes have the ſame. Goa itſelf has few manufactures or productions; their beſt trade being in arrack. The river's mouth is defended by ſeveral forts and batteries, well planted with large cannon on both ſides; and there are ſeveral other forts in different places. It is 250 miles N. by W. of Cochin. E. Lon. 74. 0. N. Lat. 15. 31.

GOAL. See GAOL.

GOAT, in zoology. See CAPRA.

GOAT's-*Beard*, in botany. See TRAGOPOGON.

GOAT-*Sucker*, in ornithology. See CAPRIMULGUS.

GOBELIN (Giles), a famous French dyer, in the reign of Francis I. diſcovered a method of dying a beautiful ſcarlet, and his name has been given ever ſince to the fineſt French ſcarlets. His houſe, in the ſuburb of St Marcel at Paris, and the river he made uſe of, are ſtill called *the Gobelins*. An academy for drawing, and a manufactory of fine tapeſtries, were erected in this quarter in 1666; for which reaſon the tapeſtries are called *the Gobelins*.

GOBIUS, in ichthyology, a genus of fiſhes belonging to the order of thoracici. They have two holes between the eyes, four rays in the membrane of the gills, and the belly-fins are united in an oval form. There are eight ſpecies, principally diſtinguiſhed by the number of rays in their fins.

GOD, one of the many names of the Supreme Being. See CHRISTIANITY; METAPHYSICS, n° 6. 222–230.; and MORAL PHILOSOPHY, n° 161, &c.

GODDARD (Jonathan), an eminent phyſician and chemiſt, and one of the firſt promoters of the Royal Society, was born about the year 1617. He was elected a fellow of the college of phyſicians in 1646, and appointed reader of the anatomical lecture in that college in 1647. As he took part againſt Charles I. accepted the wardenſhip of Merton-college, Oxford, from Oliver Cromwell when chancellor, and ſat ſole repreſentative of that univerſity in Cromwell's parliament, he was removed from his wardenſhip in a manner diſgraceful to him by Charles II. He was however then profeſſor of phyſic at Greſham college, to which he retired, and continued to attend thoſe meetings that gave birth to the Royal Society; upon the firſt eſtabliſhment of which, he was nominated one of the council. Being fully perſuaded that the preparation of medicines was no leſs the phyſician's duty than the preſcribing them, he conſtantly prepared his own; and in 1668 publiſhed a treatiſe recommending his example to general practice. He died of an apoplectic fit in 1674; and his memory was preſerved by the drops that bore his name, otherwiſe called *Guttæ Anglicanæ*, the ſecret of which he ſold to Charles II. for 5000 l. and which Dr Liſter aſſures us was only the volatile ſpirit of raw ſilk rectified with oil of cinnamon or ſome other eſſential oil. But he claims more particular regard, if what biſhop Seth Ward ſays be true, that he was the firſt Engliſhman who made that noble aſtronomical inſtrument, the teleſcope.

GODDESS, a heathen deity of the female ſex.

The ancients had almoſt as many goddeſſes as gods: ſuch were, Juno the goddeſs of air, Diana the goddeſs of woods, &c. and under this character were repreſented the virtues, graces, and principal advantages of life; truth, juſtice, piety, liberty, fortune, victory, &c.

It was the peculiar privilege of the goddeſſes to be repreſented naked on medals; for it was ſuppoſed that the imagination muſt be awed and reſtrained by the conſideration of the divine character.

GODEAU (Anthony), biſhop of Graſſe and Vence in France, was born at Dreux in 1605. He was a very voluminous writer, both in proſe and verſe; but his principal works are, 1. *An eccleſiaſtical hiſtory*, 3 vols. folio, containing the firſt eight centuries only, as he never finiſhed more. 2. *Tranſlation of the Pſalms into French verſe*; which was ſo well approved, that even thoſe of the reformed religion preferred it to that of Marat. He died in 1671.

GODFATHERS *and* GODMOTHERS, perſons who, at the baptiſm of infants, anſwer for their future conduct, and ſolemnly promiſe that they will renounce the devil and all his works, and follow a life of piety and virtue; and by this means lay themſelves under an indiſpenſable obligation to inſtruct them, and watch over their conduct.

This cuſtom is of great antiquity in the Chriſtian church; and was probably inſtituted to prevent children being brought up in idolatry, in caſe their parents died before they arrived at years of diſcretion.

The number of godfathers and godmothers is reduced to two, in the church of Rome; and three, in the church of England; but formerly they had as many as they pleaſed.

GODFREY (of Bouillon), prince of Lorrain, a moſt celebrated cruſader, and victorious general. He was choſen general of the expedition which the Chriſtians undertook for the recovery of the Holy Land and ſold his dukedom to prepare for the war. He took Jeruſalem from the Turks in 1099; but his piety, as hiſtorians relate, would not permit him to wear a diadem of gold in the city where his Saviour had been crowned with thorns. The ſultan of Egypt afterwards ſent a terrible army againſt him; which he defeated, with the ſlaughter of above 100,000 of the enemy. He died in 1160.

GODOLPHIN (John), an eminent Engliſh civilian, was born in the iſland of Scilly in 1617, and educated at Oxford. In 1642-3, he was created doctor of civil law; in 1653, he was appointed one of the judges of the admiralty; and at the Reſtoration, he was made one of his majeſty's advocates. He was eſteemed as great a maſter of divinity, as of his own faculty; and publiſhed, 1. *The holy limbeck.* 2. *The holy arbour.* 3. *A view of the admiral's juriſdiction.* 4. *The orphan's legacy.* 5. *Repertorium canonicum, &c.* He died in 1678.

GODWIN (Francis), ſucceſſively biſhop of Landaff and Hereford, was born in 1567. He was eminent for his learning and abilities; being a good mathematician, an excellent philoſopher, a pure Latiniſt, and an accurate hiſtorian. He underſtood the true theory of the moon's motion, a century before it was generally known. He firſt ſtarted thoſe hints afterwards purſued by biſhop Wilkins, in his *Secret and ſwiſt meſſenger;* and publiſhed *A catalogue of the lives of Engliſh biſhops.* He has neverthele ſs been accuſed as a great ſimoniac, for omitting no opportunity of diſpoſing of preferments in order to provide for his children. He died in 1648.

GODWIN (Thomas), a learned Engliſh writer born in 1517, was maſter of the free-ſchool at Abingdon in Berkſhire; where he educated a great many youths, who became eminent both in church and ſtate. His works ſhew him to have been a man of great learning; ſuch as, *Hiſtoriæ Romanæ anthologia, Synopſis antiquitatum Hebraicarum, Moſes & Aaron, Florilegium Phraſicon, &c.* He died in 1642.

GODWIT, in ornithology. See Scolopax.

GOES, or Ter Goes, a ſtrong and conſiderable town of the United Provinces, in Zealand, and capital of the iſland of South-Beveland. It communicates with the ſea by a canal; and is 10 miles eaſt of Middleburg, and 30 north of Ghent. E. Lon. 3. 50. N. Lat. 51. 33.

GOGMAGOG-hills, are hills ſo called, three miles from Cambridge, remarkable for the intrenchments and other works caſt up here: whence ſome ſuppoſe it was a Roman camp; and others, that it was the work of the Danes.

GOITO, a town of Italy, in the duchy of Mantua, taken by the Germans in 1701, and by the prince of Heſſe in 1706. It is ſeated on the river Mincio, between the lake of Mantua and that of Garda, 10 miles north-weſt of Mantua. E. Lon. 11. 0. N. Lat. 45. 16.

GOLCONDA, a kingdom of Aſia, in the peninſula on this ſide the Ganges. It is bounded on the north by that of Orixa, on the weſt by that of Balagate, on the ſouth by Biſnagar, and on the eaſt by the gulph of Bengal. It abounds in corn, rice, and cattle; but that which renders it moſt remarkable are the diamond-mines, they being the moſt conſiderable in the world: they are uſually purchaſed of the black merchants, who buy parcels of ground to ſearch for theſe precious ſtones in. They ſometimes fail in meeting with any, and in others they find immenſe riches. They have alſo mines of ſalt, fine iron for ſword-blades, and curious callicoes and chintzes. It is ſubject to the Great Mogul; and has a town of the ſame name, ſeated at the foot of a mountain, being one of the largeſt in the Eaſt-Indies. It is about ſix miles in circumference; and was formerly the reſidence of the kings, till it was conquered by the Great Mogul. It is now much frequented by the European merchants. E. Lon. 79. 10. N. Lat. 16. 30.

GOLD, the moſt precious of all the metals.

For an account of the places where gold is found in greateſt quantities; the methods of extracting it from the ore, and afterwards purifying it; with an account of its different phenomena in combination with other metals; ſee the article Metallurgy. An account of its chemical properties, ſolution in different menſtrua, &c. is given under Chemistry, nº 194, 236, 348.—For its effects on glaſs, see the article Glass and Vitrification.

Gold is the moſt fixed of all the metals; and it hath been generally believed, till very lately, that it was abſolutely fixed in every degree of fire which could be excited by human art. Some chemiſts indeed pretended to have evaporated, calcined, and even vitrified gold, by expoſing it to the focus of a good burning-glaſs; but as their experiments did not appear to have all the authenticity that was neceſſary, the opinion fell into diſcredit; and this the more readily that gold is found to reſiſt the moſt violent furnace fires without any loſs. Mr Macquer, however, in the laſt additions to his Chemical Dictionary, hath found, that this metal, when expoſed to the heat of a good burning-glaſs, loſes in weight conſiderably, and that even in a very ſhort time. He held ſome very fine gold in the focus of a large burning-glaſs, at ſeveral times, at half an hour each time, ſometimes in a hollow piece of charcoal, or in veſſels made of earthen ware and procelain; and whenever the air was very clear, and the ſun bright, a very ſenſible ſmoke aroſe to the height of three or four inches. To know the nature of this ſmoke, a cold ſilver-plate was expoſed to it; by which means, ſome of the vapour appeared on the ſilver like a tarniſh a little leſs white, but not ſenſibly yellow. But when this part of the ſilver was rubbed with a burniſher, it appeared ſo evidently to be gilded, that none could doubt the evaporation of the metal. At this experiment ſeveral members of the Academy of Sciences were preſent.

The experiments with regard to the calcination and vitrification of gold were alſo tried by Mr Macquer, in preſence of Meſſrs Montigny, Cadet, Lavoiſier, and Briſſon. The glaſs employed was that of Tſchirnhauſen, the ſame which had formerly been employed by Mr Homberg. Gold of 24 carats fine was expoſed to the focus of this glaſs ſeveral times, by half an hour at a time, on veſſels made of a very refractory porcelain earth.—When the gold was melted, which happened in the ſpace of a few ſeconds, it took a ſpherical form as nearly as its gravity would permit, and had nearly the conſiſtence of quickſilver. The melted maſs ſoon acquired a rotatory motion round its axis, ſometimes in one direction, and ſometimes in another, according to the direction of the focus upon the metal; (which, by-the-bye, is a very curious appearance, and ſeems difficult to be accounted for). A ſmoke aroſe as in the former experiments. On the ſurface of the melted gold, ſpots evidently vitrified were formed, which ſeparated from the metal. Theſe afterwards united into a dark violet-coloured maſs, of a greater curvature than the melted gold, in which they were found to be ſet, as jewels in a ring; and produced nearly the ſame appearance that the tranſparent cornea has on the globe of the eye; that is, as the ſegment of a ſmall ſphere joined to the ſurface of a large one. On a maſs of liquid gold, of about half an inch diameter, he obtained, after four hours calcination, a button of this violet glaſs, whoſe diameter exceeded two lines; and this glaſs was obſerved gradually to increaſe as the gold diminiſhed. Yet, though this very much reſembles the vitrification of the gold, Mr Macquer doth not take upon him to aſſert that it certainly is ſo; ſeeing it may ariſe from the veſſels on which the gold is ſupported, and which were coloured purple to a conſiderable diſtance, and beſides were ſprinkled with many ſmall particles of gold undecompoſed, eaſily diſtinguiſhable by a microſcope; and in the violet glaſs alſo, many ſimilar particles were obſervable. To determine the matter accurately, the experiment ought to be continued till all the particles of the metal be certainly either vitrified or evaporated.—Though this experiment, however, is hitherto equivocal when the heat of burning-glaſſes is made uſe of, it certainly ſucceeds with a ſtrong flaſh of electric fire. See ELECTRICITY, n° 113.

Method of Recovering GOLD *from Gilt Works.* The ſolubility of gold and the indiſſolubility of ſilver in aqua regia affords a principle on which gold may be ſeparated from the ſurface of ſilver; and, on this foundation, different proceſſes have been contrived, of which the two following appear to be the beſt.—Some powdered ſal ammoniac, moiſtened with aqua fortis into the conſiſtence of a paſte, is ſpread upon the gilt ſilver, and the piece heated, till the matter ſmokes, and becomes nearly dry: being then thrown into water, it is rubbed with a ſcratch bruſh, compoſed of fine braſs-wire bound together, by which the gold eaſily comes off. The other way is, by putting the gilt ſilver into common aqua regia, kept ſo hot as nearly to boil, and turning the metal frequently till it becomes all over black: it is then to be waſhed with a little water, and rubbed with the ſcratch bruſh, to get off what gold the aqua regia may have left. This laſt method appears preferable to the other; as the ſame aqua regia may be made to ſerve repeatedly till it becomes ſaturated with the gold, after which the gold may be recovered pure by precipitation with ſolution of vitriol, as directed under the article METALLURGY.

For ſeparating gold from gilt copper, ſome direct a ſolution of borax to be applied on the gilt parts, but nowhere elſe, with a pencil, and a little powdered ſulphur to be ſprinkled on the places thus moiſtened; the principal uſe of the ſolution of borax ſeems to be to make the ſulphur adhere; the piece being then made red hot, and quenched in water, the gold is ſaid to be ſo far looſened, as to be wiped off with a bruſh. Others mix the ſulphur with nitre and tartar, and form the mixture with vinegar into a paſte, which is ſpread upon the gilt parts.

Schlutter recommends mechanical means, as being generally the leaſt expenſive, for ſeparating gold from the ſurface both of ſilver and copper. If the gilt veſſel is round, the gold is conveniently got off by turning it in a lathe, and applying a proper tool, a ſkin being placed underneath for receiving the ſhavings: he ſays it is eaſy to collect into two ounces of ſhavings, all the gold of a gilt veſſel weighing thrice as many pounds. Where the figure of the piece does not admit of this method, it is to be properly fixed, and ſcrapers applied, of different kinds, according to its ſize and figure; ſome large, and furniſhed with two handles, one at each end; others ſmall and narrow, for penetrating into depreſſed parts. If the gold cannot be got off by either of theſe ways, the file muſt be had recourſe to, which takes off more of the metal underneath than the turning tool or the ſcraper, particularly than the former. The gold ſcrapings, or filings, may be purified from the ſilver or copper they contain, by the methods deſcribed under the article METALLURGY.

The editors of the *Encyclopédie* give a method of recovering the gold from wood that has been gilt on a water-ſize: this account is extracted from a memoir on the ſame ſubject, paeſented to the Academy of Sciences by M. de Montamy. The gilt wood is ſteeped for a quarter of an hour, in a quantity of water, ſufficient to cover it, made very hot: the ſize being thus ſoftened, the wood is taken out, and ſcrubbed, piece by piece, in a little warm water, with ſhort ſtiff briſtle bruſhes of different ſizes, ſome ſmall for penetrating into the carvings, and others large for the greater diſpatch in flat pieces. The whole mixture of water, ſize, gold, &c. is to be boiled to dryneſs, the dry matter made red hot in a crucible to burn off the ſize, and the remainder ground with mercury, either in a mortar, or, where the quantity is large, in a mill.

GOLD-*Coaſt.* See GUINEA.

GOLD-*Wire*, a cylindrical ingot of ſilver, ſuperficially gilt or covered with gold at the fire, and afterwards drawn ſucceſſively through a great number of little round holes, of a wire-drawing iron, each leſs than the other, till it be ſometimes no bigger than a hair of the head. See WIRE-*Drawing*.

It may be obſerved, that, before the wire be reduced to this exceſſive fineneſs, it is drawn through above an hundred and forty different holes; and that each time they draw it, it is rubbed afreſh over with new wax, both to facilitate its paſſage, and to prevent the ſilver's appearing through it.

GOLD-*Wire flatted*, is the former wire flatted between two rollers of poliſhed ſteel, to fit it to be ſpun on a ſtick, or to be uſed flat, as it is, without ſpinning, in certain ſtuffs, laces, embroideries, &c. See STUFF, &c.

GOLD-*Thread*, or *Spun-gold*, is flatted gold, wrapped or laid over a thread of ſilk, by twiſting it with wheel and iron-bobbins.

To diſpoſe the wire to be ſpun on ſilk, they paſs it between two rollers of a little mill: theſe rollers are of nicely poliſhed ſteel, and about three inches in diameter. They are ſet very cloſe to each other, and turned by means of a handle faſtened to one of them, which gives motion to the other. The gold wire in paſſing between the two, is rendered quite flat, but without loſing any thing of its gilding; and is rendered ſo exceedingly thin and flexible, that it is eaſily ſpun on ſilk-thread, by means of a hand-wheel, and ſo wound on a ſpool or bobbin. See WIRE-*Drawing*.

GOLD-*Leaf*, or *Beaten Gold*, is gold beaten with a hammer into exceeding thin leaves, ſo that it is computed, that an ounce may be beaten into ſixteen hundred leaves, each three inches ſquare, in which ſtate it takes up more than 159,052 times its former ſurface. See *Gold*-LEAF.

It muſt be obſerved, however, that gold is beaten more or leſs, according to the kind or quality of the work it is intended for; that for the gold-wire drawers to gild their ingots withal, is left much thicker than that for gilding the frames of pictures, &c. See GILDING.

GOLD-*Brocade*. See BROCADE.

Fulminating-GOLD. See CHEMISTRY, n° 356.—Since that article was printed, however, we are informed by Mr Macquer, that fulminating gold may be made without any nitrous acid. Of conſequence, the conjecture there given concerning the cauſe of its exploſion cannot be true in as far as the nitrous ammoniacal ſalt is concerned; though poſſibly the fixed air contained in the calx of gold may conſiderably contribute towards it.—Mr Bergman, whom Mr Macquer quotes, found that he could prepare fulminating gold at any time, by applying volatile alkali to it when in a greatly divided ſtate. He doth not indeed tell us whether the alcali uſed, was in a cauſtic or mild ſtate, (*i. e.* whether it was deprived of its fixed air or not): but though the experiment ſhould even be found to ſucceed with cauſtic alkali, ſtill the exploſion might depend on fixed air; becauſe cauſtic volatile alkalies are found either to imbibe, or generate this kind of air, even though excluded from the atmoſphere in the moſt careful manner; and hence the complaint among druggiſts, that alkaline ſpirits, made with quicklime, do not keep equally well with others. See *Alkaline* SPIRITS.

Shell-GOLD, that uſed by the illuminers, and wherewith we write gold-letters. It is made of the parings of leaf-gold, and even of the leaves themſelves, reduced into an impalpable powder, by grinding on a marble with honey. After leaving it to infuſe ſome time in aqua fortis, they put it in ſhells, where it ſticks. To uſe it, they dilute it with gum-water, or ſoap-water.

GOLD-*Finch*, in ornithology. See FRINGILLA.

Theſe are ſeed-birds of very curious colours, and which, were they not ſo common in this country, would probably be very much eſteemed.

They are uſually taken about Michaelmas, and ſoon become tame; but they differ very much in their ſong.—They frequently breed in the upper part of plum-trees, making their neſts of the moſs that grows upon apple-trees, and of wool; quilting the inſide with all ſorts of hairs they find upon the ground. They breed three times a-year; and the young are to be taken with the neſt at about ten days old, and fed as follows:—Pound ſome hemp-ſeed very fine in a mortar; then ſift it through a ſieve, and add to it as much wheat-bread as hemp-ſeed; and likewiſe a little flower of canary-ſeeds: then with a ſmall ſtick or quill, take up as much as the bigneſs of a white-pea, and give them ſeveral times a-day. This ought to be made freſh every day: for if it is ſuffered to ſour, it will ſpoil their ſtomachs, cauſing them to caſt up their meat; which if they do, it is very probable that they will die.—Theſe young birds muſt be carefully kept warm till they can feed themſelves, for they are very tender. In feeding, be ſure to make your bird clean his bill and mouth. If any of the meat falls upon his feathers, take it off, or elſe he will not thrive. Such as eat hemp-ſeed, to purge them, ſhould have the ſeeds of melons, ſuccory, and mercury; or elſe let them have lettuce and plantane for that purpoſe. When there is no need of purging, give them two or three times a week a little ſugar or loam in their meat, or at the bottom of the cage; for all ſeeds have an oilineſs, ſo that if they have not ſomething to abſorb it, in length of time it fouls their ſtomachs, and brings on them a flux, which is very dangerous.

GOLD-*Fiſh*. See CYPRINUS.

GOLDEN, ſomething that has a relation to gold, or conſiſts of gold.

GOLDEN *Calf*, was a figure of a calf, which the Iſraelites caſt in that metal, and ſet up in the wilderneſs, to worſhip, during Moſes's abſence into the mount; and which that legiſlator, at his return, burnt, grinded to powder, and mixed with the water the people were to drink of; as related in Exod. xxxii. The commentators have been divided on this article: the pulverizing of *gold*, and rendering it potable, is a very difficult operation in chemiſtry. Many, therefore, ſuppoſe it done by a miracle: and the reſt, who allow of nothing ſupernatural in it, advance nothing but conjectures as to the manner of the proceſs. Moſes could not have done it by ſimple calcination, nor amalgamation, nor antimony, nor calcination; nor is there one of thoſe operations that quadrates with the text.

M. Stahl has endeavoured to remove this difficulty. The method Moſes made uſe of, according to this author, was by diſſolving the metal with hepar ſulphuris; only, inſtead of the vegetable alkali, he made uſe of the Egyptian natron, which is common enough throughout the eaſt. See CHEMISTRY, n° 359.

GOLDEN *Feece*, in the ancient mythology, was the ſkin, or fleece of the ram, upon which Phryxus and Hella are ſuppoſed to have ſwam over the ſea to Colchis; and which being ſacrificed to Jupiter, was hung upon a tree in the grove of Mars, guarded by two brazen-hoof'd bulls, and a monſtrous dragon that never ſlept; but was taken and carried off by Jaſon and the Argonauts.

Many authors have endeavoured to ſhew that this fable is an allegorical repreſentation of ſome real hiſtory, particularly of the philoſopher's ſtone. Others have explained it, by the profit of the wool-trade to Colchis, or the gold which they commonly gathered there with fleeces in the rivers.

Order of the GOLDEN FLEECE, is a military order inſtituted by Philip the Good, duke of Burgundy, in 1429. It took its denomination from a repreſentation of the *golden* fleece, borne by the knights on their collars, which conſiſted of flints, and ſteels. The king of Spain is now grand maſter of the order, in quality of duke of Burgundy: the number of knights is fixed to thirty-one.

It is uſually ſaid to have been inſtituted on occaſion of an immnſe profit which that prince made by wool; though others will have a chemical myſtery couched under it, as under that famous one of the ancients, which the adepts contend to be no other than the ſecret of the elixir, wrote on the fleece of a ſheep.

Oliver de la Marche writes that he had ſuggeſted to Philip I. archduke of Auſtria, that the order was inſtituted by his grandfather Philip the Good, duke of Burgundy, with a view to that of Jaſon; and that John Germain, biſhop of Chalons, chancellor of the order, upon this occaſion made him change his opinion, and aſſured the young prince that the order had been inſtituted with a view to the fleece of Gideon. William biſhop of Tournay, chancellor likewiſe of the order, pretends that the duke of Burgundy had in view both the golden fleece of Jaſon, and Jacob's fleece, *i. e.* the ſpeckled ſheep belonging to this patriarch, according to agreement made with his father-in-law Laban. Which ſentiment gave birth to a great work of this prelate, in two parts: in the firſt, under the ſymbol of the fleece of Jaſon, is repreſented the virtue of magnanimity, which a knight ought to poſſeſs; and under the ſymbol of the fleece of Jacob, he repreſents the virtue of juſtice.

Paradin is of the ſame mind, and tells us that the duke deſigned to inſinuate that the fabulous conqueſt which Jaſon is ſaid to have made of the *golden fleece* in Colchis, was nothing elſe but the conqueſt of virtue, which gains a victory over thoſe horrible monſters vice and our evil inclinations.

GOLDEN *Number*, in chronology, a number ſhewing what year of the moon's cycle any given year is. See ASTRONOMY, n° 304——307.

GOLDEN-*Roſe*. The pope annually conſecrates a golden-roſe on the fourth Sunday in Lent, which is ſent to princeſſes, or to ſome church, as a mark of his peculiar affection.

GOLDEN *Rule*, in arithmetic, a rule or praxis, of great uſe and extent in the art of numbers; whereby we find a fourth proportional to three quantities given.

The *golden rule* is alſo called the *Rule of Three*, and *Rule of Proportion*. See its nature and uſe under the article ARITHMETIC, n° 13.

GOLDINGEN, a town of Poland in the duchy of Courland, with a handſome caſtle, ſeated on the river Weia, in E. Long. 22. 31. N. Lat. 56. 48.

GOLDSMITH, or, as ſome chooſe to expreſs it, *ſilverſmith*, an artiſt who makes veſſels, utenſils, and ornaments, in gold and ſilver.

Goldſmith.

The goldſmith's work is either performed in the mould, or beat out with the hammer or other engine. All works that have raiſed figures, are caſt in a mould, and afterwards poliſhed and finiſhed: plates, or diſhes, of ſilver or gold, are beat out from thin flat plates; and tankards, and other veſſels of that kind, are formed of plates ſoldered together, and their mouldings are beat, not caſt. The buſineſs of the goldſmiths formerly required much more labour than it does at preſent; for they were obliged to hammer the metal from the ingot to the thinneſs they wanted: but there are now invented flatting-mills, which reduce metals to the thinneſs that is required, at a very ſmall expence. The goldſmith is to make his own moulds; and for that reaſon ought to be a good deſigner, and have a taſte in ſculpture: he alſo ought to know enough of metallurgy, to be able to aſſay mixed metals, and to mix the alloy.

The goldſmiths in London employ ſeveral hands under them for the various articles of their trade: ſuch are the jeweller, the ſnuff-box and toy maker, the ſilver-turner, the gilder, the burniſher, the chaſer, the refiner, and the gold-beater. See the articles JEWELLER, &c.

Goldſmiths are ſuperior tradeſmen: their wares muſt be aſſayed by the wardens of the company of this name in London, and marked; and gold is to be of a certain touch. No goldſmith may take above one ſhilling the ounce of gold, beſides what he has for the faſhioning, more than the buyer may be allowed for it at the king's exchange; and here any falſe metal ſhall be ſeized and forfeited to the king. The cities of York, Exeter, Briſtol, &c. are places appointed for the aſſaying wrought-plate of goldſmiths; alſo a duty is granted on ſilver-plate of ſix-pence an ounce, &c. Plate made by goldſmiths ſhall be of a particular fineneſs, on pain of forfeiting 10 l.; and if any parcel of plate ſent to the aſſayers is diſcovered to be of a coarſer alloy than the reſpective ſtandards, it may be broken and defaced; and the fees for aſſaying are particularly limited.

GOLDSMITH (Oliver), a celebrated Engliſh writer, was born at Roſcommon in Ireland, in the year 1731. His father, who poſſeſſed a ſmall eſtate in that county, had nine ſons, of which Oliver was the third. He was originally intended for the church; and with that view, after being well inſtructed in the claſſics, was, with his brother the Rev. Henry Goldſmith, placed in Trinity college, Dublin, about the latter end of the year 1749. In this ſeminary of learning he continued a few years, when he took a bachelor's degree: but, his brother not being able to obtain any preferment after he left the college, Oliver, by the advice of Dean Goldſmith of Cork, turned his thoughts to the ſtudy of phyſic; and, after attending ſome courſes of anatomy in Dublin, proceeded to Edinburgh in the year 1751, where he ſtudied the ſeveral branches of medicine under the different profeſſors in that univerſity. His beneficent diſpoſition ſoon involved him in unexpected difficulties; and he was obliged precipitately to leave Scotland, in conſequence of engaging himſelf to pay a conſiderable ſum of money for a fellow-ſtudent.

A few days after, about the beginning of the year 1754, he arrived at Sunderland, near Newcaſtle, where he was arreſted at the ſuit of a taylor in Edinburgh, to whom he had given ſecurity for his friend. By the good offices of Laughlin Maclane, Eſq; and Dr. Sleigh, who were then in the college, he was ſoon delivered out of the hands of the bailiff; and took his paſſage on board a Dutch ſhip to Rotterdam, where, after a ſhort ſtay, he proceeded to Bruſſels:

he then viſited great part of Flanders; and after paſſing ſome time at Straſbourg and Louvain, where he obtained a degree of bachelor in phyſic, he accompanied an Engliſh gentleman to Berne and Geneva.

It is undoubtedly fact, that this ingenious, unfortunate man, travelled on foot moſt part of his tour. He had left England with very little money; and, being of a philoſophical turn, and at that time poſſeſſing a body capable of ſuſtaining every fatigue, and a heart not eaſily terrified at danger, he became an enthuſiaſt to the deſign he had formed of ſeeing the manners of different countries. He had ſome knowledge of the French language, and of muſic, and he played tolerably well on the German flute; which, from an amuſement, became at ſome times the means of ſubſiſtence. His learning produced him a hoſpitable reception at moſt of the religious houſes: and his muſic made him welcome to the peaſants of Flanders and other parts of Germany. "Whenever I approached," he uſed to ſay, "a peaſant's houſe towards night-fall, I played one of my moſt merry tunes; and that procured me not only a lodging, but ſubſiſtence for the next day: but in truth, (his conſtant expreſſion), I muſt own, whenever I attempted to entertain perſons of a higher rank, they always thought my performance odious, and never made me any return for my endeavours to pleaſe them."

On Mr Goldſmith's arrival at Geneva, he was recommended as a proper perſon for a travelling tutor to a young man, who had been unexpectedly left a conſiderable ſum of money by his uncle Mr S——, formerly an eminent pawnbroker near Holborn. This youth, who had been articled to an attorney, on receipt of his fortune, determined to ſee the world; and, on his engaging with his preceptor, made a proviſo, that he ſhould be permitted to govern himſelf; and Goldſmith ſoon found his pupil underſtood the art of directing in money-concerns extremely well, as avarice was his prevailing paſſion. His queſtions were uſually how money might be ſaved, and which was the leaſt expenſive courſe of travel; whether any thing could be bought that would turn to account when diſpoſed of again in London? Such curioſities on the way as could be ſeen for nothing he was ready enough to look at; but, if the ſight of them was to be paid for, he uſually aſſerted, that he had been told they were not worth ſeeing. He never paid a bill that he would not obſerve how amazingly expenſive travelling was; and all this, though he was not yet twenty-one. During Goldſmith's continuance in Switzerland, he aſſiduouſly cultivated his poetical talent, of which he had given ſome ſtrikings proofs while at the college of Edinburgh. It was here he ſent the firſt ſketch of his delightful poem, called the Traveller, to his brother the clergyman in Ireland, who, giving up fame and fortune, had retired, with an amiable wife, to happineſs and obſcurity, on an income of only 40 l. a year.

From Geneva Mr Goldſmith and his pupil viſited the ſouth of France; where the young man, upon ſome diſagreement with his preceptor, paid him the ſmall part of his ſalary which was due, and embarked at Marſeilles for England. Our wanderer was left once more upon the world at large, and paſſed through a variety of difficulties in traverſing the greateſt part of France. At length his curioſity being ſatiated, he bent his courſe towards England, and arrived at Dover, the beginning of the winter, in the year 1758. When he came to London, his ſtock of caſh did not amount to two livres. An entire ſtranger in this metropolis, his mind was filled with the moſt gloomy reflections on his embarraſſed ſituation. With ſome difficulty he diſcovered that part of the town in which his old acquaintance Dr Sleigh reſided. This gentleman received him with the warmeſt affection, and liberally invited him to ſhare his purſe till ſome eſtabliſhment could be procured for him. Goldſmith, unwilling to be a burden to his friend, a ſhort time after eagerly embraced an offer which was made him to aſſiſt the late Rev. Dr Milner, in inſtructing the young gentlemen at the academy at Peckham; and acquitted himſelf greatly to the doctor's ſatisfaction for a ſhort time: but, having obtained ſome reputation by the criticiſms he had written in the Monthly Review, Mr Griffith, the proprietor, engaged him in the compilation of it; and, reſolving to purſue the profeſſion of writing, he returned to London, as the mart where abilities of every kind were ſure of meeting diſtinction and reward. As his finances were by no means in a good ſtate, he determined to adopt a plan of the ſtricteſt œconomy, and took lodgings in an obſcure court in the Old Bailey, where he wrote ſeveral ingenious little pieces. The late Mr Newberry, who at that time gave great encouragement to men of literary abilities, became a kind of patron to our young author; and introduced him as one of the writers in the Public Ledger, in which his Citizen of the World originally appeared, under the title of "Chineſe Letters."

Fortune now ſeemed to take ſome notice of a man ſhe had long neglected. The ſimplicity of his character, the integrity of his heart, and the merit of his productions, made his company very acceptable to a number of reſpectable families; and he emerged from his ſhabby apartments in the Old Bailey, to the politer air of the Temple, where he took handſome chambers, and lived in a genteel ſtyle. The publication of his Traveller, and his Vicar of Wakefield, was followed by the performance of his comedy of the Good-natured Man at Covent-Garden theatre, and placed him in the firſt rank of the poets of the preſent age.

Among many other perſons of diſtinction who were deſirous to know him, was the duke of Northumberland; and the circumſtance that attended his introduction to that nobleman is worthy of being related, in order to ſhew a ſtriking trait of his character. "I was invited," ſaid the Doctor (as he was then univerſally called) "by my friend Mr Piercy, to wait upon the duke, in conſequence of the ſatisfaction he had received from the peruſal of one of my productions. I dreſſed myſelf in the beſt manner I could; and, after ſtudying ſome compliments I thought neceſſary on ſuch an occaſion, proceeded to Northumberland-houſe, and acquainted the ſervants that I had particular buſineſs with his Grace. They ſhewed me into an antichamber; where, after waiting ſome time, a gentleman, very elegantly dreſſed, made his appearance. Taking him for the duke, I delivered all the fine things I had compoſed, in order to compliment him on the honour he had done me: when, to my great aſtoniſhment, he told me, I had miſtaken him for his maſter, who would ſee me immediately. At that inſtant, the duke came into the apartment; and I was ſo confuſed on the occaſion, that I wanted words, barely ſufficient to expreſs the ſenſe I entertained of the duke's politeneſs, and went away exceedingly chagrined at the blunder I had committed."

Another feature in his character we cannot help laying before the reader. Previous to the publication of his Deſerted Village, the bookſeller had given him a note for one hundred guineas for the copy, which the doctor mentioned, a few hours after, to one of his friends; who obſerved, it was a very great ſum for ſo ſhort a performance. "In truth," replied Goldſmith, "I think ſo too; I have not been eaſy ſince I received it; therefore I will go back and return him his note:" which he abſolutely did, and left it entirely to the bookſeller to pay him according to the profits produced by the ſale of the piece, which turned out very conſiderable.

During the laſt rehearſal of his comedy, intitled, She ſtoops to Conquer, which Mr Coleman had no opinion would ſucceed, on the Doctor's objecting to the repetition of one of Tony Lumpkin's ſpeeches, being apprehenſive it might injure the play, the manager with great keenneſs replied, "Pſha, my dear Doctor, do not be fearful of ſquibs, when we have been ſitting almoſt theſe two hours upon a barrel of gunpowder." The piece, however, contrary to Mr Coleman's expectation, was received with uncommon applauſe by the audience; and Goldſmith's pride was ſo hurt by the ſeverity of the above obſervation, that it entirely put an end to his friendſhip for the gentleman that made it.

Notwithſtanding the great ſucceſs of his pieces, by ſome of which it is aſſerted, upon good authority, he cleared 1800 l. in one year, his circumſtances were by no means in a proſperous ſituation; which was partly owing to the liberality of his diſpoſition, and partly to an unfortunate habit he had contracted of gaming, the arts of which he knew very little of, and conſequently became the prey of thoſe who were unprincipled enough to take advantage of his ſimplicity.

Juſt before his death he had formed a deſign for executing an Univerſal Dictionary of Arts and Sciences, the proſpectus of which he actually publiſhed. In this work ſeveral of his literary friends (particularly, Sir Joſhua Reynolds, Dr Johnſon, Mr Beauclerc, and Mr Garrick) had undertaken to furniſh him with articles upon different ſubjects. He had entertained the moſt ſanguine expectations from the ſucceſs of it. The undertaking, however, did not meet with that encouragement from the bookſellers which he had imagined it would undoubtedly receive; and he uſed to lament this circumſtance almoſt to the laſt hour of his exiſtence.

He had been for ſome years afflicted, at different times, with a violent ſtrangury, which contributed not a little to embitter the latter part of his life; and which, united with the vexations which he ſuffered upon other occaſions, brought on a kind of habitual deſpondency. In this unhappy condition he was attacked by a nervous fever, which, being improperly treated, terminated in his diſſolution on the 4th of April 1774. His remains were privately depoſited in the Temple burial-ground.

As to his character, it is ſtrongly illuſtrated by Mr Pope's line,

In wit a man, ſimplicity a child.

The learned leiſure he loved to enjoy was too often interrupted by diſtreſſes which aroſe from the liberality of his temper, and which ſometimes threw him into loud fits of paſſion: but this impetuoſity was corrected upon a moment's reflection; and his ſervants have been known, upon theſe occaſions, purpoſely to throw themſelves in his way, that they might profit by it immediately after; for he who had the good fortune to be reproved, was certain of being rewarded for it. The univerſal eſteem in which his poems were held, and the repeated pleaſure they give in the peruſal, is a ſtriking teſt of their merit. He was a ſtudious and correct obſerver of nature; happy in the ſelection of his images, in the choice of his ſubjects, and in the harmony of his verſification; and, though his embarraſſed ſituation prevented him from putting the laſt hand to many of his productions. His Hermit, his Traveller, and his Deſerted Village, bid fair to claim a place among the moſt finiſhed pieces in the Engliſh language.

Beſides the works already mentioned, he wrote, 1. Hiſtory of the earth and animated nature, 6 vols 8vo. 2. Hiſtory of England, 4 vols 8vo. 3. Hiſtory of Rome, 2 vols. 4. Abridgements of the two laſt, for the uſe of ſchools. 5. A view of experimental philoſophy, 3 vols 8vo.; a poſthumous work, not eſteemed. 6. Miſcellanies, &c.

GOLIUS (James), a celebrated profeſſor of Arabic and the mathematics at Leyden, was deſcended from a very honourable family, and born at the Hague in the year 1596. He was put to the univerſity of Leyden, where he ſtudied under Erpinius; and having made himſelf maſter of all the learned languages, applied himſelf to the mathematics, phyſic, and divinity. He afterwards travelled into Africa and Aſia; and became greatly eſteemed by the king of Morocco, and the ſultan of the Turks. He at length returned to Leyden, loaden with manuſcripts; and in 1624, ſucceeded Erpenius in the Arabic chair. As he had been an eye-witneſs of the wretched ſtate of Chriſtianity in the Mahometan countries, he was filled with the compaſſion of a fellow-chriſtian; and none ever ſolicited for a place of honour and profit with greater eagerneſs, than he for procuring a new edition of the New Teſtament, in the original language, with a tranſlation into the vulgar Greek, by an Archimandrite; and as there are ſome of theſe Chriſtians, who uſe the Arabic tongue in divine ſervice, he alſo took care to have diſperſed among them an Arabic tranſlation of the Confeſſion of the Proteſtants, together with the Catechiſm and Liturgy. In 1626, he was alſo choſen profeſſor of mathematics; and diſcharged the functions of both profeſſorſhips, with the greateſt applauſe, during 40 years. He was likewiſe appointed interpreter in ordinary to the ſtates for the Arabic, Turkiſh, Perſian, and other eaſtern languages, for which he had an annual penſion, and a preſent of a gold chain, with a very beautiful medal, which he wore as a badge of his office. He publiſhed, 1. The life of Tamerlane, written in Arabic. 2. The hiſtory of the Saracens, written by Elmacin. 3. Alferganus's elements of aſtronomy, with a new verſion and learned commentaries. 4. An excellent Arabic lexicon. 5. A Perſian Dictionary. He died in 1667.

GOLTZIUS (Henry), a famous engraver and painter, born in 1558, at Mulbreck, in the duchy of Juliers. His ill health induced him to travel; and to prevent his being known, he took the name of his man-ſervant, maintained by him for his ſkill in painting: by which ſtratagem he enjoyed the pleaſure of hearing what was ſaid of his works, without being known. Travelling reſtored his health for a while; but he relapſed, and died at Harlem in 1617. Mr Evelyn has given a ſtrong teſtimony of his merit as an Engraver. As his works are very numerous, his execution muſt have been remarkably ready.

GOLTZIUS (Hubert), a learned German, born at Venlo in the duchy of Gueldres in 1526. His father was a painter, and himſelf was bred to the art under Lambert Lombard: but he did little at painting, or at leaſt his pictures are very ſcarce; for having a peculiar turn to antiquities, he devoted himſelf to the ſtudy of medals. He travelled through Germany, France, and Italy, to make collections, as well as to draw from thence all the lights he could towards clearing up ancient hiſtory: he was the author of ſeveral excellent works, in which he was ſo accurate and nice, that he had them printed at his own houſe, under his own correction, and even engraved the plates and medals with his own hand. His veneration for Roman antiquities was ſo great, that he gave all his children Roman names: and married, for his ſecond wife, the widow of the antiquarian Martinus Smetius; probably more for the ſake of Smetius's medals and inſcriptions, than for his own ſake; and was puniſhed accordingly by her plaguing him all his life, if ſhe did not ſhorten it. He died in 1583.

GOMBAULD (John Ogier de), one of the beſt French poets in the 17th century, and one of the firſt members of the French academy, was born at St. Juſt de Luſſac. He acquired the eſteem of Mary de Medicis, and of the wits of his time. He was a Proteſtant, and died in a very advanced age. He wrote many works in verſe and proſe. His epigrams, and ſome of his ſonnets, are particularly eſteemed.

GOMBROON, by the natives called *Bander Abaſſi*, a city of Perſia, ſituated in N. Lat. 27. 40. E. Long. 55. 30. The name of *Gombroon*, or *Comerong*, Captain Hamilton tells us, it had from the Portugueſe; becauſe it was remarkable for the number of prawns and ſhrimps caught on its coaſts, by them called *comerong*. This city owes its wealth and grandeur to the demolition of Ormus, and the downfal of the Portugueſe empire in the Eaſt-Indies. It is now juſtly accounted one of the greateſt marts in the Eaſt, was built by the great ſhah Abas, and from him, as ſome think, obtained the name of *Bander-Abaſſi*, which ſignifies the court of Abas. It ſtands on a bay about nine leagues to the northward of the eaſt end of the iſland of Kiſhmiſh, and three leagues from the famous Ormus. The Engliſh began to ſettle here about the year 1631, when, in conſideration of their ſervices againſt the Portugueſe, ſhah Abas granted them half the cuſtoms of that port. This was confirmed by a phirmaund, and duly regarded, till the Engliſh began to neglect the ſervices they had ſtipulated. Whether the company has any emolument from the cuſtoms, at preſent, is what we cannot pretend to aſcertain. The town is large, but its ſituation bad; wanting almoſt every thing that contributes to the happineſs, and even ſupport of life. Towards the land it is encompaſſed by a ſort of wall; and towards the ſea are ſeveral ſmall forts, with a platform, and a caſtle or citadel, mounted with cannon to ſecure it and the road from the attempts of an enemy by ſea. The houſes in moſt of the ſtreets are ſo out of repair, ſome half down, others in a heap of rubbiſh, that a ſtranger would imagine the town had been ſacked and ravaged by a barbarous people; not a veſtige of the wealth really contained in the place appearing in view. The bazars and ſhops round them, are kept, for the moſt part, by Banians, whoſe houſes are generally in good order. Moſt of the houſes are built with earth and lime, but ſome of the beſt with ſtone. Many of them have a ſort of ventilators at top, which contribute greatly to the health of the inhabitants in the hot ſeaſons of the year. The moſt ſickly months here are April, May, September, and October. With fiſh and mutton the inhabitants are well ſupplied. Rice is imported from India; and wheat is ſo plenty, that the poor ſubſiſt chiefly on bread and dates. The country hereabouts abounds in the moſt delicious fruits, as apricots, peaches, pomegranates, pears, mangoes, grapes, quavas, plumbs, ſweet quinces, and water-melons. The apricots, however, are ſmall, and extremely dangerous if eaten to exceſs.

Thoſe conveniences are more than overbalanced by the ſcarcity of freſh water, with which the inhabitants are ſupplied from Aſſeen, a place ſeven miles diſtant, there not being a ſpring or well in the town. Perſons of condition keep a camel conſtantly employed in bringing freſh and wholeſome water. Captain Hamilton gives it as his opinion, that one cauſe of the unwholeſomeneſs of this city is the reflection of the rays of light from a high mountain to the north of it. He ſays, that when the beams are reflected from this mountain, they almoſt fire the air, and, for two or three months in the year, render the ſituation intolerable. For this reaſon the people of condition retire into the country, to paſs the heats of June, July, and Auguſt. The very ſea, during this ſeaſon, is affected, inſomuch that the ſtench is no leſs diſagreeable than that of putrid carcaſes; and this is encreaſed by the quantities of ſhell-fiſh left on the ſhore, from which an exhalation ariſes that tarniſhes gold and ſilver, and is leſs tolerable than the bilge-water of a tight ſhip. At Aſſeen the Engliſh factory have a country-houſe and gardens, to which they retire occaſionally. Here they have whole groves of Seville orange-trees, which, though not natural to the country, thrive very well, and are always verdant, bearing ripe and green fruit, with bloſſoms, all at the ſame time. They have likewiſe tanks and ponds of fine freſh water, with every thing elſe that can moderate the heat of the climate, and render life agreeable and elegant. About ten miles from Aſſeen is a place called *Minoa*, where are cold and hot natural baths, reckoned infallible in the cure of all ſcrophulous diſorders, rheumatiſms, and other diſeaſes, by bathing.

Gombroon is extremely populous, on account of the commerce carried on by the Dutch and Engliſh factories, as well as the natives. The Engliſh factory is cloſe by the ſea, at ſome diſtance from the Dutch, which is a commodious and fine new building. A great part of the company's profit ariſes from freights. As the natives have not one good ſhip of their own, and are extremely ignorant of navigation, they freight their goods for Surat, and other Indian marts, in Engliſh and Dutch bottoms, at an exorbitant rate. The commodities of the Gombroon market are, fine wines of different kinds, raiſins, almonds, kiſh-miſhes, prunellas, dates, piſtachio-nuts, ginger, ſilks, carpets, leather, tutty, galbanum, ammoniac, aſa-fætida, tracaganth, with other gums, and a variety of ſhop medicines. Theſe are in a great meaſure the produce of Carmania, which they bring to Gombroon in caravans. The Engliſh company had once a ſmall factory in the province of Carmania, chiefly for the ſake of a fine wool produced there, and uſed by the hatters. The ſaid company had once a project of carrying a breed of the Perſian goats to St Helena; but whether it was executed, or what ſucceſs it met with, we cannot ſay. Although the company pay no cuſtoms, yet they uſually make a preſent to the ſhabander, to avoid the trouble he has it in his power to give them. All private traders with the company's paſſes, enjoy the ſame privileges, on paying two *per cent.* to the company, one to the agent, and one to the broker. All private trade, either by European or country ſhips, has long been engroſſed by the company's ſervants.

GOMERA, one of Canary iſlands lying between Ferro and Teneriffe. It has one good town of the ſame name, with an excellent harbour, where the Spaniſh fleet often take in refreſhments. They have corn ſufficient to ſupply the inhabitants, with one ſugar-work, and great plenty of wine and fruits. It is ſubject to the Spainards, who conquered it in 1445. W. Long. 17. 10. N. Lat. 28. 0.

GOMORRAH, (anc. geog.) one of the cities of the plain or of the vale of Siddim in Judæa, deſtroyed together with Sodom by fire from heaven, on account of the wickedneſs of the people. To determine its particular ſituation at preſent, is impoſſible.

GOMORRO iſlands. See COMORA.

GOMPHOSIS, in anatomy, that kind of articulation by which the teeth are fixed in the jaw-bone. See ANATOMY, n° 2. e.

GOMPHRÆNA, GLOBE AMARANTH; a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſeven ſpecies; but only one of them is commonly cultivated in our gardens, *viz.* the globoſa. It hath an upright ſtalk branching all round, two or three feet high, garniſhed with oval, lanceolate, and oppoſite leaves; and every branch and ſide-ſhoot terminated by a cloſe globular head of flowers, compoſed of numerous, very ſmall ſtarry florets cloſely covered with dry ſcaly calices placed *imbricatim*, perſiſtent, and beautifully coloured purple, white, red, or ſtripped and variegated. The flowers themſelves are ſo ſmall, and cloſely covered with the ſcaly calices, that they ſcarcely appear. The numerous cloſely placed ſcaly coverings being of a dry, firm, conſiſtence, coloured and glittering, collected into a compact round head, about the ſize of an ordinary cherry, make a fine appearance. They are annual plants, natives of India; and require artifical heat to raiſe and forward them to a proper growth, ſo that they may flower in perfection, and produce ripe ſeed. They flower from June to November; and if the flowers are gathered when at full growth, and placed out of the ſun, they will retain their beauty ſeveral months.

GONDI (John Francis Paul), cardinal de Retz, was the ſon of Philip Emanuel de Gondi, count de Joigny, lieutenant-general, &c. and was born in 1613. From a doctor of the Sorbonne, he firſt became coadjutor to his uncle John Francis de Gondi, whom he ſucceeded in 1654 as archbiſhop of Paris; and was finally made a cardinal. This extraordinary perſon has drawn his own character in his memoirs with impartiality. He was a man who, from the greateſt degree of debauchery, and ſtill languiſhing under its conſequences, made himſelf adored by the people as a preacher. At the age of 23, he was at the head of a conſpiracy againſt the life of cardinal Richelieu; he precipitated the parliament into cabals, and the people into ſedition: he was, ſays M. Voltaire, the firſt biſhop who carried on a civil war without the maſk of religion. However, his intrigues and ſchemes turned out ſo ill, that he was obliged to quit France; and he lived the life of a vagrant exile for five or ſix years, till the death of his great enemy cardinal Mazarin, when he returned on certain ſtipulated conditions. After aſſiſting in the conclave at Rome, which choſe Clement IX. he retired from the world, and ended his life like a philoſopher in 1679; which made Voltaire ſay, that in his youth he lived like Catiline, and like Atticus in his old age. He wrote his Memoirs in his retirement; the beſt edition of which is that of Amſterdam, 4 vols. 12mo. 1719.

GONORRHÆA, an effluvia of white, greeniſh, or differently-coloured matter from the urethra; moſt commonly owing to venereal infection. See (Index ſubjoined to) MEDICINE, and SURGERY.

GONZAGA (Lucretia), was one of the moſt illuſtrious ladies of the 16th century; and much celebrated for her wit, her learning, and her delicate ſtyle. Hortenſio Lando wrote a beautiful panegyric upon her, and dedicated to her his dialogue of moderating the paſſions. Her beautiful letters have been collected with the greateſt care. We learn from theſe, that her marriage with John Paul Manfrone was unhappy.— She was married to him when ſhe was not 14 years of age, and his conduct afterwards gave her infinite uneaſineſs. He engaged in a conſpiracy againſt the duke of Ferrara; was detected and impriſoned by him; but, though condemned by the judges, not put to death. She did all in her power to obtain his enlargement, but in vain; for he died in priſon, having ſhewn ſuch impatience under his misfortunes, as made it imagined he had loſt his ſenſes. She never would liſten afterwards to any propoſals of marriage, tho' ſeveral were made to her. All that came from her pen was ſo much eſteemed, that a collection was made even of the notes ſhe writ to her ſervants; ſeveral of which are to be met with in the edition of her letters.

GONDOLA, a ſort of barge curiouſly ornamented, and navigated on the canals of Venice; alſo a paſſage-boat, of ſix or eight oars, in other parts of the coaſts of Italy.

Good.

GOOD, in general, whatever is apt to increaſe pleaſure, ro diminiſh pain in us; or, which amounts to the ſame, whatever is able to procure or preſerve to us the poſſeſſion of agreeable ſenſations, and remove thoſe of an oppoſite nature.

Moral GOOD denotes the right conduct of the ſeveral ſenſes and paſſions, or their juſt proportion and accommodation to their reſpective objects and relations. See MORALS.

GOOD *Abearing*, (*bonus geſtus*,) ſignifies an exact carriage or behaviour of a ſubject towards the king and the people, whereunto ſome perſons upon their miſbehaviour are bound: and he that is bound to this, is ſaid to be more ſtrictly bound than to the peace; becauſe where the peace is not broken, the ſurety *de bono geſtu* may be forfeited by the number of a man's company, or by their weapons.

GOOD *Behaviour*, in law, an exact carriage and behaviour to the king and his people.

Jacob's Law Dict.

A juſtice of the peace may, at the requeſt of another, or where he himſelf ſees cauſe, demand ſurety for the good behaviour; and to that end the juſtice may iſſue out his warrant againſt any perſons whatſoever, under the degree of nobility; but when it is a nobleman, complaint is to be made in the court of chancery, or king's-bench, where ſuch nobleman may be bound to keep the peace. Infants and feme-coverts, who ought to find ſurety by their friends, may be bound over to their good behaviour; as alſo lunatics, that have ſometimes lucid intervals, and all others who break the peace, or being ſuſpected to do it, by affrays, aſſaults, battery, wounding, fighting, quarrelling, threatening, &c. A perſon may be likewiſe bound to his good behaviour for a ſcandalous way of living, keeping bawdy-houſes, gaming-houſes, &c. and ſo may common drunkards, whoremongers, common whores, cheats, libellers, &c. He who demands ſurety for the peace, on any violence offered, muſt take an oath before the juſtice, that he goes in fear of his life, or ſome bodily harm, &c. and that it is not out of malice, but from a regard to his own ſafety.

GOOD-*Friday*, a faſt of the Chriſtian church, in memory of the ſufferings and death of Jeſus Chriſt. It is obſerved on the Friday in *holy* or *paſſion week;* and it is called, by way of eminence, *good*, becauſe of the bleſſed effects of our Saviour's ſufferings, which were a propitiatory or expiating ſacrifice for the ſins of the world. The commemoration of our Saviour's ſufferings has been kept from the very firſt ages of Chriſtianity, and was always obſerved as a day of the ſtricteſt faſting and humiliation. Among the Saxons it was called *Long-Friday;* but for what reaſon, except on account of the long faſtings and offices then uſed, is uncertain. On Good-Friday the Pope ſits on a plain form; and, after ſervice is ended, when the cardinals wait on him back to his chamber, they are obliged to keep a deep ſilence, as a teſtimony of their ſorrow. In the night of Good-Friday, the Greeks perform the obſequies of our Saviour round a great crucifix, laid on a bed of ſtate, adorned with flowers: theſe the biſhops diſtribute among the aſſiſtants, when the office is ended. The Armenians, on this day, ſet open a holy ſepulchre, in imitation of that of mount Calvary.

GOOD-*Hope*, or *Cape of Good-Hope*, the moſt ſoutherly promontory of Africa, where the Dutch have built a good town and fort. It is ſituated in the country of the Hottentots. See HOTTENTOTS.

GOOD *Manners*. See MANNERS.

GOOSE, in ornithology. See ANAS.

GOOSE-*Ander*, in ornithology. See MERGUS.

GOOSE-*Berry*, in botany. See RIBES.

GOOSE-*Neck*, in a ſhip, a piece of iron fixed on the one end of the tiller, to which the laniard of the whip-ſtaff or the wheel-rope comes, for ſteering the ſhip.

GOOSE-*Wing*, in the ſea-language. When a ſhip ſails before, or with a quarter-wind on a freſh gale, to make the more haſte, they lanch out a boom, and ſail on the lee-ſide; and a ſail ſo fitted, is called a *gooſe-wing*.

GORCUM, a town of the United Provinces, in South Holland, which carries on a conſiderable trade in cheeſe and butter. It is ſituated on the rivers Lingne and Maeſe, in E. Lon. 4. 55. N. Lat. 51. 49.

GORDIANUS I. (Roman general,) was for his valour and virtues, choſen emperor by the army in the reign of Maximinus, A. D. 237; but his ſon, whom he had aſſociated with himſelf in the throne, being ſlain by Capellian, the governor of Mauritania for Maximinus, Gordianus killed himſelf the ſame year. See ROME.

GORDIANUS III. (grandſon of the former), a renowned warrior, and ſtyled *The guardian of the Roman commonwealth*. He was treacherouſly aſſaſſinated by Philippus, an Arabian, one of his generals; who, to the eternal diſgrace of the Romans of that æra, ſucceeded him in the empire, A. D. 244. See ROME.

GORDIAN-*Knot*, in antiquity, a knot made in the leathers or harneſs of the chariot of Gordius king of Phrygia, ſo very intricate, that there was no finding where it began or ended. The inhabitants had a tradition, that the oracle had declared, that he who untied this knot ſhould be maſter of Aſia. Alexander having undertaken it, was unable to accompliſh it: when fearing leſt his not untying it ſhould be deemed an ill augury, and prove a check in the way of his conqueſts, he cut it aſunder with his ſword, and thus either accompliſhed or eluded the oracle.

GORDIUS, the HAIR-WORM, a genus of inſects belonging to the claſs of *vermes inteſtina*. There are two ſpecies, 1. The aquaticus, with a filiform body, of equal thickneſs, and ſmooth. It hath a pale colour, with both the ends black; and inhabits boggy places, and clay at the bottom of water. 2. The argillaceus is of an uniform yellow colour, twiſted ſpirally, and lying flat. It is common in the inteſtines of herring, and other ſea-fiſh. Ariſtotle remarks, that the ballerus and tillo are infeſted in the dog-days with a worm that torments them ſo much, that they riſe to the top of the water, where the heat deſtroys them. To theſe worms alſo may probably be owing the agonies to which the bleaks are at certain times ſubject. See CYPRINUS.

GORDIUS, king of Phrygia, and father of Midas, was a poor huſbandman, with two yokes of oxen, wherewith he ploughed his land and drew his wain. An eagle ſitting a long while upon one of his oxen, he conſulted the ſoothſayers; a virgin bid him ſacrifice to Jupiter in the capacity of king. He married the virgin, who brought forth Midas. The Perſians inſtructed by the oracle to ſet the firſt perſon they met in a wain upon the throne, met Gordius, and made him king. Midas for this good fortune dedicated to Jupiter his father's cart. The knot of the yoke, they ſay, was ſo well twiſted, that he who could unlooſe it was promiſed the empire of Aſia; hence the proverb of *the Gordian knot* had its original. See **Gordian** *Knot*.

GORDON (Thomas) noted for his tranſlations and political writings, was born at Kirkudbright in North-Britain. He came young to London; where he ſupported himſelf by teaching languages, until he procured employment under the earl of Oxford in queen Anne's time, but in what capacity is not now known. He firſt diſtinguiſhed himſelf in the defence of Dr Hoadley in the Bangorian controverſy; which recommended him to Mr Trenchard, in conjunction with whom he wrote the well-known *Cato's Letters*, upon a variety of important public ſubjects. Theſe were followed by another periodical paper, under the title of *The Independent Whig*; which was continued ſome years after Mr Trenchard's death, by Gordon alone, againſt the hierarchy of the church; but with more acrimony than was ſhewn in *Cato's Letters*. At length Sir Robert Walpole retained him to defend his adminiſtration, to which end he wrote ſeveral pamphlets; and died firſt commiſſioner of the wine-licences in 1750. There are two other collections of tracts of his writing, *The cordial for low ſpirits*, and *The pillars of prieſtcraft and orthodoxy ſhaken*. In his tranſlations of *Salluſt* and other works, he places the verbs at the ends of ſentences, according to the Latin idiom, in a very ſtiff and affected manner.

GORE, in heraldry, one of the abatements, which, according to Gullim, denotes a coward. It is a figure conſiſting of two arch lines drawn one from the ſiniſter chief, and the other from the ſiniſter baſe, both meeting in an acute angle in the middle of the feſs point. See **Heraldry**.

GOREE, a ſmall iſland of Africa, near Cape de Verd, ſubject to the French. It is barren, but of great importance on account of its good trade. It was taken by the Engliſh in May 1759, and given up by the treaty of peace in 1763. E. Long. 12. 25. N. Lat. 14. 30.

Goree, the capital town of an iſland of the ſame name in Holland, eight miles South of Briel. E. Long. 3. 50. N. Lat. 51. 55.

GORGE, in architecture, the narroweſt part of the Tuſcan and Doric capitals, lying between the aſtragal, above the ſhaft of the pillar, and the annulets.

Gorge, in forrtification, the entrance of the platform of any work. See **Fortification**.

GORGED, in heraldry, the bearing of a crown, coronet, or the like, about the neck of a lion, a ſwan, &c. and in that caſe it is ſaid, the lion or cygnet is *gorged* with a ducal coronet, &c.

Gorged is alſo uſed when the gorge or neck of a peacock, ſwan, or the like bird, is of a different colour or metal from the reſt.

GORGET, a kind of breaſt-plate like a half moon, with the arms of the prince thereon; worn by the officers of foot. They are to be either gilt or ſilver, according to the colour of the buttons on the uniforms.

GORGONS, in antiquity. Authors are not agreed in the accounts they give of the Gorgons. Diodorus Siculus will have the Gorgons and Amazons to have been two warlike nations of women who inhabited that part of Libya which lay on the lake Tritonidis. We may well imagine, ſays that author, that they had frequent quarrels together; as being women and neighbours. He goes on to give an account of a moſt bloody engagement between them, wherein the Amazons had the better; three thouſand of the Gorgons being made priſoners, and the reſt obliged to take ſhelter in a wood, to which the Amazons ſet fire, with an intention to deſtroy the whole nation of Gorgons; but as the wind did not prove favourable, they were obliged to deſiſt, and retire to their own territories. Here the Amazons, intoxicated with their victory, gave themſelves up to feaſting and mirth; and as the guard was very negligently kept in the night-time, the 3000 priſoners laid hold of the opportunity, and, ſeizing the ſwords of theſe imprudent females, maſſacred a great number of them; but were themſelves at laſt overpowered and cut to pieces. Myrine, the queen of the Amazons, cauſed monuments to be erected to her female warriors who had been ſlain on this occaſion; which monuments were ſtill to be ſeen, ſays our author, in his days. Theſe female nations are ſaid to have been exterminated by Hercules.

Pauſanias's account of the Gorgons is much to the ſame purpoſe. They were, ſays he, the daughters of Phorbus; after whoſe death one of them, named *Meduſa*, reigned over the people dwelling near the lake Tritonidis. The queen was paſſionately fond of hunting and war, ſo that ſhe laid the neighbouring countries quite waſte. At laſt, Perſeus having made war on the Gorgons, and killed the queen herſelf, when he came to take a view of the field of battle, he found the queen's corpſe ſo extremely beautiful, that he ordered her head to be cut off, which he carried home with him to ſhew to his countrymen the Greeks, who could not behold it without aſtoniſhment.

Theſe accounts appear ſomewhat credible; but others repreſent the Gorgons in a very incredible manner, making them to be a kind of monſtrous women, all covered over with hair, who lived in woods and foreſts. Others again, make them a kind of animal reſembling a ſheep, with ſuch long hair on their faces, that it required their utmoſt efforts to clear it away before they could ſee any thing; but when once they had effected this, they killed all they ſaw with the poiſonous influence of their eyes.

GORGONA, a ſmall iſland of Italy, in the ſea of Tuſcany, and near that of Corſica, about eight miles in circumference; remarkable for the large quantity of anchovies taken near it. E. Long. 10. 9. N. Lat. 43. 22.

Gorgona, a ſmall iſland of the South Sea, 12 miles Weſt of the coaſt of Peru, in America. It is indifferent high land, very woody, and ſome of the trees are very tall and large, and proper for maſts. It is about 10 miles in circumference, and has ſeveral ſprings and rivulets of excellent water, but is ſubject to conſtant rains. W. Long. 79. 3. S. Lat. 3. 30.

GORITIA, or Goritz, a ſtrong town of Germany, in the circle of Auſtria, and duchy of Carniola, with a caſtle; ſeated on the river Lizonzo, 20 miles north-eaſt of Aquileia, and 70 north-eaſt of Venice. E. Long. 13. 43. N. Lat. 46. 12.

GORLITZ, a town of Germany, in Upper Luſatia, ſubject to the elector of Saxony. It is a handſome ſtrong place, and ſeated on the river Nieſſe, in E. Long. 15. 15. N. Lat. 51. 10.

GOSHAWK. See Falco.

GOSLAR, a large and ancient town of Lower Saxony, and in the territory of Brunſwick; it is a free imperial city, and it was here that gun-powder was firſt invented, by a monk as is generally ſuppoſed. It is a large place, but the buildings are in the ancient taſte. In 1728, 280 houſes, and St Stephen's fine church, were reduced to aſhes. It is ſeated on a mountain, near the river Goſe, and near it are rich mines of iron. The inhabitants are famous for brewing excellent beer. E. Long. 3. 37. N. Lat. 51. 55.

GOSPEL, the hiſtory of the life, actions, death, reſurrection, aſcenſion, and doctrine of Jeſus Chriſt.

The word is Saxon, and of the ſame import with the Latin term *evangelium*, which ſignifies glad tidings, or good news.

This hiſtory is contained in the writings of St Matthew, St Mark, St Luke, and St John; who from thence are called *evangeliſts*. The Chriſtian church never acknowledged any more than theſe four goſpels as canonical; notwithſtanding which, ſeveral apocryphal goſpels are handed down to us, and others are entirely loſt.

GOSSYPIUM, or Cotton, a genus of the polyandria order, belonging to the monodelphia claſs of plants. There are four ſpecies, all of them natives of warm climates. 1. The herbaceum, or common herbaceous cotton, hath an herbaceous ſmooth ſtalk two feet high, branching upwards; five-lobed ſmooth leaves; and yellow flowers from the ends of the branches, ſucceeded by roundiſh capſules full of ſeed and cotton. 2. The hirſutum, or hairy American cotton, hath hairy ſtalks branching laterally two or three feet high: palmated, three and five lobed hairy leaves; and yellow flowers, ſucceeded by large oval pods furniſhed with ſeeds and cotton. 3. The barbadenſe, or Barbadoes ſhrubby cotton, hath a ſhrubby ſtalk branching four or five feet high, three-lobed ſmooth leaves, glandulous underneath; and yellow flowers ſucceeded by oval pods, containing ſeeds and cotton. 4. The arboreum, or tree-cotton, hath an upright woody perennial ſtalk, branching ſix or eight feet high; palmated, four or five lobed ſmooth leaves; and yellow flowers, ſucceedby large pods filled with ſeeds and cotton.

The firſt three ſpecies are annual, but the fourth is perennial both in root and ſtalk. In warm countries theſe plants are cultivated in great quantities in the fields for the ſake of the cotton they produce; but the firſt ſpecies is moſt generally cultivated. The pods are ſometimes as large as middling-ſized apples, cloſely filled with the cotton ſurrounding the ſeed. When theſe plants are raiſed in this country, they muſt be continually kept in a warm ſtove, where they will produce ſeeds and cotton. They are propagated by ſeeds. See Cotton.

The American Iſlands produce cotton ſhrubs of various ſizes, which riſe and grow up without any culture; eſpecially in low and marſhy grounds. Their produce is of a pale red; ſome paler than others; but ſo ſhort that it cannot be ſpun. None of this is brought to Europe, though it might be uſefully employed in making of hats. The little that is picked up, ſerves to make mattraſſes and pillows.

The cotton-ſhrub that ſupplies our manufactures, requires a dry and ſtony ſoil, and thrives beſt in grounds that have already been tilled. Not but that the plant appears more flouriſhing in freſh lands than in thoſe which are exhauſted; but, while it produces more wood, it bears leſs fruit.

A weſtern expoſure is fitteſt for it. The culture of it begins in March and April, and continues during the firſt ſpring-rains. Holes are made at ſeven or eight feet diſtance from each other, and a few ſeeds thrown in. When they are grown to the height of five or ſix inches, all the ſtems are pulled up, except two or three of the ſtrongeſt. Theſe are cropped twice before the end of Auguſt. This precaution is the more neceſſary, as the wood bears no fruit till after the ſecond pruning; and, if the ſhrub was ſuffered to grow more than four feet high, the crop would not be the greater, nor the fruit ſo eaſily gathered. The ſame method is purſued for three years; for ſo long the ſhrub may continue, if it cannot conveniently be renewed oftener with the proſpect of an advantage that will compenſate the trouble.

This uſeful plant will not thrive if great attention is not paid to pluck up the weeds that grow about it. Frequent rains will promote its growth; but they muſt not be inceſſant. Dry weather is particularly neceſſary in the months of March and April, which is the time of gathering the cotton, to prevent it from being diſcoloured and ſpotted.

When it is all gathered in, the ſeeds muſt be picked out from the wool with which they are naturally mixed. This is done by means of a cotton-mill; which is an engine, compoſed of two rods of hard wood, about 18 feet long, 18 lines in circumference, and fluted two lines deep. They are confined at both ends, ſo as to leave no more diſtance between them than is neceſſary for the ſeed to ſlip through. At one end is a kind of little millſtone, which, being put in motion with the foot, turns the rods in contrary directions. They ſeparate the cotton, and throw out the ſeed contained in it.

GOTHA, a town of Germany, in the circle of Upper Saxony, and capital of a duchy of the ſame name. It is 15 miles weſt of Erford, and 15 ſouth-eaſt of Mulhauſen. E. Long. 11. 0. N. Lat. 52. 25.

GOTHARD, one of the higheſt mountains of Swiſſerland; and from the top, where there is an hoſpital for monks, is one of the fineſt proſpects in the world. It is eight miles from Aldorf.

GOTHIC, in general, whatever has any relation to the Goths: thus, we ſay, Gothic cuſtoms, Gothic architecture, &c.

GOTHLAND, the moſt ſouthern province of Sweden, being a peninſula, encompaſſed on three ſides by the Baltic Sea, or the channel at the entrance of it. It is divided into ſeveral parts, which are Eaſt Gothland, Weſt Gothland, Smaland, Halland, Bleaking, and Schonen. It was a long time in the poſſeſſion of the kings of Denmark, but was ceded to Sweden in 1654. The principal towns of Gothland are Calmar, Landſcroon, Chriſtianople, Daleburg, Gothenburg, Helmſtat, Lunden, Malmone, and Vexio.

Goths.

GOTHS, a warlike nation, and above all others famous in the Roman hiſtory, came originally out of Scandinavia, (the name by which the ancients diſtinguiſhed the preſent countries of Sweden, Norway, Lapland, and Finmark.) According to the moſt probable accounts, they were the firſt inhabitants of thoſe countries; and from thence ſent colonies into the iſlands of the Baltic, the Cimbrian Cherſoneſus, and the adjacent places yet deſtitute of inhabitants. The time of their firſt ſettling in Scandinavia, and the time when they firſt peopled with their colonies the abovementioned iſlands and Cherſoneſus, are equally uncertain; though the Gothic annals ſuppoſe the latter to have happened in the time of Serug the great-grandfather of Abraham. This firſt migration of the Goths is ſaid to have been conducted by their king Eric; in which all the ancient Gothic chronicles, as well as the Daniſh and Swediſh ones, agree. Their ſecond migration is ſuppoſed to have happened many ages after; when, the abovementioned countries being overſtocked with people, Berig, at that time king of the Goths, went out with a fleet in queſt of new ſettlements. He landed in the country of the Ulmerugians, now Pomerania, drove out the ancient inhabitants, and divided their lands among his followers. He fell next upon the Vandals, whoſe country bordered on that of the Ulmerugians, and overcame them; but inſtead of forcing them to abandon their country, he only made them ſhare their poſſeſſions with the Goths.

The Goths who had ſettled in Pomerania and the adjacent parts of Germany being greatly increaſed, inſomuch that the country could no longer contain them, they undertoook a third migration in great numbers, under Filimer ſurnamed the *Great*, their fifth prince after leaving Scandinavia; and taking their route eaſtward, entered Scythia, advanced to the Cimmerian Boſphorus, and, driving out the Cimmerians, ſettled in the neighbourhood of the Palus Mæotis. Thence in proceſs of time, being greatly increaſed in Scythia, they reſolved to ſeek new ſettlements; and accordingly, taking their route eaſtward, they traverſed ſeveral countries, and at length returned into Germany.

Their leader in this expedition was the celebrated Woden, called alſo *Voden*, *Othen*, *Oden*, *Godan*, and *Guadan*. Of this Woden many wonderful things are related in the Sueo-gothic chronicles. He was king of the Aſgardians, whom the northern writers will have to be the ſame with a people called *Aſpurgians* mentioned by Strabo and Ptolemy. By Strabo they are placed near the Cimmerian Boſphorus. Aſpurgia was the metropolis of a province which Strabo calls *Aſia;* and Woden and his followers are ſtyled by the ancient Gothic writers *Aſæ*, *Aſianæ*, and *Aſiotæ*. The kings of Aſpurgia were maſters of all that part of Scythia which lay to the weſtward of Imaus, and was by the Latins called *Scythia intra Imaum*, or "Scythia within Imaus."

At what time Woden reigned in this country, is quite uncertain; but all hiſtorians agree, that he went out in queſt of new ſettlements with incredible numbers of people following him. He firſt entered Roxolania, comprehending the countries of Pruſſia, Livonia, and great part of Muſcovy. From thence he went by ſea into the north parts of Germany; and having reduced Saxony and Jutland, he at laſt ſettled in Sweden, where he reigned till his death, and became ſo famous that his name reached all countries, and he was by the northern nations worſhipped as a god. He is ſuppoſed to have brought with him the Runic characters out of Aſia, and to have taught the northern nations the art of poetry; whence he is ſtyled the father of the Scaldi or Scaldri, their poets, who deſcribed in verſe the exploits of the great men of their nation, as the bards did among the Gauls and Britons.

The Romans diſtinguiſhed the Goths into two claſſes; the Oſtrogoths and Viſigoths. Theſe names they received before they left Scandinavia, the *Viſigoths* being ſoftened by the Latins from *Weſterogoths*, or thoſe who inhabited the Weſtern part of Scandinavia, as the Oſtrogoths were thoſe who inhabited the eaſtern part of that country. Their hiſtory affords nothing of moment till the time of their quarrelling with the Romans; which happened under the reign of the emperor Caracalla, ſon to Severus. After that time their hiſtory becomes ſo cloſely interwoven with that of the Romans, that for the moſt remarkable particulars of it we muſt refer to the article Rome. After the deſtruction of the Roman empire by the Heruli, the Oſtrogoths, under their king Theodoric, became maſters of the greateſt part of Italy, having overcome and put to death Odoacer king of the Heruli in 494. They retained their dominion in this country till the year 553, when they were finally conquered by Narſes, the emperor Juſtinian's general. See (Hiſtory of) Italy. The Viſigoths ſettled in Spain in the time of the emperor Honorius, where they founded a kingdom which continued till the country was ſubdued by the Saracens; for a particular account of all which, ſee the article Spain.

The Goths were famous for their hoſpitality and kindneſs to ſtrangers, even before they embraced the Chriſtian religion. Nay, it is ſaid, that from their being eminently good, they were called *Goths* by the neighbouring nations; that name, according to Grotius and moſt other writers, being derived from the German word *goten*, which ſignifies "good." They encouraged, ſays Dio, the ſtudy of philoſophy above all other barbarous or foreign nations, and often choſe kings from among their philoſophers. Polygamy was not only allowed but countenanced among them; every one being valued or reſpected according to the number of his wives. By ſo many wives they had an incredible number of children, of whom they kept but one at home, ſending out the reſt in queſt of new ſettlements; and hence thoſe ſwarms of people which overran ſo many countries. With them adultery was a capital crime, and irremiſſibly puniſhed with death. This ſeverity, and likewiſe polygamy, prevailed among them when they were known to the Romans only by the name of *Getes*, (their moſt ancient name); as appears from the poet Menander, who was himſelf one of that nation; and from Horace, who greatly commends the chaſtity of their women. Their laws fell little ſhort of thoſe of the ancient Romans. Their government was monarchical; their religion was much the ſame with that of the ancient Germans or Celtes; and their dreſs is deſcribed by Apollinaris Sidonius in the following words: "They are ſhod (ſays he) with high ſhoes made of hair, and reaching up to their ankles; their knees, thighs, and legs, are without any covering; their garments of various colours ſcarce reaching to the knee; their ſleeves only cover the top of their arms; they wear green caſſocks with a red border; their belts hang on their ſhoulder; their ears are covered with twiſted locks, they uſe hooked lances and miſſile weapons."

GOTHOFRED, or **GODFREY**, (Denis or Dionyſius) an eminent civil lawyer, born of an illuſtrious houſe at Paris, in 1549. Finding his country involved in the confuſion of the leaguers, he accepted of a profeſſor's chair at Geneva, until he was patronized and employed by Henry IV.; but being afterward ſtripped of his employments as a huguenot, he at length retired to Heidelburg, from whence no offers were able to detach him. He was, however, diſappointed of his intention to end his days there; for the diſturbances that broke out in the Palatinate obliged him, in 1621, to take refuge in Straſburg, where he died the following year. He wrote a great number of books; but his principal work is the *Corpus Jurus Civilis cum notis.*

GOTHOFRED (Thodore), ſon of the former, was born at Geneva, in 1580. As ſoon as he had finiſhed his ſtudies, he went to Paris; where he conformed to the Romiſh religion, and applied with indefatigable induſtry to the ſtudy of hiſtory, that of France particularly, wherein he became very eminent, as appears by his works. In 1632, the king made him one of his hiſtoriographers, with a ſtipend of 3000 livres; and, in 1636, he was ſent to Cologn, to aſſiſt at the treaty of peace negociating there, on the part of France, by the cardinal of Lyons. This treaty being removed to Munſter, Gothofred was ſent thither, where he drew up Memoirs on the ſubject; and continued in that city, in the king's ſervice, to his death in 1649. His principal work is his *Account of the Ceremonial* of the kings of France.

GOTHOFRED (James), brother of the preceding, was born at Geneva, in 1587. Applying himſelf to the ſtudy of the law, he obtained the profeſſor's chair there, was made counſellor of the city, and was ſeveral times employed in France, Germany, Piedmont, and Switzerland, to negociate their affairs in the name of the republic. He died in 1562; and his chief work is his *Codex Theodoſianus, cum perpetuis commentariis, &c.*

GOTHOFRED (Denis), ſon of Theodore above mentioned, was born at Paris, in 1615. He ſtudied hiſtory, after his father's example; became as eminent in that department of knowledge; and obtained the reverſion of his father's place of hiſtoriographer royal, from Lewis XIII. when he was but 25 years of age. He publiſhed his father's *Ceremonial of France;* finiſhed his *Memoirs of Philip de Commines;* and was preparing a *Hiſtory of Charles VIII.* when he died in 1681. It was publiſhed by his eldeſt ſon, Denis, in 1684.

GOTTENBURG, a rich and ſtrong town of Weſt Gothland, in Sweden, with a good harbour, at the mouth of the river Gothelba; which is the beſt ſituated for foreign trade of any in Sweden, as it lies without the ſound. E. Lon. 11. 50. N. Lat. 57. 44.

GOTTINGEN, a conſiderable town of Lower Saxony, in Germany, and in the duchy of Brunſwick; formerly free and imperial, but now ſubject to the elector of Hanover. Here his late Majeſty, George II. founded an univerſity. It is ſeated on the river Leine, in E. Lon. 10. 5. N. Lat. 51. 32.

GOTTORP, a town of the duchy of Heſwic, in Denmark, and capital of the duchy of Holſtein Gottorp, where the duke has a very fine palace.

GOUDA, or **TURGOW**, a conſiderable town of South Holland, in the United Provinces, remarkable for its ſtately church. It is ſeated on the river Iſſel, in E. Lon. 4. 37. N. Lat. 52. 2.

GOVERNMENT, in general, is the polity of a ſtate, or an orderly power conſtituted for the public good.

Civil government was inſtituted for the preſervation and advancement of mens civil intereſts, and for the better ſecurity of their lives, liberties, and properties. The uſe and neceſſity of government is ſuch, that there never was an age or country without ſome ſort of civil authority: but as men are ſeldom unanimous in the means of attaining their ends, ſo their differences in opinion in relation to government has produced a variety of forms of it. To enumerate them, would be to recapitulate the hiſtory of the whole earth. But, according to Monteſquieu, and moſt other writers, they may in general be reduced to one of theſe three kinds. 1. The republican. 2. The monarchical. 3. The deſpotic.—The firſt is that, where the people in a body, or only a part of the people, have the ſovereign power: the ſecond, where one alone governs, but by fixed and eſtabliſhed laws: but, in the deſpotic government, one perſon alone, without law and without rule, directs every thing by his own will and caprice. See the article LAW, n° 1. 3—10.—On the ſubject of government at large, ſee Monteſquieu's *L' Eſprit des Loix*, l. 2. c. 1.; Locke, ii. 129, &c. quarto edition, 1768; Sidney on Government; Sir Thomas Smith *de Repub. Angl.;* and Acherly's Britannic Conſtitution.—As to the Gothic government, its original and faults, &c. ſee Monteſquieu's *L'Eſprit des Loix*, l. 11. c. 8.—With reſpect to the feudal policy, how it limited government; ſee FEODAL *Syſtem.*

GOVERNMENT is alſo a poſt or office, which gives a perſon the power or right to rule over a place a city, or a province, either ſupremely, or by deputation.

GOVERNMENT is likewiſe uſed for the city, country, or place to which the power of governing is extended.

GOULART (Simon), a famous miniſter of Geneva, was born at Senlis, in 1543; and was one of the moſt indefatigable writers of his time. He made conſiderable additions to the Catalogue of witneſſes of the truth, compoſed by Illyricus; and acquired a great reputation by his works, the principal of which are, 1. A tranſlation of Seneca. 2. A collection of memorable hiſtories. 3. A tranſlation of St Cyprian *De lapſis.* 4. Several devotional and moral treatiſes. He died at Geneva in 1628.

GOURD, in botany. See CUCURBITA.

GOURGUES (Dominique de), an illuſtrious French patriot, a private gentleman of Gaſcony. The Spaniards having inhumanly maſſacred a colony of Frenchmen who had ſettled in Forida, Gourgues took a ſevere revenge on them, an account of which is given under the article Florida. On his return, he was received with acclamations by his countrymen, but was forbid to appear at court. Queen Elizabeth invited him to command an Engliſh fleet againſt the Spaniards, in 1593; but he died at Tours, in his way to England.

GOURNAY, a town of France, in the duchy of Normandy and territory of Bray, celebrated for its butter-market. It is ſeated on the river Ept, in E. Lon. 0. 33. N. Lat. 49. 25.

Gournay (Mary de Jars de), a lady celebrated for her learning, was the daughter of William de Jars, lord of Neufvi and Gournay. After the death of her father, ſhe was protected by Montaigne and Cardinal Richlieu. To the daughter of the former ſhe dedicated her Noſegay of Pindus; and compoſed ſeveral other works, the moſt conſiderable of which is *Les Avis*. She died at Paris in 1685, aged 80. The critics are divided concerning the reputation of this lady: by ſome ſhe is ſtyled the *Syren of France*; others ſay her works ſhould have been buried with her.

GOUT. See (Index ſubjoined to) Medicine.

GOWER (John), one of our moſt ancient Engliſh poets, was cotemporary with Chaucer, and his intimate friend. Of what family, or in what county he was born, is uncertain. He ſtudied the law, and was ſome time a member of the ſociety of Lincoln's inn, where his acquaintance with Chaucer began. Some have aſſerted that he was a judge; but this is by no means certain. In the firſt year of Henry IV. he became blind; a miſfortune which he laments in one of his Latin poems. He died in the year 1402; and was buried in St Mary Overie, which church he had rebuilt, chiefly at his own expence, ſo that he muſt have lived in affluent circumſtances. His tomb was magnificent, and curiouſly ornamented. It ſtill remains, but hath been repaired in later times. From the collar of S S, round the neck of his effigies, which lies upon the tomb, it is conjectured that he had been knighted. As to his character as a man, it is impoſſible, at this diſtance of time, to ſay any thing with certainty. With regard to his poetical talents, be was undoubtedly admired at the time when he wrote, though a modern reader may find it difficult to diſcover much harmony or genius in any of his compoſitions. He wrote, 1. *Speculum meditantis*, in French; in ten books. There are two copies of this in the Bodleian library. 2. *Vox clamantis*, in Latin verſe; in ſeven books. Preſerved alſo in the Bodleian library, and in that of All-Souls. It is a chronicle of the inſurrection of the commons in the reign of Richard II. 3. *Confeſſio amantis*; printed at Weſtminſter by Caxton, in 1493. Lond. 1532, 1554. It is a ſort of poetical ſyſtem of morality, interſperſed with a variety of moral tales. 4. *De rege Henrico* IV. Printed in Chaucer's works. There are likewiſe ſeveral hiſtorical tracts, in manuſcript, written by our author, which are to be found in different libraries; alſo ſome ſhort poems printed in Chaucer's works.

GOWN, Robe, a long upper garment, wore by lawyers, divines, and other graduates; who are hence called *men of the gown*, or *gownmen*.

The gown is an ample ſort of garment, wore over the ordinary cloaths, hanging down to the feet.—It is faſhioned differently for eccleſiaſtics, and for laymen.

At Rome, they gave the name "virile gown," *toga virilis*, to a plain kind of gown which their youth aſſumed when arrived at puberty. This they particularly denominated *prætexta*. See Toga, Pretexta, &c.

Hiſtory of Mancheſter, i. 302.

"The remarkable dreſs of our Britiſh anceſtors, (Mr Whitaker obſerves), which continued very nearly the ſame to the commencement of the laſt century among the natives of Ireland, and has actually deſcended to the preſent among the mountaineers of Scotland, and is therefore rendered very familiar to our ideas, carried in it an aſtoniſhing appearance to the Romans. And it ſeems to have been equally the dreſs of the men and women, among the nobles of Britain. But, in a few years after the erection of the Roman-Britiſh towns in the north, and in the progreſs of refinement among them, this ancient habit began to be diſeſteemed by the chiefs of the cities, and looked upon as the badge of ancient barbariſm. And the growing prejudices were ſoon ſo greatly improved, that, within twenty years only after the conſtruction of the towns, the Britiſh ſagum was actually reſigned, and the Roman *toga* or "gown" aſſumed by many of them.

"The gown, however, never became univerſal in Britain. And it ſeems to have been adopted only by the barons of the cities and the officers of the crown; and has therefore been tranſmitted to us as the robe of reverence, the enſign of literature, and the mantle of magiſtracy. The woollen and plaided garments of the chiefs having naturally ſuperſeded the leathern veſtures of their clients, the former were ſtill wore by the generality of the Britons. And they were retained by the gentlemen of the country, and by the commonalty both in country and city. That this was the caſe, appears evident from the correſpondent conduct of the Gauls and Britons; who kept their Virgata Sagula to the laſt, and communicated them to the Franks and Saxons. The plaided drapery of the Britons ſtill appeared general in the ſtreets of Mancheſter; and muſt have formed a ſtriking contraſt to the gown of the chief, the dark mantle of Italy. And it, and the ornamented buttons on the ſhoulder, are preſerved among us even to the preſent moment, in the parti-coloured cloathing and the taſſelled ſhoulder-knots of our footmen."

In ſome univerſities, phyſicians wear a ſcarlet-gown.—In the Sorbonne, the doctors are always in gowns and caps. Beadles, &c. wear gowns of two or more colours.

Among the French officers, &c. they diſtinguiſh thoſe of the *ſhort gown* or *robe*; which are ſuch as have not been regularly examined.—They have alſo barbers of the *ſhort gown*, who are ſuch as are obliged to practiſe in an inferior way to thoſe of the long robe.

Gown is alſo taken in the general for civil magiſtrature, or the profeſſion oppoſite to that of arms. In this ſenſe it was that Cicero ſaid, *cedant arma togæ*.

GRAAF (Regnier de), a celebrated phyſician, born at Sckoonhaven, in Holland, in 1641. He ſtudied

Grabe, Grace.

died phyſic at Pruſſia. He was educated in Leyden, where he acquired great honour by publiſhing a treatiſe *De Succo Pancreatico*. He alſo publiſhed three pieces upon the organs of generation, both male and female; upon which ſubject he had a controverſy with Swammerdam. He died young, in 1673; and his works, with his life prefixed, were publiſhed at Leyden in 1677, in 8vo.

GRABE (John Erneſt), a very learned writer in the beginning of the 18th century, a native of Koninſberg in Pruſſia. He was educated in the Lutheran religion; but the reading of the fathers led him into doubts. He preſented to the electoral conſiſtory at Sambia in Pruſſia a memorial, containing his doubts. The elector gave orders to three eminent divines to anſwer them. Their anſwers ſhook him a little in his reſolution of embracing the Roman Catholic religion; and one of them, Spener, adviſed him to go to England. He went; and king William gave him a penſion, which was continued by Queen Anne. He was ordained a prieſt of the church of England, and honoured with the degree of Doctor of Divinity by the univerſity of Oxford; upon which occaſion Dr George Smalridge pronounced two Latin orations, which were afterwards printed. He wrote, 1. *Spicelegium S. S. Patrum, ut et Hereticorum ſæculi poſt Chriſtum natum*, 8vo. 2. An edition of the Septuagint, from the Alexandrian manuſcript in St James's library. 3. Notes on Juſtin, &c.; and other works, which are eſteemed by the learned.

GRACE, among divines, is taken, 1. For the free love and favour of God, which is the ſpring and ſource of all the benefits we receive from him. 2. For the work of the Spirit renewing the ſoul after the image of God; and continually guiding and ſtrengthening the believer to obey his will, to reſiſt and mortify ſin, and overcome it.

GRACE is alſo uſed, in a peculiar ſenſe, for a ſhort prayer ſaid before and after meat.

The proofs of the moral obligation of this ceremony, drawn from different paſſages of the New Teſtament, are ſo well known, that it is needleſs to inſiſt on them here. Some others, drawn from the practice of different nations, and of very remote antiquity, may not be diſagreeable to our readers.

1. Athenæus tells us, in his *Deipnoſoph.* lib. ii. that in the famous regulation made by Amphictyon, king of Athens, with reſpect to the uſe of wine, both in ſacrifices, and at home, he required that the name of *Jupiter the Suſtainer* ſhould be decently and reverently pronounced. The ſame writer, in lib. iv. p. 149. quotes Hermeias, an author extant in his time, who informs us of a people in Egypt, inhabitants of the city of Naucratis, whoſe cuſtom it was on certain occaſions, after they had placed themſelves in the uſual poſture of eating at the table, to riſe again, and kneel; when the prieſt or precentor of the ſolemnity began to chant a grace, according to a ſtated form amongſt them; and when that was over, they joined in the meal, in a ſolemn ſacrificial manner. Heliodorus, has a paſſage in his *Æthiopics* to the ſame purpoſe, that it was the cuſtom of the Egyptian philoſophers to pour out libations and put up ejaculations before they ſat down to meals. Porphyry, in his treatiſe *De abſtin.* lib. iv. p. 408. gives a great character of the Samnean gymnoſophiſts in Egypt, for the ſtrictneſs of their life: as one article in their favour, he obſerves, that at the ſounding of a bell before their meals, which conſiſted only of rice, bread, fruits, and herbs, they went to prayers; which being ended, and not before, the bell ſounded again, and they ſat down to eating. In general, this was a religious uſage or rite amongſt the ancient Greeks; and derived from yet older ages, if Clement of Alexandria rightly informs us. He mentions, that theſe people, when they met together to refreſh themſelves with the juice of the grape, ſung a piece of muſic, in imitation of the Hebrews pſalms, which they called a *ſcholion*. Livy, lib. xxxix. ſpeaks of it as a ſettled cuſtom among the old Romans, that they offered ſacrifice and prayer to the gods, at their meals and compotations. But one of the fulleſt teſtimonies to our purpoſe is given by Quintilian, *Declam* 301. *Adiſti menſam*, ſays he, *ad quam cum venire cæpimus, Deos invocamus*; "We approached the table (at ſupper together), and then invoked the gods."

Grace.

The Jeſuit Trigautius, in his very elegant and inſtructive narrative of the Chriſtian expedition of their miſſionaries into China, book i. p. 69. gives this account of the people there, in the particular now under conſideration. "Before they place themſelves for partaking of an entertainment, the perſon who makes it, ſets a veſſel, either of gold or ſilver, or marble, or ſome ſuch valuable material, in a charger full of wine, which he holds with both his hands, and then makes a low bow to the perſon of chief quality or character at the table. Then, from the hall or dining room, he goes into the porch or entry, where he again makes a very low bow, and turning his face to the ſouth, pours out this wine upon the ground, as a thankful oblation to the Lord of heaven. After this, repeating his reverential obeiſance, he returns into the hall, &c."

The Turks pray for a bleſſing on their meat; and many more inſtances might be produced of infidels, who have conſtantly obſerved the like cuſtom, in ſome way or other.

2. The fact, therefore, with reſpect to the heathen world, being thus evident; we proceed to the ſentiments and behaviour of the *Jews* in this particular. Their celebrated hiſtorian *Joſephus*, giving a detail of the rites and cuſtoms of the *Eſſenes*, who were confeſſedly the ſtricteſt and moſt pious profeſſors of the Jewiſh religion, has this remarkable paſſage to the preſent purpoſe: "The prieſt," ſays he, "begs a bleſſing before they preſume to take any nouriſhment; and it is looked upon as a great ſin to take or taſte before." Then follows the thankſgiving before meat: and "when the meal," proceeds he, "is over, the prieſt prays again; and the company with him bleſs and praiſe God as their preſerver, and the donor of their life and nouriſhment."

Philo, in his book *De vita contemplativa*, gives an account of a body of men and women ſtricter than even the Eſſenes themſelves. He diſtinguiſhes them by no particular name, though his relation is very accurate and circumſtantial; namely, that, on certain ſpecial occaſions, before "they took their meals, they placed themſelves in a proper decent order; when, lifting up their hands and eyes to heaven, they prayed to

God, that he would be pleaſed to be propitious to them in the uſe of thoſe his good creatures."

From the Hebrew ritual it appears, that the Jews had their hymns and pſalms of thankſgiving, not only after eating their paſſover, but on a variety of other occaſions, at and after meals, and even between their ſeveral courſes and diſhes; as when the beſt of their wine was brought upon the table, or their aromatic confections, or the fruit of the garden, &c. On the day of the paſſover was ſung Pſalm cxiv. *When Iſrael came out of Egypt*, &c.

Ariſtæus has a paſſage full on the preſent ſubject. "*Moſes*," ſays he, "*commands, that when the Jews are going to eat or drink, the company ſhould immediately join in ſacrifice or prayer.*" Where Rabbi Eleazar (upon that author) met with this ſentence, has been controverted. But ſuppoſing it not to be found *in ſcriptis*, it is ſufficient for us to know that the Jews did conſtantly practiſe this cuſtom, upon the foundation of an ancient and general tradition and uſage. That the prophet Daniel gave thanks after meat, is evident from the Apocryphal book concerning *Bel and the Dragon*, where, ver. 38, 39. we find, that *Daniel ſaid, Thou haſt remembered me, O God! neither haſt thou forſaken them who ſeek thee and love thee. So Daniel aroſe, and did eat.* Of this text Prudentius takes notice in Cathemirin. hymn iv.

> *His ſumptis Danielis excitavit*
> *In cœlum faciem, ciboque fortis,*
> *Amen reddidit, allelujah dixit.*
>
> The much-belov'd took the repaſt,
> And up to heav'n his eyes he caſt;
> By which refreſh'd, he ſung aloud,
> Amen, and allelujah to his God

Where, by the way, it may be obſerved, that the poet is a little miſtaken, in making the prophet give thanks after meat; whereas, according to the text, he did it before,

GRACE, or *Gracefulneſs*, in the human character; an agreeable attribute, inſeparable from motion as oppoſed to reſt, and as comprehending ſpeech, looks, geſture, and loco-motion.

As ſome motions are homely, the oppoſite to *graceful;* it is to be inquired, With what motions is this attribute connected? No man appears graceful in a maſk; and therefore, laying aſide the expreſſions of the countenance, the other motions may be genteel, may be elegant, but of themſelves never are graceful. A motion adjuſted in the moſt perfect manner to anſwer its end, is elegant; but ſtill ſomewhat more is required to complete our idea of grace or gracefulneſs.

What this unknown *more* may be, is the nice point. One thing is clear from what is ſaid, that this *more* muſt ariſe from the expreſſions of the countenance: and from what expreſſions ſo naturally as from thoſe which indicate mental qualities, ſuch as ſweetneſs, benevolence, elevation, dignity? This promiſes to be a fair analyſis; becauſe of all objects mental qualities affect us the moſt; and the impreſſion made by graceful appearance upon every ſpectator of taſte, is too deep for any cauſe purely corporeal.

The next ſtep is, to examine what are the mental qualities, that, in conjunction with elegance of motion, produce a graceful appearance. Sweetneſs, cheerfulneſs, affability, are not ſeparately ſufficient, nor even in conjunction. Dgnity alone, with elegant motion, produce a graceful appearance; but ſtill more graceful with the aid of other qualities, thoſe eſpecially that are the moſt exalted. See DIGNITY.

But this is not all. The moſt exalted virtues may be the lot of a perſon whoſe countenance has little expreſſion: ſuch a perſon cannot be graceful. Therefore to produce this appearance, we muſt add another cirumſtance, viz. an expreſſive countenance, diſplaying to every ſpectator of taſte, with life and energy, every thing that paſſes in the mind.

Collecting theſe circumſtances together, grace may be defined, "that agreeable appearance which ariſes from elegance of motion and from a countenance expreſſive of dignity". Expreſſions of other mental qualities are not eſſential to that appearance, but they heighten it greatly.

Of all external objects, a graceful perſon is the moſt agreeable.

Dancing affords great opportunity for diſplaying grace, and haranguing ſtill more. See DANCING, DECLAMATION, and ORATORY.

But in vain will a perſon attempt to be graceful, who is deficient in amiable qualities. A man, it is true, may form an idea of qualities he is deſtitute of; and, by means of that idea, may endeavour to expreſs theſe qualities by looks and geſtures: but ſuch ſtudied expreſſion will be too faint and obſcure to be graceful.

Act of GRACE, the appellation given to the act of parliament 1696, c. 32. which allows priſoners for civil debts to be ſet at liberty, upon making oath that they have not wherewithal to ſupport themſelves in priſon, unleſs they are alimented by the creditors on whoſe diligences they were impriſoned, within ten days after intimation made for that purpoſe. See LAW, Part III. N° clxxxv. 13.

Days of GRACE, three days immediately following the term of payment of a bill, within which the creditor muſt proteſt it if payment is not obtained, in order to entitle him to recourſe againſt the drawer. See LAW, Part III. N° clxxiii. 16.

GRACE is alſo a title of dignity given to dukes, archbiſhops, and in Germany to barons and other inferior princes.

GRACES, in heathen mythology, three goddeſſes, whoſe names were *Aglia*, *Thalia*, and *Euphroſyne;* that is, *ſhining*, *flouriſhing*, and *gay;* or, according to ſome authors, *Paſithea*, *Euphroſyne*, and *Ægiale*. Some make them the daughters of Jupiter, and Eurynome, or Eunomia, the daughter of Oceanus; but the moſt common opinion is, that they were the daughters of Bacchus and Venus.

They are ſometimes repreſented dreſſed; but more frequently naked, to ſhew, perhaps, that whatever is truly graceful, is ſo in itſelf, without the aid of exterior ornaments. They preſided over mutual kindneſs and acknowledgment; beſtowed liberality, eloquence, and wiſdom, together with a good grace, gaiety of diſpoſition, and eaſineſs of manners.

GRACCHUS (Tiberius), elected tribune of the Roman people, demanded in the ſenate, in their name, the execution of the Agrarian law; by which all perſons poſſeſſing above 200 acres of land were to be deprived of the ſurplus, for the benefit of the poor citizens, amongſt whom an equal diſtribution of them was to be made; having carried his plan into execution by violent meaſures, he fell a victim to his zeal, being aſſaſſinated by his own party, 133 B. C. Caius, his brother, purſuing the ſame ſteps, was killed by the conſul Opimius, 121 B. C. See (hiſtory of) ROME.

GRACULA, in ornithology, a genus belonging to the order of picæ. The bill is convex, cultrated, and bare at the point; the tongue is not cloven, but is fleſhy and ſharpiſh; it has three toes before, and one behind. There are eight ſpecies, principally diſtinguiſhed by their colour.

GRACULUS, in ornithology. See CORVUS.

GRADATION, in general, the aſcending ſtep by ſtep, or in a regular and uniform manner.

GRADATION, in logic, a form of reaſoning, otherwiſe called SORITES.

GRADATION, in painting, a gradual and inſenſible change of colour, by the diminution of the teints and ſhades.

GRADATION, in rhetoric, the ſame with CLIMAX.

GRADISKA, a ſtrong town of Hungary in Sclavonia, on the frontiers of Croatia, taken by the Turks in 1691. It is ſeated on the river Save, in E. Lon. 17. 55. N. Lat. 45. 38.

GRADISKA, a ſtrong town of Italy, in a ſmall iſland of the ſame name on the frontiers of Friuli, in E. Lon. 13. 37. N. Lat. 46. 6. It is ſubject to the houſe of Auſtria.

GRADO, a ſtrong town of Italy, in a ſmall iſland of the ſame name, on the coaſt of Friuli, and in the territory of Venice. E. Lon. 13. 35. N. Lat. 45. 52.

GRADUATE, a perſon who has taken a degree in the univerſity. See DEGREE.

GRÆVIUS (John George), one of the moſt learned writers in the 17th century. In the 24th year of his age, the elector of Brandenburg made him profeſſor at Duiſbourg. In 1658, he was invited to Deventer to ſucceed his former maſter Gronovius. In 1661, he was appointed profeſſor of eloquence at Utrecht; and 12 years after, he had the profeſſorſhip of politics and hiſtory conferred on him. He fixed his thoughts here, and refuſed ſeveral advantageous offers. He had, however, the ſatisfaction to be ſought after by divers princes, and to ſee ſeveral of them come from Germany to ſtudy under him. He died in 1703, aged 71. His *Theſaurus antiquitatum et hiſtoriarum Italiæ*, &c. and other works, are well known.

GRAFTING, or ENGRAFTING, in gardening, is the taking a ſhoot from one tree, and inſerting it into another in ſuch a manner, that both may unite cloſely and become one tree. By the ancient writers on huſbandry and gardening, this operation is called *inciſion*, to diſtinguiſh it from inoculation or budding, which they call *inſerere oculos*.

Grafting hath been practiſed from the moſt remote antiquity; but its origin and invention is differently related by naturaliſts. Theophraſtus tells us, that a bird having ſwallowed a fruit whole, caſt it forth into a cleft or cavity of a rotten tree; where mixing with ſome of the putrified parts of the wood, and being waſhed with the rains, it budded, and produced within this tree another tree of a different kind. This led the huſbandman to certain reflections, from which ſoon afterwards aroſe the art of engrafting.

Pliny ſets the ſame thing in a different light: a countryman having a mind to make a palliſade in his grounds, that it might endure the longer, he bethought himſelf to fill up and ſtrengthen the bottom of the palliſade, by running or wattling it with the trunks of ivy. The effect of this was, that the ſtakes of the palliſades taking root, became engrafted into the trunks, and produced large trees; which ſuggeſted to the huſbandman the art of engrafting.

The uſe of grafting is to propagate any curious ſorts of fruits ſo as to be certain of the kinds; which cannot be done by any other method: for as all the good fruits have been accidentally obtained from ſeeds, ſo the ſeeds of theſe, when ſown, will many of them degenerate, and produce ſuch fruit as is not worth the cultivating: but when ſhoots are taken from ſuch trees as produce good fruit, theſe will never alter from their kind, whatever be their ſtock or tree on which they are grafted.

The reaſon or philoſophy of engrafting is ſomewhat obſcure; and had not accident given the firſt hint, all our knowledge of nature would never have led us to it. The effect is ordinarily attributed to the diverſity of the pores or ducts of the graft from thoſe of the ſtock, which change the figure of the particles of the juices in paſſing through them to the reſt of the tree.

Mr Bradley, on occaſion of ſome obſervations of Agricola, ſuggeſts ſomething new on this head. The ſtock grafted on, he thinks, is only to be conſidered as a fund of vegetable matter, which is to be filtered through the cyon, and digeſted, and brought to maturity, as the time of growth in the veſſels of the cyon directs. A cyon, therefore, of one kind, grafted on a tree of another, may be rather ſaid to take root in the tree it is grafted in, than to unite itſelf with it: for it is viſible that the cyon preſerves its natural purity and intent, though it be fed and nouriſhed with a mere crab; which is, without doubt, occaſioned by the difference of the veſſels in the cyon from thoſe of the ſtock: ſo that grafting may be juſtly compared to planting.

In proſecution of this view of that ingenious author, we add, that the natural juices of the earth, by their ſecretion and comminution in paſſing through the roots, &c. before they arrive at the cyon, muſt doubtleſs arrive there half elaborated and concocted; and ſo diſpoſed for a more eaſy, plentiful, and perfect aſſimilation and nutrition; whence the cyon muſt neceſſarily grow and thrive better and faſter than if it were put immediately in the ground, there to live on coarſe diet and harder of digeſtion: and the fruit produced by this further preparation in the cyon, muſt be finer and further exalted than if fed immediately from the more imperfectly prepared and altered juices of the ſtock.

Many have talked of changing of ſpecies, or producing mixed fruits, by engrafting one tree on another of the ſame claſs; but as the graft carries the juices from the ſtock to the pulp of the fruit, there is little hope of ſucceeding in ſuch an expectation by ever ſo many repeated grafts: but if, after changing the graft and ſtock ſeveral ſucceſſive times, you ſet the ſeed of the fruit produced on the graft in a good mould, it is poſſible that a change may happen, and a new mixed plant may be produced. Thus the almond and peach may, by many changes in the graftings, and by interrations of the ſtones of the peaches, and of the ſhells of the almonds, and by teribrations of the ſtem of the root here and there, alter their nature ſo much, that the coat or pulp of the almond may approach to the nature of the peach, and the peach may have its kernel enlarged into a kind of almond; and on the ſame principle, the curious gardener may produce many ſuch mixed kinds of things.

Mr Du Hamel has obſerved, that, in grafting of trees, there is always found at the inſertion of the graft, a change in the directions of fibres, and a ſort of twiſting or turning about of the veſſels, which greatly imitates that in the formation of certain glands in animal bodies: and from thence he infers, that a new ſort of viſcus being formed by this means, the fruit may very naturally be ſo far influenced by it, as to be meliorated on the new-branch; but that no ſuch ſudden and eſſential changes can be effected by thoſe means, as too many of the writers on agriculture pretend. He obſerves, however, that this anatomical obſervation would not have been ſufficient to convince him of the falſity of too many of theſe relations, had not experiment joined to confirm him in this opinion. He tried many grafts on different trees; and, for fear of error, repeated every experiment of conſequence ſeveral times: but all ſerved only to convince him of the truth of what he at firſt ſuſpected. He grafted in the common way the peach upon the almond, the plum upon the apricot, the pear upon the apple, the quince, and the white thorn; one ſpecies of plum on other very different ſpecies, and upon the peach the apricot and the almond. All theſe ſucceeded alike: the ſpecies of the fruit was never altered; and in thoſe which would not come to fruit, the leaves, the wood, and the flowers, were all the ſame with thoſe of the tree from whence the graft was taken.

Authors on agriculture have alſo mentioned a very different ſort of grafting; namely, the ſetting grafts of one tree upon ſtocks of a different genus; ſuch as the grafting the pear upon the oak, the elm, the maple, or the plum, &c. Mr Du Hamel tried a great number of thoſe experiments carefully, and found every one of them unſucceſsful; and the natural concluſion from this was, that there muſt be ſome natural alliance between the ſtocks and their grafts, otherwiſe the latter will either never grow at all, or very ſoon periſh.

Notwithſtanding the facility with which grafts generally take on good ſtocks, there are many accidents and uncertainties attending them in their different periods. Some periſh immediately; ſome, after appearing healthy for many months, and ſome even for years. Of theſe laſt ſome die without the ſtocks ſuffering any thing; others periſh together with the ſtocks. It is very certain, that the greater part of grafted trees do not live ſo long as they would have done in their natural ſtate; yet this is no unexceptionable rule: for there are ſome which evidently live the longer for this practice; nay, there are inſtances of grafts which, being placed on ſtocks naturally of ſhort duration, live longer than when placed on thoſe which are more robuſt and laſting. Theſe irregularities have been but little conſidered hitherto, though they might be made productive of conſiderable advantages.—One great requiſite for the ſucceeding of any graft is, that it be in its own nature capable of ſo cloſe and intimate an union with the ſubſtance of the ſtock, that it becomes as it were a natural branch of it. If all trees reſembled one another in their ſtructure and juices, the ſize and elaſticity of their veſſels, &c. probably the grafts of all trees would ſucceed upon on another; but this is by no means the caſe.

Trees are well known to be compoſed of numerous arrangements of hollow fibres, and theſe are different and unequal in every ſpecies of tree. In order to the ſucceeding of a graft, it is plain that there muſt be a conformity in its veſſels and juices with thoſe of the ſtock; and the more nearly they agree in this, probably the better they ſucceed, and the farther they differ, the worſe.—If there be, however, ſome difference in the ſolid parts of trees, there are evidently many more in the juices. The ſap in ſome trees is white as milk, in others it is reddiſh, and in ſome as clear and limpid as water. In ſome, it is thin and very fluid; in others, thick and viſcous. In the taſte and ſmell of theſe juices there are alſo not leſs differences: ſome are ſweet, ſome inſipid, ſome bitter, ſome acrid, and ſome fetid: the quality of the ſap thus makes a very great difference in the nature of trees; but its quantity, and derivation to the parts, is ſcarce leſs obſervable. Of this we have familiar inſtances in the willow and the box; one of which will produce longer ſhoots in a year, than the other in 20.

Another difference yet more ſtriking, and indeed more eſſential in regard to the growth of grafts than all theſe, is the different ſeaſon of the year at which trees ſhoot out their leaves, or ripen their flowers. The almond-tree is in flower before other trees in general have opened their earlieſt buds; and when other trees are in flower, this is full of leaves, and has its fruit ſet before the mulberry begins to puſh out its earlieſt buttons. When we conſider all theſe differences in trees, we cannot but wonder how it is poſſible for a branch of one to live upon another; and it becomes a much more perplexing queſtion how any graft can ſucceed, than how ſuch numbers come to miſcarry. A graft of one pear upon another ſhall be ſeen to ſucceed preſently as if upon its own tree; and in a fortnight will gain ſix inches in length, and ſo of ſome others.—This muſt be owing to the great ſimilarity between the ſtock and the graft in all reſpects; and a great contrariety or difference in ſtructure of parts will make as remarkable a difference on the other hand. An inſtance of this may be obſerved in the plum and the elm; which no art can ever make to ſucceed upon one another, whether the plum be grafted on the elm, or the elm upon the plum ſtock. Theſe are examples of the extremes of eaſy growth, and of abſolute decay; but there are many conjunctions of trees which ſeem of a middle nature between the two, and neither immediately periſh, nor totally ſucceed. Of theſe, ſuch as were grafted in autumn uſually remain green the whole winter without puſhing; and thoſe which are grafted in ſpring remain green a month or longer, but ſtill without ſhooting. Some particular ones have alſo been known to make a few ſhoots the firſt, or even the ſecond ſap ſeaſon after the operation; but all periſh at the end of theſe times. Of this kind are the grafts of the pear-tree upon the elm, the maple, and the hornbeam, and the mulberry upon the elm and fig, with many others.

When we come to inquire into the cauſe of this, we find that theſe grafts, though unnatural, have yet had a communication with the ſtock by means of a few ſmall veſſels, which has been ſufficient to keep them green, or even to make them ſhoot a little, during the great aſcent of the ſap: But the far greater number of the fibres have had all the while no communication, and are found putrified, dried up, or covered with a putrid juice. This has evidently happened by means of the diſproportion in ſize between the veſſels of the ſtock and of the graft, and the great difference between their natural juices, which are obſtacles abundantly ſufficient to prevent either an union of the fibres, or the introduction of new ſap.

The grafts of the almond on the plum, and of the plum on the almond, always grow very vigorouſly for the firſt year, and give all the appearances imaginable of ſucceeding entirely; yet they always periſh in the ſecond or third year. The almond-graft upon the plum-ſtock always puſhes out very vigorouſly at firſt; but the part of the ſtock immediately under the graft grows ſmaller and periſhes, the graft abſorbing too much of the juices, and the graft neceſſarily periſhes with it. The decay of the whole generally happens early in the ſpring; and that plainly from the different ſeaſon of the natural ſhooting of the two trees, the almond puſhing very vigorouſly, and conſequently draining the ſtock of its juices, at a time when, according to its nature, the juices are but in ſmall quantity in it, and the ſap does not begin to aſcend. The grafts of the plum on the almond are, from the ſame cauſe, furniſhed with an abundance of ſap which they have at that time no occaſion for; and conſequently they as certainly periſh of repletion, as the other of inanition.

The peach grafted on the plum ſucceeds excellently, and lives longer than it would have done in a natural ſtate; the reaſon ſeems to be, that the peach is a tender tree, ſhoots with great vivacity, and produces more branches than the root is able to maintain. Thus the peach trees are uſually full of dead wood; and often their large branches periſh, and ſometimes their whole trunk. On this occaſion the plum being a ſlow ſhooting tree, communicates its virtue to the graft; and the peach conſequently ſends out ſhoots which are more robuſt and ſtrong, and are no more in number than the root is able to ſupply with nouriſhment, and conſequently the tree is the more laſting.

The grafts, or cions, with which the grafting is effected, are young ſhoots of laſt ſummer's growth, for they muſt not be more than one year, and ſuch as grow on the outſide branches, and robuſt but moderate ſhooters; ſuch alſo as are firm and well ripened, ſhould always be choſen from healthful trees: obſerving, that the middle part of each ſhoot is always the beſt graft, cut at the time of grafting to five or ſix inches in length, or ſo as to have four or five good eyes or buds; but ſhould be preſerved at full length till grafting time, and then prepared as hereafter directed.

They ſhould be collected or cut from the trees in February, in mild weather, before their buds begin to ſwell, or advance much for ſhooting: in collecting them, chooſe ſuch as have not made lateral or ſide ſhoots; cut them off at full length; and if they are not to be uſed as ſoon as they are collected, lay their lower ends in ſome dry earth in a warm border till grafting time, and, if ſevere weather ſhould happen, cover them with dry litter.

The proper tools and other materials uſed in grafting, are,

A ſtrong knife for cutting off the heads of the ſtocks, previous to the inſertion of the graft; alſo a ſmall handſaw for occaſional uſe in cutting off the heads of large ſtocks.

A common grafting-knife, or ſtrong, ſharp penknife, for cutting and ſhaping the grafts ready for inſertion; alſo to ſlope and form the ſtocks for the reception of the grafts.

A flat grafting-chiſel and ſmall mallet for clefting large ſtocks, in cleft-grafting, for the reception of the graft.

A quantity of new baſs-ſtrings for bandages, for tying the grafted parts cloſe, to ſecure the grafts, and promote their ſpeedy union with the ſtock. And,

A quantity of grafting clay, for claying cloſely round the grafts after their inſertion and binding, to defend the parts from being dried by the ſun and winds, or too much liquified by wet, or pinched by cold; for theſe parts ought to be cloſely ſurrounded with a coat of clay in ſuch a manner as effectually to guard them from all weathers, which would prove injurious to young grafts, and deſtroy their cementing property, ſo as to prevent the junction: therefore, a kind of ſtiff loamy mortar muſt be prepared of ſtrong fat loam, or, in default thereof, any ſort of tough binding clay, either of which ſhould be laid in an heap, adding thereto about a fourth of freſh horſe-dung free from litter, and a portion of cut hay, mixing the whole well together, and adding a little water; then let the whole be well beaten with a ſtick upon a floor, or other hard ſubſtance; and as it becomes too dry, apply more water, at every beating turning it over, always continuing to beat it well at top till it becomes flat; which muſt be repeated more or leſs according to the nature of the the clay, but ſhould be ſeveral times done the firſt day: next morning repeat the beating, ſtill moiſtening it with water; and by thus repeating the beating ſix or eight times every day for two or three days, or every other day at leaſt, for a week, it will be in proper order for uſe; obſerving, it ſhould be prepared a week at leaſt before it is uſed, but if a month the better.

The ſeaſon for performing the operation of grafting is February and March: though, when the work is performed in February, it for the general part proves the moſt ſucceſsful, more eſpecially for cherries, plums, and pears; and March grafting is well adapted for apples.

There are different methods of grafting in practice, termed Whip-grafting——Cleft-grafting——Crown-grafting——Cheek-grafting——Side-grafting——Root-grafting—and Grafting by approach or Inarching: but Whip-grafting and Cleſt-grafting are moſt commonly uſed; and Whip-grafting moſt of all, as being the moſt expeditious and ſucceſsful of any.

Whip-grafting.—This being the moſt ſucceſsful method of grafting is the moſt commonly practiſed in all the nurſeries; it is always performed upon ſmall ſtocks, from about the ſize of a gooſe-quill, to half an inch or a little more or leſs in diameter, but the nearer the ſtock and graft approach in ſize the better; and is called *whip-grafting*, becauſe the grafts and ſtocks being nearly of a ſize, are ſloped on one ſide, ſo as to fit each other, and tyed together in the manner of whips, or joints of angling-rods, &c. and the method is as follows.

Having the cions or grafts, knife, bandages, and clay ready, then begin the work by cutting off the head of the ſtock at ſome clear ſmooth part thereof; this done, cut one ſide ſloping upward, about an inch and half or near two inches in length, and make a notch or ſmall ſlit near the upper part of the ſlope downward about half an inch long, to receive the tongue of the cion; then prepare the cion, cutting it to five or ſix inches in length, forming the lower end alſo in a ſloping manner, ſo as exactly to fit the ſloped part of the ſtock, as if cut from the ſame place, that the rinds of both may join evenly in every part; and make a ſlit ſo as to form a ſort of tongue to fit the ſlit made in the ſlope of the ſtock; then place the graft, inſerting the tongue of it into the ſlit of the ſtock, applying the parts as evenly and cloſe as poſſible; and immediately tye the parts cloſe together with a ſtring of baſs, bringing it in a neat manner ſeveral times round the ſtock and graft; then clay the whole over near an inch thick on every ſide, from about half an inch or more below the bottom of the graft, to an inch over the top of the ſtock, finiſhing the whole coat of clay in a kind of oval globular form, rather longwiſe, up and down, cloſing it effectually about the cion, and every part, ſo as no ſun, wind, nor wet may penetrate, to prevent which is the whole intention of claying; obſerving to examine it now and then, to ſee if it any where cracks or falls off, and if it does it muſt be inſtantly repaired with freſh clay.

This ſort of grafting may alſo be peformed, if neceſſary, upon the young ſhoots of any bearing tree, if intended to alter the ſorts of fruits, or have more than one ſort on the ſame tree.

By the middle or latter end of May, the grafts will be well united with the ſtock, as will be evident by the ſhooting of the graft; then the clay ſhould be wholly taken away; but ſuffer the baſs bandage to remain ſome time longer until the united parts ſeem to ſwell and be too much confined by the ligature, then take the tying wholly off.

Their farther culture is directed under the reſpective articles, whether deſigned for dwarfs or ſtandards, &c.

Cleft-grafting.—This is ſo called, becauſe the ſtock being too large for whip-grafting is cleft or ſlit down the middle for the reception of the graft; and is performed upon ſtocks from about one to two inches diameter.

Firſt, with a ſtrong knife cut off the head of the ſtock; or if the ſtock is very large, it may be headed with a ſaw; and cut one ſide ſloping upwards about an inch and half to the top; then proceed with a ſtrong knife or chiſel, to cleave the ſtock at top, croſs-way the ſlope, fixing the knife or chiſel towards the back of the ſlope, and with your mallet ſtrike it, ſo as to cleave the ſtock about two inches, or long enough to admit the graft, keeping it open with the chiſel; this done, prepare the cion, cutting it to ſuch length as to leave four or five eyes, the lower part of which being ſloped on each ſide, wedge-faſhion, an inch and half or two inches long, making one ſide to a thin edge, the other much thicker, leaving the rind thereon, which ſide muſt be placed outward in the ſtock; the cion being thus formed, and the cleft in the ſtock being made and kept open with the chiſel, place the graft therein at the back of the ſtock the thickeſt ſide outward, placing the whole cut part down into the cleft of the ſtock, making the rind of the ſtock and graft join exactly; then removing the grafting chiſel, each ſide of the cleft will cloſely ſqueeze the graft, ſo as to hold it faſt; it is then to be bound with a ligature of baſs, and clayed over, as obſerved in whip-grafting, leaving three or four eyes of the cions uncovered.

If intended to graft any pretty large ſtocks or branches by this method, two or more grafts may be inſerted in each; in this caſe the head muſt be cut off horizontally, making no ſlope on the ſide, but ſmooth the top, then cleave it quite a-croſs, and place a graft on each ſide, as the ſtock may be cleft in two places, and inſert two grafts in each cleft; they are thus to be tied and clayed as in the other methods.

This method of grafting may be performed upon the branches of bearing trees, when intended either to renew the wood, or change the ſort of fruit.

Towards the latter end of May, or the beginning of June, the junction of the graft and ſtock in either method will be effectually formed, and the graft begin to ſhoot, when the clay may be taken off, and in a fortnight or three weeks after take off alſo the bandages.

Crown-grafting.—This kind of grafting is commonly practiſed upon ſuch ſtocks as are too large to cleave, and is often performed upon the large branches of apple and pear trees, &c. that already bear fruit, when it is intended to change the ſorts, or renew the tree with freſh-bearing wood. It is termed *crown-grafting*, becauſe the ſtock or branch being headed down, ſeveral grafts are inſerted at top all around betwixt the wood and bark, ſo as to give it a crown-like appearance: obſerving, that this kind of grafting ſhould not be performed until March, or early in April; for then the ſap being in motion, renders the bark and wood of the ſtock much eaſier to be ſeparated for the admiſſion of the graft.

The manner of performing this ſort of grafting is as follows:

Firſt, cut off the head of the ſtock or branch with a ſaw horizontally, and pare the top ſmooth; then having the grafts, cut one ſide of each flat, and ſomewhat ſloping, an inch and half long, forming a ſort of ſhoulder at top of the ſlope to reſt upon the crown of the ſtock; and then raiſing the rind of the ſtock with a wedge, ſo as to admit the cion between that and the wood two inches down, place the grafts with the flat ſide next the wood, thruſting it down far enough for the ſhoulder to reſt upon the top of the ſtock, and in this manner may be put three, four, five, or more grafts in one large ſtock or branch.

When the grafts are all thus inſerted, let the whole be tied tight and well clayed; obſerving to leave two or three eyes of each graft uncovered, but raiſing the clay an inch above the top of the ſtock, ſo as to throw the wet quickly off, without lodging about the grafted parts, which would ruin the whole work.

Crown-grafting may alſo be performed, by making ſeveral clefts in the crown of the ſtock, and inſerting the grafts round the top into the clefts.

The grafts will be pretty well united with the ſtock, and exhibit a ſtate of growth, by the end of May or beginning of June, and the clay may then be taken away.

Mawe's Dict.

The trees grafted by this method will ſucceed extremely well; but, for the firſt two or three years, have this inconvenience attending them, of being liable to be blown out of the ſtock by violent winds; which muſt be remedied by tying long ſticks to the body of the ſtock or branch, and each graft tied up to one of the ſticks.

Cheek-grafting.—Cut the head of the ſtock off horizontally, and pare the top ſmooth; then cut one ſide ſloping an inch and half or two inches deep, and cut the lower part of the graft ſloping the ſame length, making a ſort of ſhoulder at top of the ſloped part: it is then to be placed upon the ſloped part of the ſtock, reſting the ſhoulder upon the crown of it: bind it with baſs, and finiſh with a covering of clay as in the other methods.

Side-grafting.—This is done by inſerting grafts into the ſides of the branches without heading them down; and may be practiſed upon trees to fill up any vacancy, or for the purpoſe of variety, to have ſeveral ſorts of apples, pears, plums, &c. upon the ſame tree.

It is performed thus. Fix upon ſuch parts of the branches where wood is wanted to furniſh the head or any part of the tree; there ſlope off the bark and a little of the wood, and cut the lower end of the grafts to fit the part as near as poſſible; then join them to the branch, and tie them with baſs, and clay them over.

Root-grafting.—This is done by Whip-grafting cions upon pieces of the root of any tree of the ſame genus, and planting the root where it is to remain; it will take root, draw nouriſhment, and feed the graft.

Grafting by Approach, or Inarching.—This ſort of grafting is, when the ſtocks deſigned to be grafted, and the tree from which you intend to take the graft, either grow ſo near, or can be placed ſo near together, that the branch or graft may be made to approach the ſtock, without ſeparating it from the tree, till after its union or junction with the ſtock; ſo that the branch or graft being bent to the ſtock, they together form a ſort of arch; whence it is called Grafting by Approach, or Inarching. Being a ſure method, it is commonly practiſed upon ſuch trees as are with difficulty made to ſucceed by any of the former ways of grafting.

When intended to propagate any kind of tree or ſhrub by this method of grafting, if the tree, &c. is of the hardy kind, and growing in the full ground, a proper quantity of young plants for ſtocks muſt be ſet round it; and when grown of a proper height, the work of inarching muſt be performed; or, if the branches of the tree you deſign to graft from is too high for the ſtocks, in that caſe ſtocks muſt be planted in pots, and a ſlight ſtage muſt be erected around the tree, of due height to reach the branches, and the pots containing the ſtocks muſt be placed upon the ſtage.

As to the method of performing the work: Obſerve, that in this method of grafting, it is ſometimes performed with the head of the ſtock cut off, and ſometimes with the head left on till the graft is united with the ſtock; though, by previouſly heading the ſtock, the work is much eaſier performed; and having no top, its whole effort will be directed to the nouriſhment of the graft; having, however, the ſtocks properly placed, either planted in the ground, or in pots around the tree to be propagated; then make the moſt convenient branches approach the ſtock, and mark on the body of the branches the parts where they will moſt eaſily join to the ſtock, and in thoſe parts of each branch pare away the bark and part of the wood two or three inches in length, and in the ſame manner pare the ſtock in the proper place for the junction of the graft; then make a ſlit upwards in the branch, ſo as to form a ſort of tongue, and make a ſlit downwards in the ſtock to admit it; let the parts be then joined, ſlipping the tongue of the graft into the ſlip of the ſtock, making the whole join in an exact manner, and tie them cloſely together with baſs, and afterwards cover the whole with a due quantity of clay, as before directed in the other methods.

After this, let a ſtout ſtake be fixed, if poſſible, for the ſupport of each graft, to which let that part of the ſtock and graft be faſtened, which is neceſſary to prevent their being disjoined by the wind.

The operation being performed in ſpring, let them remain in that poſition about four months, when they will be united, and the graft may then be ſeparated from the mother-tree. In doing this, be careful to perform it with a ſteady hand, ſo as not to looſen or break out the graft, ſloping it off downwards cloſe to the ſtock; and if the head of the ſtock was not cut down at the time of grafting, it muſt now be done cloſe to the graft, and all the old clay and bandage muſt alſo be cleared away, and replaced with new, to remain a few weeks longer.

Obſerve, however, that if you ſhall think the grafts are not firmly united with the ſtock in the period of time above-mentioned, let them remain another year till autumn, before you ſeparate the grafts from the parent-tree.

By this kind of grafting, you may raiſe almoſt any kind of tree or ſhrub, which is often done by way of curioſity, to ingraft a fruit-bearing branch of a fruit-tree upon any common ſtock of the ſame fraternity or genus, whereby a new tree bearing fruit is raiſed in a few months. This is ſometimes practiſed upon orange and lemon trees, &c. by grafting bearing-branches upon ſtocks raiſed from the kernels of any of the ſame kind of fruit, or into branches of each other, ſo as to have orange, lemons, and citrons, all on the ſame tree.

An anonymous author has given us in a treatiſe, publiſhed at Hamburgh, under the title *Amænitates Hortenſes Novæ*, a new method of grafting trees, ſo as to have very beautiful pyramids of fruit upon them, which will exceed in beauty, flavour, and quantity, all that can be otherwiſe produced. This, he ſays, he had long experienced, and gives the following method

thod of doing it. The trees are to be tranſplanted in autumn, and all their branches cut off. Early in the following ſummer the young ſhoots are to be pulled off, and the buds are then to be ingrafted into them in an inverted direction. This, he ſays, adds not only to the beauty of the pyramids, but alſo makes the branches more fruitful. Theſe are to be cloſely connected to the trunk, and to be faſtened in with the common ligature: they are to be placed circularly round the tree, three buds in each circle, and theſe circles at ſix inches diſtance from one another. The old trees may be grafted in this manner, the ſucceſs having been found very good in thoſe of twenty years ſtanding; but the moſt eligible trees are thoſe which are young, vigorous, and full of juice, and are not above a finger or two thick. When theſe young trees are tranſplanted, they muſt be fenced round with pales to defend them from the violence of the wind; and there muſt be no dung put to them till they are thoroughly rooted, for fear of rotting them before the fibres ſtrike. The buds ingrafted muſt be ſmall, that the wounds made in the bark to receive them, not being very large, may heal the ſooner; and if the buds do not ſucceed, which will be perceived in a fortnight, there muſt be others put in their place. The wound made to receive theſe buds muſt be a ſtraight cut, parallel to the horizon; and the piece of bark taken out muſt be downward, that the rain may not get in at the wound. In the autumn of the ſame year, this will be a green and flouriſhing pyramid; and the next ſummer it will flower, and ripen its fruit in autumn.

GRAHAM (James), Marquis of Montroſe, was comparable to the greateſt heroes of antiquity. He undertook, againſt almoſt every obſtacle that could terrify a leſs enterpriſing genius, to reduce the kingdom of Scotland to the obedience of the king; and his ſucceſs was anſwerable to the greatneſs of the undertaking. By valour, he in a few months almoſt effectuated his deſign; but, for want of ſupplies, was forced to abandon his conqueſts. After the death of Charles I. he, with a few men, made a ſecond attempt, but was immediately defeated by a numerous army. As he was leaving the kingdom in diſguiſe, he was betrayed into the hands of his enemy, by the Lord Aſton, his intimate friend. He was carried to his execution with every circumſtance of indignity that wanton cruelty could invent; and hanged upon a gibbet 30 feet high, with the book of his exploits appended to his neck. He bore this reverſe of fortune with his uſual greatneſs of mind, and expreſſed a juſt ſcorn at the rage and inſult of his enemies. We meet with many inſtances of valour in this active reign; but Montroſe is the only inſtance of heroiſm. He was executed May 21ſt, 1650. See BRITAIN, n° 137, 143, 165.

GRAHAM (Sir Richard), lord viſcount Preſton, eldeſt ſon of Sir George Graham of Netherby, in Cumberland, Bart. was born in 1648. He was ſent ambaſſador by Charles II. to Lewis XIV. and was maſter of the wardrobe and ſecretary of ſtate under James II. But when the Revolution took place, he was tried and condemned, on an accuſation of attempting the reſtoration of that prince; though he obtained a pardon by the queen's interceſſion. He ſpent the remainder of his days in retirement, and publiſhed an elegant tranſlation of *Boethius on the conſolation of philoſophy*. He died in 1695.

GRAHAM (George), clock and watch maker, the moſt ingenious and accurate artiſt in his time, was born in 1675. After his apprenticeſhip, Mr Tompion received him into his family, purely on account of his merit; and treated him with a kind of parental affection as long as he lived. Beſide his univerſally acknowledged ſkill in his profeſſion, he was a complete mechanic and aſtronomer; the great mural arch in the obſervatory at Greenwich, was made for Dr Halley, under his immediate inſpection, and divided by his own hand: and from this incomparable original, the beſt foreign inſtruments of the kind are copies made by Engliſh artiſts. The ſector by which Dr Bradley firſt diſcovered two new motions in the fixed ſtars, was of his invention and fabric: and when the French academicians were ſent to the north to aſcertain the figure of the earth, Mr Graham was thought the fitteſt perſon in Europe to ſupply them with inſtruments; thoſe who went to the ſouth were not ſo well furniſhed. He was for many years a member of the Royal Society, to which he communicated ſeveral ingenious and important diſcoveries; and regarded the advancement of ſcience more than the accumulation of wealth. He died in 1751.

GRAHAM'S *Dyke*. See ANTONINUS'S *Wall*.

GRAIN, corn of all ſorts, as barley, oats, rye, &c. See CORN, WHEAT, &c.

GRAIN is alſo the name of a ſmall weight, the twentieth part of a ſcruple in apothecaries weight, and the twenty-fourth of a penny-weight troy.

A grain-weight of gold-bullion is worth two-pence, and that of ſilver but half a farthing.

GRAIN alſo denotes the component particles of ſtones and metals, the veins of wood, &c. Hence croſs-grained, or againſt the grain, means contrary to the fibres of wood, &c.

GRAIN (Baptiſt le), maſter of the requeſts in ordinary to Mary de Medicis queen of France's houſehold, wrote *The hiſtory of Henry the Great*, and of *Lewis* XIII. from the beginning of his reign to the death of the maſhal d'Ancre in 1617. This hiſtory is reckoned to be wrote with impartiality, and the ſpirit of a true patriot; and contains many things not to be found any where elſe. He vigorouſly aſſerts the edict that had been granted to the reformed.

GRAMINA, GRASSES; one of the ſeven tribes or natural families, into which all vegetables are diſtributed by Linnæus in his *Philoſophia Botanica*. They are defined to be plants which have very ſimple leaves, a jointed ſtem, a huſky calix termed *gluma*, and a ſingle ſeed. This deſcription includes the ſeveral ſorts of corn as well as graſſes. In Tournefort they conſtitute a part of the fifteenth claſs, termed *apetali*; and in Linnæus's ſexual method, they are moſtly contained in the ſecond order of the third claſs, called *triandria digynia*.

This numerous and natural family of the graſſes, has engaged the attention and reſearches of ſeveral eminent botaniſts. The principal of theſe are, Ray, Monti, Micheli, and Linnæus.

M. Monti, in his *Catalogus ſtirpium agri Bononienſis, gramina ac hujuſmodi affinia complectens*, printed at Bononia in 1719, divides the graſſes, from the diſpoſition of their flowers, as Theophraſtus and Ray had divided them before him, into three ſections or orders—Theſe are, 1. Graſſes having flowers collected in a ſpike. 2. Graſſes having their flowers collected in a panicle or looſe ſpike. 3. Plants that in their habit and external appearance are allied to the graſſes.

This claſs would have been natural if the author had not improperly introduced ſweet-ruſh, juncus, and arrow-headed graſs, into the third ſection. Monti enumerates about 306 ſpecies of the graſſes, which he reduces under Tournefort's genera; to theſe he has added three new genera.

Scheuchzer, in his *Ariſtographia*, publiſhed likewiſe in 1719, divides the graſſes, as Monti, from the diſpoſition of their flowers into the five following ſections. 1. Graſſes with flowers in a ſpike, as phalaris, anthoxanthum, and frumentum. 2. Irregular graſſes, as ſchœnanthus and cornucopiæ. 3. Graſſes with flowers growing in a ſimple panicle or looſe ſpike, as reed and millet. 4. Graſſes with flowers growing in a compound panicle, or diffuſed ſpike, as oats and poa. 5. Plants by their habit nearly allied to the graſſes, as cypreſs-graſs, ſcirpus, linagroſtis, ruſh, and ſceuchzeria.

Scheuchzer has enumerated about four hundred ſpecies, which he deſcribes with amazing exactneſs.

Micheli has divided the graſſes into ſix ſections, which contain in all, forty-four genera, and are arranged from the ſituation and number of the flowers.

GRAMINA, the name of the fourth order in Linnæus's fragments of a natural method, conſiſting of the numerous and natural family of the graſſes, viz. agroſtis; aira; alopecurus, or fox-tail graſs; anthoxanthum, or vernal graſs; ariſtida; arundo, or reed; avena, or oats; bobartia; briza; bromus; cinna; cornucopiæ, or horn-of-plenty graſs; cynoſurus; dactylis; elymus; feſtuca, or feſcue-graſs; hordeum, or barley; lagurus, or hare's-tail graſs; lolium, or darnel; lygeum, or hooded matweed; melica; mileum, or millet; nardus; oryza, or rice; panicum, or panic-graſs; paſpalum; phalaris, or canary-graſs; phleum; poa; ſaccharum, or ſugar-cane; ſecale, or rye; ſtipa, or winged ſpike-graſs; triticum, or wheat; uniola, or ſea-ſide oats of Carolina; coix, or Job's tears; olyra; pharus; tripſacum; zea, Indian Turkey wheat, or Indian corn; zizania; ægilops, or wild feſcue-graſs; andropogon; apluda; cenchrus; holcus, or Indian millet; iſchæmum. See BOTANY, p. 1305, col. 2.

GRAMMAR.

1. **GRAMMAR** is *the art of ſpeaking or of writing any language with propriety.*

2. Grammar conſidered as an *Art*, neceſſarily ſuppoſes the previous exiſtence of language; and as its deſign is to teach any language to thoſe who are ignorant of it, it muſt be adapted to the genius of that particular language of which it treats.—A juſt method of grammar, therefore, ſuppoſing a language introduced by cuſtom, without attempting any alterations in it, furniſhes certain obſervations called *rules*, to which the methods of ſpeaking uſed in this language may be reduced; this collection of rules is what is called a *grammar* of any particular language. For the greater diſtinctneſs with regard to theſe rules, grammarians have uſually divided this ſubject into four diſtinct heads, viz. ORTHOGRAPHY, or *the art of combining letters into ſyllables, and ſyllables into words;* ETYMOLOGY, or *the art of deducing one word from another, and the various modifications by which the ſenſe of any one word can be diverſified;* SYNTAX, or what relates *to the conſtruction or due diſpoſition of the words of a language into ſentences or phraſes;* and PROSODY, or that which treats of *the quantities and accents of ſyllables, and the art of making verſes.*

3. But grammar conſidered as a *Science*, views language in itſelf: neglecting particular modifications, or the analogy which *words* may bear to *each other*, it examines the analogy and relation between *words* and *things;* diſtinguiſhes between thoſe particulars which are *eſſential* to language, and thoſe which are only *accidental;* and thus furniſhes a certain ſtandard by which different languages may be compared, and their ſeveral excellencies or defects pointed out. This is what is called PHILOSOPHIC or UNIVERSAL GRAMMAR.

OF UNIVERSAL GRAMMAR.

4. IT is not neceſſary here to inquire how language was originally invented, to trace the various changes it may have undergone, or to examine whether any one language may be conſidered as the original from which all others have been derived: it is ſufficient for our purpoſe to obſerve, that all mankind, however diverſified in other reſpects, agree in the common uſe of language; from which it appears, that language is not merely accidental and arbitrary, but founded in the nature of things, and within the reach of all mankind. It is therefore an object worthy of a philoſophic inquiry, to diſcover the foundations upon which this univerſal fabric has been raiſed.

5. The deſign of ſpeech is to publiſh to others the thoughts and perceptions of our mind. The moſt acute feelings of man, as well as of every other animal, are expreſſed by ſimple inarticulate ſounds, which, as they tend to the preſervation of the individual, are univerſally underſtood. Theſe inarticulate but ſignificant ſounds, therefore, conſtitute a natural and univerſal language, which man, as a mere ſenſitive being, partakes in common with the other animals. But as man is not only endowed with ſenſation, but with the faculty of reaſoning, ſimple inarticulate ſounds are inſufficient for expreſſing all the various modifications of thought, or for communicating to others a chain of argumentation: it was therefore neceſſary to call in the aid of *articulation;* which by modifying theſe ſimple ſounds, and by fixing a particular meaning to theſe modifications, forms the language peculiar to man, and which diſtinguiſhes him from all other animals, and enables him to communicate with facility

all that diverſity of ideas with which his mind is ſtored. Theſe ſounds, thus modified and having a determinate meaning, are called WORDS; and as all language is compoſed of ſignificant words variouſly combined, a knowledge of them is neceſſary previous to our acquiring an adequate idea of language.

6. But, as it is by words that we expreſs the various ideas which occur to the mind, it is neceſſary to examine how ideas themſelves are ſuggeſted, before we can aſcertain the various claſſes into which words may be diſtributed. With this view, therefore, let us ſuppoſe a reaſonable being, devoid of every prepoſſeſſion whatever, placed upon this globe. His attention would, in the firſt place, be directed to the various objects which he ſaw exiſting around him: theſe he would naturally endeavour to diſtinguiſh from one another, and give them names, by means of which the idea of them might be recalled when the objects themſelves were abſent. This is one copious ſource of words; and forms a natural claſs which muſt be common to every language, and which is diſtinguiſhed by the name of NOUNS. And as theſe nouns are the names of the ſeveral ſubſtances which exiſt, they have likewiſe been called SUBSTANTIVES.

7. It would likewiſe be early diſcovered, that every one of theſe ſubſtances was endowed with certain qualities or attributes, to expreſs which another claſs of words would be requiſite. Thus, *to be weighty*, is a quality of matter; *to think*, is an attribute of man. Therefore, in every language, words have been invented to expreſs the various qualities of the ſeveral objects which exiſt. Theſe may all be comprehended under the general denomination of ATTRIBUTIVES.

8. Theſe two claſſes of words muſt comprehend all things that exiſt: for whatever exiſts, muſt of neceſſity be either a ſubſtance, or the attribute of ſome ſubſtance; and hence theſe two claſſes muſt comprehend all thoſe words which are ſignificant of themſelves, and may be called WORDS SIGNIFICANT OF THEMSELVES. If any other words occur, they can only be ſignificant in ſo far as they tend to explain or connect the words of the two former claſſes.

9. But, although theſe words form the baſis or matter of a language, in the ſame manner as ſtones form the matter of a building; yet, as ſtones cannot be arranged into a regular ſtructure without a cement to bind and connect them, ſo theſe original words ſtand in need of others to connect them, before they can be made to expreſs all the variety of our ideas. Another order of words, therefore, was neceſſary, which, although not of themſelves ſignificant, yet, when joined with others, might acquire a meaning. Theſe form a ſecond general claſs of words, that may be called WORDS NOT OF THEMSELVES SIGNIFICANT, and which cannot acquire any meaning but ſo far as they ſerve either to EXPLAIN or CONNECT the others.

10. Hence, therefore, all words which can poſſibly be invented, may be divided into two general claſſes; thoſe that are SIGNIFICANT OF THEMSELVES, and thoſe that are NOT. Words which are ſignificant of themſelves, are either expreſſive of the names of ſubſtances, and therefore called SUBSTANTIVES; or, of qualities, which we call ATTRIBUTIVES. Words which are not ſignificant of themſelves, muſt acquire a meaning either as defining or connecting others, which we ſhall arrange under the two claſſes of DEFINITIVES and CONNECTIVES, each of which ſhall be examined in their order.

CHAPTER I.

OF SUBSTANTIVES.

11. SUBSTANTIVES may be divided into two claſſes, viz. thoſe which are primary, commonly called NOUNS; and thoſe of a ſecondary order, which are often ſubſtituted for nouns, and are hence called PRONOUNS; each of which we ſhall conſider ſeparately.

SECT. I. *Of* Subſtantives *of the Firſt Order, called* NOUNS.

12. NOUNS are *all thoſe words by which objects or ſubſtances are denominated, and which diſtinguiſh them from one another, by names applicable to each, without marking either quantity, quality, action, or relation.* And as all the objects which exiſt muſt be either in the ſame ſtate that they were produced by *nature*, or changed from their original ſtate by *art*, or *abſtracted* from ſubſtances by the powers of imagination, this naturally ſuggeſts a diviſion of nouns into NATURAL, as *man*, *vegetable*, *tree*, &c.; ARTIFICIAL, as *houſe*, *ſhip*, *watch*, &c.; OR ABSTRACT, as *whiteneſs*, *temperance*, &c.

13. But the diverſity of objects being ſo great as to render it impoſſible for any perſon to know the diſtinct names of every individual, therefore it has been found expedient to arrange them under certain general claſſes, the names of which may be more eaſily acquired, ſo that by referring any unknown object to the claſs to which it belongs, we in ſome meaſure ſupply the want of proper names. Hence, therefore, each of the above ſpecies of nouns are divided into thoſe which denote genera, ſpecies, and individuals. Thus, in natural ſubſtances, *animal*, *vegetable*, and *foſſile*, denote genera; *man*, *dog*, *tree*, *metal*, are ſpecies; and *Alexander*, *Cæſar*, *oak*, *gold*, are individuals. In artificial ſubſtances, *edifice* is a genus; *houſe*, *tower*, *church*, are ſpecies; and the *Vatican*, *Tron-church*, and *Herriot's-hiſpital*, individuals. In *abſtract* ſubſtances, *motion* is a genus; *flight* and *courſe*, are ſpecies; the *flight of Mahomet*, the *courſe of a gre-hound*, are innividuals. Each of theſe general claſſes might be ſubdivided into many ſmaller; but as theſe leſſer diviſions can only relate to the particular genius of different languages, it does not fall within our plan to conſider them. We therefore proceed to take notice of the accidents which accompany nouns. Of which kind may be reckoned *number* and *gender*.

14. As *nouns* are the names of *ſubſtances*, and as there may be many ſubſtances of the ſame kind, therefore nouns muſt be adapted to expreſs whether there is one or more of thoſe objects of which we ſpeak. Nouns, therefore, in every language, admit of a certain variation to denote this circumſtance, which is called *number*. Thus, in the Engliſh language, when we ſpeak of a ſingle place of habitation, we call it *a houſe*; but if of more, we call them *houſes*. In the firſt of theſe caſes the noun is ſaid to be in the *ſingular*, and in the laſt caſe the *plural* number: nor does the Engliſh, or any other language except the Greek, admit of any other variation but theſe two: and altho' the Greek language admits of a particular variation of the

Of nouns.

the noun called the *dual* number, which is a plural limited to two objects; yet this cannot be conſidered as eſſential to language; and it is perhaps doubtful whether this variation ought to be conſidered as an elegance or a defect in that language.

15. But although number be a natural accident of nouns, it can only be conſidered as eſſential to thoſe which denote genera or ſpecies, as it does not deſcend to individuals. Thus we ſay, *animal*, or *animals*, *vegetables*, and *foſſils*; as alſo *man*, or *men*, *dogs*, *trees*, &c. But we only ſay, *Xenophon*, *Cæſar*, *Bucephalus*, &c. in the ſingular. Nor do theſe admit of a plural, excepting when we conſider any proper name as a general appellative under which many others are arranged, when it is no longer the name of an individual, but that of a ſpecies, and as ſuch admits of a plural; as the *Alexanders*, the *Ptolemies*, the *Howards*, the *Pelhams*, the *Montagues*, &c. The reaſon of all which will be obvious, if we conſider, that every genus may be found whole and entire in each of its *ſpecies*; for *man*, *horſe*, and *dog*, are each of them an entire and complete *animal*: and every ſpecies may be found whole and entire in each of its individuals; for *Socrates*, *Plato*, and *Xenophon*, are each of them completely and entirely a *man*. Hence it is, that every *genus*, though ONE, is multiplied into MANY; and every *ſpecies*, though ONE, is alſo multiplied into MANY, *by reference to thoſe beings which are their ſubordinates*. But as *no individual has any ſuch ſubordinates*, it can never in ſtrictneſs be conſidered as MANY, and ſo is truly an INDIVIDUAL as well in *nature* as in *name*, and therefore cannot admit of number.

16. Beſides number, another accident of nouns is *gender*, the nature of which may be thus explained: As nouns are the names of the various objects in nature; and as the diſtinction of ſex is perceptible among all thoſe objects which are animated, and as thoſe which are inanimate cannot admit of any ſex at all; therefore all the beings which can become the objects of our ſpeculation, may be conſidered as either *males* or *females*, or ſuch as admit of *no* ſex, and therefore may be ſaid to be neuter, or of *neither* ſex. Hence, therefore, grammarians have made a threefold diſtinction of nouns, into *maſculine genders*, or thoſe which denote *males*; *feminine*, or thoſe which denote *females*; and *neuters*, which denote thoſe ſubſtances that admit of no ſex. But, although the origin of genders is thus ſo clear and obvious; yet every language that we know of, except the Engliſh, deviates from the order of nature, and often attributes ſex to thoſe ſubſtances which are totally incapable of any: nay, ſome languages are ſo particularly defective in this reſpect, as to claſs every object inanimate as well as animate under either the *maſculine* or *feminine gender*, as they admit of no gender for thoſe that are of neither ſex. This is the caſe with the French, Italian, and Spaniſh. But the Engliſh, ſtrictly following the order of nature, puts every noun which denotes a male animal, and no others, in the *maſculine* gender; every name of a female animal, in the *feminine*; and every animal whoſe ſex is not obvious, or known, as well as every inanimote object whatever, in the *neuter* gender. Nor does this rule admit of any exceptions; although poets take the liberty of perſonifying any objects they think proper, and endow them with whatever ſex ſuits their purpoſe beſt; which ſerves admirably to diſtinguiſh between the cool language of philoſophy, and the enthuſiaſm of poetry.

17. Although *Caſes* are not neceſſary accidents of nouns; yet as they have been often conſidered as ſuch, it will perhaps be deemed proper to take ſome notice of them.—As natural objects remain the ſame, altho' obſerved from many different points of view, they are not in their own nature altered, although they may be connected with others in many different ways: their names therefore ought to remain unchanged, although their relations to other words may be varied. However, there are certain circumſtances in which nouns may be conſidered with reſpect to their relation *to*, and connection *with*, other words, which occur more frequently than others. Some languages (particularly the Greek and Latin) expreſs *ſome* of theſe circumſtances by a variation of the original noun, which variations are called CASES. But the Engliſh, and almoſt all the modern languages of Europe, have followed the order of nature, and allow the noun to remain the ſame, expreſſing its relation and connection with other words by the help of diſtinct words called *prepoſitions*.—Which of theſe methods is beſt, it is not our preſent purpoſe to inquire. See LANGUAGE.

18. It has been ſuppoſed the Engliſh nouns admit of one variation which anſwers to the genitive caſe of the Latins.—Thus the word *Alexander* is an Engliſh noun in its proper form, and in that caſe which in Latin would be called the *Nominative*. The variation which they called the *Genitive* Caſe, is expreſſed in Engliſh by adding the prepoſition OF before the noun; thus, OF *Alexander*. But the ſame meaning may be conveyed by the word *Alexander's*; for the meaning is the ſame, if I ſay the houſe *of Alexander*, or *Alexander's* houſe. This, therefore, has been called a true inflection of the original noun. However, although this opinion has been adopted by all grammarians, it appears to have been adopted without ſufficient examination, as will be evident from the following conſiderations.

There are certain circumſtances in which this ſuppoſed genitive cannot be ſubſtituted inſtead of the other: for I may ſay, I ſpeak OF *Alexander*, I write OF *Cæſar*, I think OF *Pompey*; but I cannot ſay, I ſpeak *Alexander's*, I write *Cæſar's*, or I think *Pompey's*. Hence theſe two are not in all caſes ſynonymous terms; and therefore one of them muſt be conſidered as only accidentally coinciding with the other in particular circumſtances.

Again, every one of theſe ſuppoſed genitives can with propriety aſſume all the various ſigns of the different *caſes* in the Engliſh language: for we may ſay ſimply, as in the nominative caſe, *Alexander's houſe*; but we can alſo ſay, OF *Alexander's houſe*, TO, WITH, FROM, IN, BY, or FOR *Alexander's houſe*, &c. If this then be a real genitive, it requires the ſign of the genitive, as well as of the other caſes, to explain it; which would be an abſurdity too great to be admitted.—But it may be aſked, If theſe are not genitives, to what claſs of words can they be referred?

In anſwer to this, it has been already obſerved, that the variety of ſubſtances is ſo great, that it is im-

Pronouns.

impoſſible for any perſon to know the names of every one of them ; and therefore, they have been arranged under the ſeveral orders of genera and ſpecies. We now further obſerve, that as the individuals are ſo exceedingly numerous, it would be impoſſible even to invent proper names for each, and far leſs would it be poſſible to make theſe names be known to every perſon who might accidentally ſee them: therefore, when we want to aſcertain any individual object, and diſtinguiſh it from all the other individuals of the ſame ſpecies, we are obliged to have recourſe to particular epithets, or definitives, to aſcertain that individual.—Thus, I ſee a particular houſe which I want to diſtinguiſh from other houſes : this has no particular name of its own : I muſt therefore aſcertain it in the beſt manner I can : and as the ſhorteſt is always the beſt, we moſt naturally denominate it from its owner or poſſeſſor if we know him ; and therefore call it *Alexander's*, *James's*, or *John's*, houſe.—Here then we ſee, that the words *Alexander's*, *James's*, and *John's*, do not ſtand as nouns, but as *articles* or *definitives* ſerving to aſcertain and point out the individuality of the noun with which they are joined, and are much nearer allied to adjectives than to ſubſtantives. Theſe, therefore, like other articles, do not alter the caſe of the noun ; ſo that the term *Alexander's houſe*, is as much the proper name of a particular houſe, as *Alexander* or *James* are the proper names of particular men, and of conſequence may be varied through the different caſes as well as the other.—It is ſurpriſing, that this idea never occurred to grammarians ; for *St Peter's* at Rome, and *St Paul's* at London, are as truly the proper names of theſe two noble edifices, as the *Rotundo* or the *Circus* are the proper names of two other ſtructures.—We may therefore ſafely conclude, that the Engliſh language admits of no caſes at all, and that the only eſſential accidents of nouns are gender and number.

SECT. II. *Of* Subſtantives *of the Second Order, called* PRONOUNS.

19. ALL converſation paſſes between individuals. When theſe individuals are unknown to each other, how ſhall the one ſpeaker addreſs the other when he knows not his name ; or how explain himſelf by his own name, of which the other is wholly ignorant ? This might perhaps have been at firſt effected by pointing: but as it behoved this method to be extremely inconvenient and defective, it was neceſſary that a particular claſs of words ſhould be invented for this purpoſe ; and as theſe words always ſupply the place of a noun, they have been called PRONOUNS ;—the nature of which may be explained as follows.

20. Suppoſe the parties converſing to be wholly unacquainted, and the ſubject of the converſation to be the ſpeaker himſelf: here, to ſupply the place of pointing, the inventors of language have furniſhed the ſpeaker with the pronoun *I ; I write, I deſire :* and as the ſpeaker is always principal with reſpect to his own diſcourſe, they have therefore called this the *pronoun* of the FIRST perſon.

Again, ſuppoſe the ſubject of the converſation to be the party addreſſed : here, for ſimilar reaſons, they invented the pronoun THOU, THOU *writeſt*, THOU *walkeſt ;* and as the party addreſſed is next in dignity to the ſpeaker, or at leaſt comes next with reference to the diſcourſe, they therefore called this the *pronoun* of the SECOND perſon.

But as the ſubject of the converſation may be ſome third object different from either the ſpeaker or the party addreſſed, another pronoun was neceſſary; and as this object might be either a *male* or a *female*, or a *neuter*, it was neceſſary to have one pronoun for each of the genders, HE for the *maſculine*, SHE for the *feminine*, and IT for the *neuter*: and this, in diſtinction to the former, was called the *pronoun* of the THIRD perſon.—Hence the diſtribution of pronouns into *perſons*.

21. We have already ſeen that nouns admit of number; pronouns, which are their ſubſtitutes, likewiſe admit of number. There may be many ſpeakers of the ſame ſentiment, as well as one who including himſelf ſpeaks the ſame ſentiment with MANY; ſpeech may likewiſe be addreſſed to MANY at a time as well to as ONE; and the ſubject of the diſcourſe may likewiſe be MANY ; therefore the pronoun of every one of the *perſons* muſt admit of number, to expreſs this ſingularity or plurality. Hence, therefore, the pronoun of the firſt perſon *I*, has the plural WE; that of the ſecond perſon *thou*, has the plural YOU; and that of the third perſon *he*, *ſhe*, or *it*, has the plural THEY, which is equally applied to all the three genders.

22. With regard to gender, we do not find in any language that the pronouns of the *Firſt* or *Second* perſons admit of any diſtinction in this reſpect: nor was it neceſſary that they ſhould; as the ſpeaker and party addreſſed are uſually preſent with one another, this diſtinction is generally obvious from dreſs and external appearance. But this is not the caſe with regard to the pronoun of the *Third* perſon; of whoſe character and diſtinctions we often know no more than what we learn from the diſcourſe itſelf; and hence it is, that in almoſt all languages the pronoun of the third perſon admits of genders, as we have already ſeen the Engliſh admits of the triple diſtinction of maſculine, feminine, and neuter.—The utility of which threefold diſtinction will be beſt ſhewn by an example. Suppoſing there was no ſuch diſtinction, and that we ſhould read in any hiſtory HE cauſed HIM to deſtroy HIM, and were told that the pronoun which is here thrice repeated ſtood each time for ſomething different; that is to ſay, for a man, for a woman, and for a city, whoſe names were *Alexander*, *Thais*, and *Perſepolis*. Taking the pronoun thus diveſted of its genders, it does not appear which of the three was deſtroyed, which the deſtroyer, or which the cauſe that moved to the deſtruction. But there is no ambiguity when we hear the genders diſtinguiſhed; and when, inſtead of the ambiguous ſentence, *he* cauſed *him* to deſtroy *him*, we are told with the proper diſtinctions that SHE cauſed HIM to deſtroy IT. Then we know with certainty, that the promoter was the *woman*, that her inſtrument was the *hero*, and that the ſubject of her cruelty was the unfortunate *city*.—From this example we would be ſurpriſed how the *Italian*, *French*, and *Spaniſh*, could expreſs themſelves with preciſion or elegance, with no more than two variations of this perſon.

23. From the ſame cauſes, as a diſtinction of gender is unneceſſary in the pronouns of the firſt and ſecond perſons, we ſee the reaſon why a ſingle pronoun to each perſon, an *I* for the firſt, and a THOU for the ſecond,

are ſufficient for all the purpoſes of language, as theſe are always ſuppoſed preſent and obvious. But it is not ſo with reſpect to the third perſon, as the various relations of different objects made it neceſſary to have not *one*, but *many;* ſuch as, HE, SHE, IT, THIS, THAT, OTHER, SOME, ALL, ANY, &c.

24. Although we have ſaid that there is only one pronoun for each of the firſt and ſecond perſons, yet the Engliſh reader may perhaps be puzzled with finding two diſtinct words applied to each; I and ME, for the firſt perſon; THOU and THEE, for the ſecond. The learned reader will at once ſee that theſe two words ME and THEE are equivalent to the *accuſative* caſe of the Latin pronoun: but, in order to make the meaning of this as plain as poſſible without embarraſſing ourſelves about unneceſſary terms, we ſhall only obſerve, no effect can be produced without a cauſe, and no action can be performed without producing ſome effect. The ſame perſon may in different circumſtances be either the active and efficient cauſe *of*, or the paſſive ſubject who ſuffers *by*, an action: ſome languages have therefore formed different words to expreſs the ſame object in theſe different circumſtances. Thus in the Latin ſentences, *Brutus amavit Caſſium*, Brutus loved Caſſius; and *Caſſius amavit Brutum*, Caſſius loved Brutus; the word *Brutus* in the firſt, and *Caſſius* in the ſecond, is the form which the noun aſſumes when it is uſed as the efficient cauſe; and *Brutum* and *Caſſium* the forms which the ſame nouns aſſume when they are repreſented as the paſſive ſubjects. This laſt, then, is what was called the *accuſative* caſe of the noun, and the firſt was called the *nominative*. We have already ſeen, that the Engliſh noun admits of no caſes, the active ſubject always preceding the verb, and the paſſive following it; as is plain from the above ſentences, where *Brutus* and *Caſſius* remain unchanged in both ſituations; and the ſame might be obſerved of all other modern languages: yet the Engliſh and all modern languages admit of a different word to expreſs the different ſtate of the pronouns. Thus, we ſay, I *eſteem* THEE, I *admire* HIM, I *love* HER: in all of which ſentences, *I* the pronoun of the firſt perſon, is the *active;* and THEE of the ſecond perſon, and HIM and HER of the third, are the *paſſive* ſubjects, and are therefore expreſſed by the words THEE, HIM, and HER. But if the caſe be reverſed, and the pronoun of the firſt perſon becomes the paſſive ſubject, and the others the active, they aſſume a different form; thus, THOU *eſteemeſt*, HE *admires*, SHE *loves*—ME. Hence, therefore, it appears that we have two diſtinct words for each of theſe pronouns to expreſs the different ſtates in which they may be repreſented, exactly analogous to the nominative and accuſative caſes of the Romans. Whether theſe are to be admitted as caſes of our pronouns, or whether they may not rather be conſidered as diſtinct words formed for that particular purpoſe, is of little conſequence for us to inquire; as, in whatever light they be conſidered, this variation cannot be looked upon as an eſſential part of language, but only as a particular refinement, invented to prevent the diſagreeable repetition of the pronoun, which behoved frequently to have happened without this contrivance. This ſeems to be the only reaſon why pronouns have been endowed with this variety, and not nouns. For as nouns are in themſelves greatly diverſified, the ſameneſs of ſounds does not here ſo often occur as it would have done in the pronouns, where the ſame *I*, THOU, HE, SHE, or IT, anſwers for the name of every object which occurs in nature; but, by this diverſity in the form of the words, this circumſtance is in ſome meaſure obviated. And it is probably for the ſame reaſon, that the plural of each of theſe pronouns is ſo very different from the ſingular. Thus, from *I* of the firſt perſon is formed WE in the plural, and from ME the plural US; from THOU and THEE the plurals YE and YOU; from HE, SHE,—HIM, HER, and IT, the plurals THEY and THEM. In all of which there is not the leaſt reſemblance between the ſingular and plural of any one word; and, except in HE and HIM, THEY and THEM, there is not any ſimilarity between what may by ſome be thought to be the different *caſes* of the ſame word.

25. We have ſeen that the ſame object may ſometimes be the cauſe of an action, and ſometimes the object which ſuffers by it. We now obſerve, that the ſame object may ſometimes be, with regard to the ſame action, both the active cauſe and paſſive ſubject: as when we ſay, *Brutus killed himſelf.* In which caſe it is evident, that Brutus was both the cauſe that produced, and the object that ſuffered by the action; the pronoun *himſelf* being put for his name: for, were it not for the ſameneſs of the ſound, and the ambiguity which would be occaſioned by it, we might ſurely ſay, *Brutus killed Brutus.* It was therefore neceſſary to have a particular pronoun for the paſſive ſubject, in all thoſe caſes where the ſame object was the agent; and on this account the word SELF has been invented, having the plural SELVES. This pronoun therefore, which ſerves on all occaſions to repreſent the action as returning upon the agent that produced it, may be called the *reciprocal pronoun;* which has this peculiarity, that it can never ſtand by itſelf, but muſt alway have the aſſiſtance of the pronoun in whoſe place it is ſubſtituted; as, MYSELF, THYSELF, HIMSELF, HERSELF, ITSELF, with their plurals. But although this ſeems to have been the original uſe of this pronoun; yet, in the Engliſh language, its uſe has been extended further; and from its always having a reference to the agent of any action, it has been employed to denote that agent by way of emphaſis, as performing the action without the aid or aſſiſtance of any other; as, *he himſelf went.* And from this circumſtance it has been further extended to denote any object as performing or ſuffering any thing which we would not naturally have expected from its known character or nature; as in this ſentence: "The moſt daring of mankind are ſometimes ſtartled before they venture upon the commiſſion of any extraordinary crime; even Cæſar HIMSELF felt the utmoſt perturbation of mind before he dared to paſs the Rubicon."

26. Theſe are all that can be properly called *perſonal pronouns;* but there are others which are derived from them, called *poſſeſſive pronouns,* as, MY, THY, MINE, HIS, HER'S, ITS, &c. the nature of which it will be neceſſary here to explain. We have already ſhewn how nouns, when they came to denote poſſeſſion, were no longer to be conſidered as nouns, but rather as definitives or articles; ſo the pronouns which we here conſider, being the real ſubſtitutes of *nominal* articles, ought alſo to be conſidered as a diſtinct claſs of pronomial articles; for as theſe never, in any caſe, can be

ſubſtituted for a noun, they cannot be conſidered as pronouns. Grammarians have been led into the miſtake of placing them under this head, becauſe they are the ſubſtitutes of theſe words, which, although they aſſume the appearance of nouns, only perform the part of definitives. Thus we have ſeen, that when we ſay, *Alexander's houſe;* the word *Alexander's* can only be conſidered as a definitive: and, in the ſame manner, if Alexander was the ſpeaker, he might ſay, MY *houſe;* if the party addreſſed, it would be, THY *houſe;* or if any third perſon, HIS, and in the ſame manner HERS or ITS, *houſe*. In all which caſes this poſſeſſive pronoun is ſubſtituted for that word which only ſerves to define and aſcertain the identity of the noun; and not for the noun itſelf, which muſt always be either expreſſed or underſtood. Hence the reaſon why one pronoun becomes the ſubſtitute of this noun and its proper definitive, whether that definitive appears in the form of a noun or pronoun: for I can ſay, "*Alexander's houſe* is more elegant than *Mary's*, or *his houſe* is more elegant than *hers*, although IT neither is ſo commodious nor agreeable to live in." In which example it is plain, that the words *his* and *hers* are ſtrictly the ſubſtitutes only of *Alexander's* and *Mary's*, and nothing more; whereas the pronoun IT is the ſubſtitute of the whole noun with its definitive *Alexander's houſe*. The other claſs of pronouns poſſeſſive, MINE, THINE, &c. as they do not ſo much ſerve to diſtinguiſh individuals, as to aſcertain the property of the thing ſpoken of, which may, in a certain ſenſe, be conſidered as an attribute thereof, are more nearly allied to attributives, and have therefore by ſome been called *adjectives*. And it muſt be acknowledged, that theſe two claſſes of words are ſo nearly allied to one another, that it is difficult to aſcertain, in all caſes, the preciſe boundary between them.

27. Beſides theſe, there are other words which ſometimes aſſume the province of pronouns, and are generally conſidered as belonging to this claſs, although in many caſes improperly; ſuch as, THIS, THAT, ANY, SOME, THESE, THOSE, ALL, and ſome others, which may be called *improper* pronouns. To diſtinguiſh when they may be conſidered as pronouns, we may obſerve, that when they ſtand by themſelves, and ſupply the place of a noun, as when we ſay, THIS *is virtue, give me* THAT, then are they pronouns. But when they are aſſociated to ſome noun, as when we ſay, THIS HABIT *is virtue*, or THAT MAN *defrauded me;* then, as they do not ſupply *the place* of a noun, but only ſerve to *aſcertain* one, they fall rather under the ſpecies of *definitives*, or *articles*. And indeed it muſt be confeſſed, that theſe, as well as the poſſeſſive pronouns, are more properly adapted to define and aſcertain individuals among nouns, than to ſupply their place; and therefore are oftener to be conſidered as articles than as pronouns. The beſt rule to diſtinguiſh when they are to be conſidered as the one or the other, is this. The genuine PRONOUN *always ſtands by itſelf*, aſſuming the power of a NOUN, and ſupplying its *place*. The genuine ARTICLE *never ſtands by itſelf;* but appears at all times *aſſociated to ſomething elſe*, requiring a noun for its ſupport, as much as *attributives* or *adjectives*.

28. The three orders of pronouns already mentioned, may be called *prepoſitive;* becauſe they are capable of introducing or leading a ſentence, without having reference to any thing previous. But there is another order of pronouns which can never be employed but to *connect* ſentences, and muſt therefore always have a reference to ſome ſentence that precedes them; as, WHO, WHICH, WHAT. The nature of which may be explained as follows.

29. Suppoſe I ſay, LIGHT *is a body;* LIGHT *moves with great celerity;* theſe would apparently be two diſtinct ſentences. But if, inſtead of the ſecond LIGHT, I were to place the prepoſitive pronoun IT, and ſay, LIGHT *is a body*, IT *moves with great celerity*; the ſentences would ſtill be diſtinct, and two. But if I add a *connective*, (as for example, AND) ſaying, LIGHT *is a body*, AND IT *moves with great celerity*; I then, by connection, make the two into *one*. Now it is *in the united powers of a connective and another pronoun*, that we may ſee the force and character of the pronoun here treated of. For if, inſtead of the words AND IT, we ſubſtitute THAT or WHICH; ſaying, LIGHT *is a body* WHICH *moves with great celerity*; the ſentence ſtill retains its *unity*, and becomes, if poſſible, more compact than before. We may therefore call this pronoun the SUBJUNCTIVE; becauſe it cannot introduce an original ſentence, but only ſerves to *ſubjoin one to ſome other which is previous*.

30. The application of this *ſubjunctive*, like the other pronouns, is univerſal. It may be the ſubſtitute of all kinds of ſubſtantives, natural, artificial, or abſtract; general, ſpecial, or particular: for we may ſay, The *man who*, the *ſhip which*, *Alexander who*, *virtue which*, &c. Nay, it may even be the ſubſtitute of all the other pronouns, and is therefore of courſe expreſſive of all the three perſons. Thus we ſay, I WHO *now write*, THOU WHO *now readeſt*, HE WHO *now heareth*, &c. And thus the SUBJUNCTIVE is truly a *pronoun* from its *ſubſtitution*; there being no ſubſtantive exiſting in whoſe place it may not ſtand. At the ſame time it is eſſentially diſtinguiſhed from the other pronouns by this particular, that it is not only a *ſubſtitute*, but likewiſe a *connective*.

31. As to the accidents of this pronoun: From its performing the part of a connective, it of courſe follows, that neither *gender* nor *number* can be conſidered as eſſential to it; becauſe theſe are always expreſſed in the preceding parts of the ſentence to which it refers; nor do we in fact find, that this pronoun, at leaſt in modern languages, admits of any diſtinction to denote *number*, although the Engliſh language admits of one variation for the *gender*; as we employ WHO for the *maſculine* and *feminine*, and WHICH for the *neuter* gender, thus: *The man*, or *the woman*, WHO *went to Rome*; *the* TREE *which ſtands on yonder plain*, &c. It likewiſe admits of a variation ſimilar to that of the accuſative caſe; at leaſt when applied to males or females. For when the object which it repreſents is the efficient cauſe of action, it is WHO; as, *the man* WHO *fell*, &c.; but when it is the paſſive ſubject, it then, in certain circumſtances, takes the form of WHOM; as, *the man of* WHOM *I ſpeak*; although this is not univerſal; as we likewiſe ſay, *the man* WHO *was beaten*. But the neuter admits of no ſuch diſtinctions, as we equally ſay, *the tree* WHICH *fell*, or *the tree of* WHICH *I ſpoke*. But both of theſe admit of a variation to denote poſſeſſion or qualities, which is the

word WHOSE for all genders. Thus we ſay, *Socrates* WHOSE *only ſtudy was virtue*; *Elizabeth*, WHOSE *reign was glorious*.

32. To conclude: We have ſeen that ſubſtantives are either *primary* or *ſecondary*; or, in other words, NOUNS or PRONOUNS. The NOUNS denote ſubſtances, either *natural*, *artificial*, or *abſtract*; and theſe either *general*, *ſpecial*, or *particular*. The PRONOUNS, their ſubſtitutes, are either *prepoſitive* or *ſubjunctive*: the PREPOSITIVE is diſtinguiſhed into three orders, called the *firſt*, the *ſecond*, and the *third* perſons; the SUBJUNCTIVE includes the powers of all the three, having *ſuperadded*, as of its own, the peculiar force of a connective.

CHAPTER II.

Of ATTRIBUTIVES.

33. As all attributives muſt either be expreſſive of the attributes of SUBSTANCES, or of other ATTRIBUTES, we divide this claſs into two kinds; calling thoſe of the firſt kind, ATTRIBUTIVES of the FIRST ORDER; and thoſe of the ſecond kind, ATTRIBUTIVES of the SECOND ORDER.

SECT. I. Attributives *of the Firſt Order*.

34. ATTRIBUTIVES are all thoſe *principal* words that denote *attributes* conſidered as attributes. Such, for example, are the words, *black*, *white*, *great*, *little*, *wiſe*, *eloquent*, *to write*, *to walk*, *to ſpeak*, &c. all of which are the *attributes of ſubſtances*. Thus *black* is an attribute of *jet*, *white* of *ſnow*;—*wiſe* and *eloquent*, as alſo, to *write* and *ſpeak*, are attributes of *men*.

In examining the different attributes of ſubſtances, we readily perceive that ſome of them have their eſſence in *motion*; ſuch are, *to walk*, *to fly*, *to ſtrike*, *to live*, &c. Others have it in the *privation* of *motion*; as, *to ſtop*, *to reſt*, *to ceaſe*, *to die*, &c. And others have it in ſubjects that have *nothing to do* with either *motion* or its *privation*; ſuch are the attributes of *great* and *little*, *wiſe* and *fooliſh*, *white* and *black*, and, in a word, the ſeveral *quantities* and *qualities* of all things. This therefore furniſhes a natural diviſion of attributives of this order; and grammarians have called all thoſe, whoſe eſſence conſiſts in *motion* or its *privation*, VERBS; and all the others have been called ADJECTIVES; each of which we ſhall conſider ſeparately.

I. *Of* VERBS.

35. VERBS are all thoſe principal words which denote *attributes*, whoſe eſſence conſiſts in *motion*, or *energies*, (for we chooſe to make uſe of this laſt term, as it implies the exertions of the mind as well as thoſe of the body), or their *privation*. This order of attributives differs from the order called *adjectives*; not only in the particular above-mentioned, but alſo becauſe adjectives denote only qualities or quantities, which do not admit of any change of ſtate; whereas the verbal attributives may be conſidered as in ſeveral different ſtates, and therefore admit of ſeveral variations in the term employed to expreſs theſe. It may, in the firſt place, be conſidered as a ſimple attribute or energy, without particularizing any circumſtance relating to the ſtate it may be in; as in the word to WRITE. Or, in the ſecond place, as theſe are all attributes which denote motions or energies, they may be repreſented as in the ſtate of actual motion or exertion; as in the word WRITING. Or, laſtly, the motion or energy may be finiſhed, and its effect completed; as in the word WRITTEN. Hence, therefore, every verb admits of a threefold variation in every language, in each of which languages they are diſtinguiſhed by ſome particular names. Our grammarians have given the name of the INFINITIVE MODE to the original verb itſelf, and the other two variations of it are both diſtinguiſhed by the name of PARTICIPLES; that variation which exhibits the verb in its ſtate of energy being called the PARTICIPLE PRESENT or ACTIVE, and the other variation is called the PARTICIPLE PERFECT or PAST.

36. Theſe variations of the verb are founded in the nature of things, and therefore muſt be found in every language under ſome form or other. As to the other ſuppoſed variations of verbs relating to perſon, number, time, &c. the ſlighteſt reflection on this ſubject will ſhew, that a verb, conſidered as a ſimple attributive, can admit of none of theſe affections, but muſt for ever remain the ſame at all times and in all ſituations whatever; for who does not ſee, that the attribute *to write* is the ſame whether it is poſſeſſed by *you*, by *me*, or by any number of different perſons? Nor does this attribute ſuffer any change, whether it is repreſented as having been exerted a *thouſand years ago*, or at *this preſent moment*, or at *any other* aſſignable period of duration; but, like every other attribute, it muſt remain for ever the ſame. For however *ſubſtances* may vary with time, and be inceſſantly changing; yet *attributes* of every ſort are altogether beyond its power. And we muſt eaſily perceive, that the attribute which is expreſſed by the word GOOD, is the ſame now as it was at the creation, or will be while the world exiſts. And in the ſame manner, *to walk*, *to write*, *to fly*, denote attributes, which muſt each of them preſerve their own particular nature during all the ſucceſſive ages of time. Hence therefore we ſee, that the verbal attribute muſt for ever remain in that ſtate, or modification, in which it is at firſt repreſented. Nor can it ſuffer any change, however different the circumſtances may be in which it can be applied in language. All, therefore, that can be ſaid of theſe ſeveral variations with which grammarians have uſually endowed verbs, is this, That, as an attributive, it hath ſuch an intimate connection with a ſubſtantive, as neceſſarily to be united with one, before it can make a principal figure in language: and as that union may be repreſented as taking place at different times, and under different circumſtances, the inventors of ſome languages have contrived to expreſs theſe different connections by a ſingle word, inſtead of doing it by different words, as the thing in itſelf would naturally require; in the ſame manner as thoſe who uſe the ſhort-hand method of writing, make a ſingle character expreſs a whole word or ſentence: And as it was moſt natural for the contrivers of theſe words to derive them from the verb itſelf of which they are compounded, they have each of them become a *real* variation of the original *word* which expreſſes the verbal attribute; and, from thus being a variation of the verbal *word*, they have at laſt come to be conſidered as an *eſſential* variation of the *verb itſelf*, which has occaſioned thoſe contradictory definitions, and that confuſion of ideas, which we meet

with among all writers on this ſubject. But as we here conſider language as in itſelf, without regarding the particular forms under which it may appear, we muſt reject all theſe variations of *perſons*, *numbers*, *modes*, and *tenſes*, which the verb itſelf has uſually been ſuppoſed to undergo; and conſider them, not as eſſential variations of the verb itſelf, but as variations produced in language by the combination of the verb with other parts of ſpeech; and, therefore, relating to *ſyntax*, and of courſe belonging to thoſe grammatical diſquiſitions alone which treat of the peculiarities of any particular language. But as theſe variations have been ſo univerſally conſidered as eſſential parts of the verb itſelf, and as the terms which this diviſion of the verb have introduced into grammar are ſo frequently to be met with, it will be neceſſary to explain, in ſome meaſure, the meaning of theſe ſeveral terms.

37. In the natural world, no attribute can poſſibly exiſt without a ſubſtance to which it belongs, nor any ſubſtance without poſſeſſing certain attributes. So neceſſary and intimate is the connection between theſe, that it is as impoſſible to ſeparate them, as to create or annihilate the ſeveral ſubſtances that poſſeſs theſe attributes. But although we are thus circumſcribed as to our bodily powers, the mind admits not of ſuch limitation; but can, with the utmoſt facility, ſeparate every quality from every object whatever, and conſider them apart; as, *colour* without *ſuperficies*, *ſuperficies* without *ſolidity*, or *weight* without *matter*, &c. and, when thus ſeparated, apply them to what objects, and in what manner, it pleaſes. In this manner the mind abſtracts thoſe attributes which denote *motions* or *energies* from their *agents* or *energizers*, in the ſame way as it abſtracts *qualities* from their *ſubſtances*. And it is theſe energies thus abſtracted, which form that ſpecies of words called *verbs*; in the ſame manner as thoſe attributes which denote *quantities* and *qualities* abſtracted from their neceſſary ſubſtances, form *adjectives*. Thus, the term *to walk*, denotes a particular *energy* as conſidered perfectly apart from every *energizer*, in the ſame manner as the word *good* denotes a certain *quality* without regard to any particular *ſubſtance*.

38. Here then we diſcover a moſt eſſential difference between the order of nature, and that repreſentation of it which man makes by means of words. For in *nature*, every quality muſt at all times be united with ſome ſubſtance, nor can ever be exhibited ſeparate from it; but in *language*, every attributive, if it be conſidered at all, muſt be ſeparated from the object to which it naturally belongs. Hence we ſee the reaſon why, in language, every *energy* and energizer, not only *may* be conſidered ſeparately, but *muſt* for ever remain ſeparate, unleſs they be united by ſome other power than what is neceſſarily their own. For the attribute *to write*, can no more be united to *man* its proper energizer, than a motion could commence without a cauſe; and till this attribute is united to its proper energizer, it muſt remain in a great meaſure dead and inefficacious in language.—To communicate life and energy, therefore, to this inert attribute, it muſt be united to its proper energizer; which can only be effected by the help of an aſſertion of the ſpeaker himſelf; which may be conſidered as the ſame with regard to language, as life is in the natural world.

39. It is evident, that, by the aſſiſtance of an aſſertion, the ſpeaker is enabled to unite any energy to any particular energizer, and thus, without making any change upon the attribute itſelf, repreſent a variety of changes produced upon other bodies by its means.—Thus, if I ſay, *I write*, what do I more than aſſert that I myſelf am poſſeſſed of that particular attribute denoted by the verb *to write?* If I ſay, *You write*, or *He writes*, what do I more than aſſert that another perſon is poſſeſſed of that particular attribute or energy?—If I ſay, *He* DID *write*, I only aſſert that the ſame attribute was poſſeſſed at another time, by the ſame perſon, as before. Hence, therefore, by the help of this aſſertion of the ſpeaker, we are enabled to join this particular attribute to many different energizers, as well as to repreſent theſe different combinations as occurring at many different times; ſo that the ſame attribute may thus be made to appear under a great many different circumſtances, and exhibit a great variety of changes upon other objects, although itſelf remains unchanged; the ſeveral variations which we perceive, only relating to the objects with which it is combined, or the means by which that union is effected.—In the ſame manner it often happens, that any object in nature, a houſe, for example, may appear extremely different when viewed from different ſituations.

40. From the intimate connection that takes place between the energy, the energizer, the aſſertion, and time, theſe ſeveral acceſſories have been conſidered as eſſential parts of the verb; and therefore ſome grammarians have defined a verb to be *A word denoting an energy, with time, and an aſſertion.* But if we were thus to confound things with thoſe which may neceſſarily accompany them, we could never arrive at a clear perception of any ſubject whatever. But not to enter into the arguments that might be produced to ſhew the impropriety of this definition, we ſhall only obſerve, that by the univerſal acknowledgment of all grammarians this cannot be juſt. For they unanimouſly agree, that the *infinitive mode* is not only *a part* of every verb, but the *moſt eſſential part*; as it forms the root from which all the other parts are derived. But as this mode neither denotes either time or an aſſertion, it is evident that theſe, even by their own acknowledgment, can be at beſt but acceſſories, and not eſſential parts of the verb.

41. From theſe arguments, therefore, we muſt conclude, that the verb itſelf admits of no other variations but thoſe already taken notice of;—that before it can produce any active effect in language, like every other attribute, it muſt be united to ſome proper energizer;—that this union in language can never be effected but by means of an exertion of the vital powers of the ſpeaker, whereby he either publiſhes his perception thereof, or his will that it ſhould be;—and that this union may be repreſented as taking place at all the different times that can be aſſigned. Theſe, therefore, are each of them neceſſary accompaniments of a verb, but each of them ſeparate and diſtinct in their own nature, not only from this verb, but from one another; and it becomes an eſſential part of the ſyntax of every language, to conſider the various ways in which theſe can be combined and affect one another.—Nay, ſo intimate has this connection been thought to be by ſome, that the contrivers of certain languages have arranged

them under particular claſſes, for the ſake of diſtinctneſs and preciſion.—The form which a verb aſſumed, when thus varied in all the ways that their particular language would admit of, was called the CONJUGATION of the verb; the ſeveral parts of which may be underſtood from the following ſketch.

42. When the verb is conſidered under the compound form of which we now ſpeak, it can admit of variations chiefly in three reſpects. For, firſt, ſuppoſing the *attribute*, the *energizer*, and the *time* when that attribute was exerted by the energizer, to be the ſame; a variation may be occaſioned by a change being produced in the *perception* or *volition* of the ſpeaker, (which, for brevity, we will call the *aſſertion*), as in theſe examples: *I write*, SCRIBO; *I may write*, SCRIBAM; *do you write*, SCRIBE. The variations produced by this means have been called MODES. Secondly, Suppoſing the *attribute*, the *energizer*, and the *aſſertion*, to be the ſame; a change may be produced in the *time*, as in theſe examples: *I do write*, SCRIBO; *I have writen*, SCRIPSI; *I ſhall write*, SCRIBAM, &c. The variations produced from this cauſe have been called TENSES. And thirdly, Suppoſing the *attribute*, the *time*, and the *aſſertion*, to remain unchanged, there may be a difference in the *energizer*; and this likewiſe admits of a diviſion: for as the energizer may be only *one* or more perſons, it muſt have a variation into *ſingular* and *plural* on theſe accounts; as in theſe examples: *I write*, SCRIBO; *thou writeſt*, SCRIBIS; *he writes*, SCRIBIT; and and in the plural, *we write*, SCRIBIMUS; *ye write*, SCRIBITIS; *they write*, SCRIBUNT. The variations produced from this cauſe have been called PERSON and NUMBER.——Theſe are all the variations which have been made in the Latin or Greek languages; and therefore our grammarians, who have adopted every idea they have of grammar from theſe languages, mention no more: but it was not neceſſary that they ſhould have ſtopt here; for an attribute is ſurely as ſuſceptible of the diſtinction of ſex as of perſon, ſo that they might have had a variation for *Gender* alſo; and inſtead of having one word SCRIBIT to anſwer for all the three genders, *he*, *ſhe*, or *it writes*, they might have had three different words.—The compoſers of the Hebrew language have adopted this plan, and admit of two variations on this account. And the Ruſſian language admits of a like variation in their verb for theſe genders; as in this example: ON ZOHELAL, *he has done*; ONA ZOHELALA, *ſhe has done*, &c. But as the two languages above-mentioned do not admit of this diſtinction, therefore all the variations that our verbs are ſaid to admit of are MODES, which include within them TENSES, which include under them PERSONS, under which head is included NUMBER; and theſe are all the parts into which a CONJUGATION has been divided.—As to what concerns the nature and leſſer diſtinctions of each of theſe, the following general remarks may be ſufficient.

43. With regard to MODES; as this relates ſolely to the *perception* or *volition* of the ſpeaker, it neceſſarily follows, that there ought to be a diſtinct and particular MODE for each diverſity that there can be in his manner of perceiving or willing any thing whatever, the principal of which are the following.

If we ſimply declare that we perceive any object, or that ſuch a thing is or will be, without any limitation or contingency, it forms what has been called the DECLARATIVE OR INDICATIVE MODE; as, *I write*.—Again, if we ſimply repreſent it to be within our *power*, or to depend upon our choice, it forms two other modes, which may be called the POTENTIAL, as, *I can write*; or the ELECTIVE, as, *I may write*.—In the ſame manner, if the ſpeaker repreſents himſelf, or any other object, as *determined* to perform any action, or as *compelled* to it, or as it is his *duty* to perform it; theſe form ſo many diſtinct modes, which may be called the the DETERMINATIVE, as, *I will write*; the COMPULSIVE, as, *I muſt write*; and OBLIGATIVE, as, *I ſhould write*. But although each of theſe repreſents the ſpeaker as perceiving the agent under a different light with reſpect to the action; yet as all of them, except the indicative, agree in this, that however much they may repreſent it as the *duty* or *inclination*, &c. of the agent to perform any action with which they are aſſociated, yet as they are ſtill of the nature of contingents which may never take effect, they are frequently ſubjoined to any other verb; therefore the Latins have comprehended all of theſe under one mode, which they have called the SUBJUNCTIVE. We only take notice of this circumſtance here, to ſhew, that however naturally *ſentences* may be diſtinguiſhed into modes, according to the different ſituation of the ſpeaker; yet as the whole order of the variation of words in the conjugation of a verb is merely arbitrary, thoſe who invent them may arrange them into what order they pleaſe, and call them by what names they may think moſt proper. But, however they may vary the names or external arrangement, this does not affect the things themſelves. For, by whatever name the *mode* may be known which comprehends the words expreſſive of theſe ſeveral meanings, the ſentences formed by theſe will be either *potential*, *obligative*, *compulſive*, &c. as above explained.

All theſe modes above-mentioned only relate to the different *perceptions* of the ſpeaker. But as man is not only endowed with the powers of *perception*, but thoſe of *volition* alſo, he muſt have words to expreſs theſe; which forms another order of modes. As he is not only dependent himſelf, but has others depending upon him, he may *command*, *intreat*, *beg*, *pray*, *wiſh*, *inquire*.—Hence, therefore, ſo many different orders of modes, the IMPERATIVE, REQUISITIVE, PRECATIVE, OPTATITE, INTERROGATIVE, &c. to which may be added the VOCATIVE. But although each of theſe diſplays a diſtinct affection of the ſpeaker, yet grammarians have allotted only one variation of the verb for all of theſe purpoſes, called the IMPERATIVE MODE; all the other volitions being expreſſed by this, or ſome other modes, by the help of particular contrivances, which are different in different languages.

44. With regard to that variation of the verb which relates to *time*, called TENSES: As an action or event may be repreſented as happening at any aſſignable period of time, it is neceſſary to divide that duration into certain parts, that we may be able to repreſent the different relations which events bear to one another with reſpect to this particular. The firſt and moſt obvious diviſion of time is into *preſent*, *paſt*, and *future*. But we may go farther ſtill in our diviſions of time. For as time paſt and future may be infinitely extended, we may in *univerſal time paſt* aſſume *many particular*

lar times paſt, and in *univerſal time future many particular times future*, ſome more, ſome leſs remote, and correſponding to each other under different relations. Even *preſent time*, however, in ſtrict phyſical truth, it may be incapable of it, is by the power of the imagination brought to admit of theſe differences, and as neceſſarily implies *ſome degree of extenſion*, as every given line however minute: And hence it is not ſufficient for language to denote INDEFINITELY mere *paſt*, *preſent*, or *future* times; but on many occaſions to DEFINE with more preciſion what *kind* of *paſt*, *preſent*, or *future*, is meant.

45. Tenſes, therefore, or thoſe variations of a verb which denote a difference of *time* only, may be all divided into PRESENT, PAST, and FUTURE; each of which may be ſubdivided into DEFINITE and INDEFINITE. The *definite tenſes* are thoſe where the particular inſtant of time, whether preſent, paſt, or future, is pointed out. The *indefinite* are thoſe where paſt, preſent, or future time is indicated in general, without confining it to a particular inſtant in either of theſe caſes. Theſe have been diſtinguiſhed among grammarians by the name of AORISTS.—Thus when Milton makes Adam ſay,

Millions of ſpiritual creatures WALK *the earth,*
Unſeen, both when we wake and when we ſleep,

the verb WALK means not that they were walking at that inſtant only when Adam ſpoke, but *indefinitely* in any inſtant whatever. So likewiſe, when the ſame author calls hypocriſy

——the only evil which WALKS
Inviſible except to God alone,

the verb WALKS has the like aoriſtical ſignification. *He* WENT, *he* FELL, are *aoriſts* of the paſt, as they do not ſpecify any particular inſtant, but refer to paſt time in general. So likewiſe in the legiſlative ſentences, *thou ſhalt not kill, thou ſhalt not ſteal, &c.* the ſame aoriſtical meaning is perceived, as the prohibition does not relate to any *paricular time future*, but is extended indefinitely to *every* time *future*.

46. But it is not ſufficient for a language to denote time in this indefinite manner: it is neceſſary likewiſe that it ſhould be capable of ſpecifying any particular inſtant of time in an exact and definite manner. Thus, if, inſtead of the word WALK in the firſt ſentence above quoted, we were to put ARE WALKING, it brings down the verb to denote a particular time, and ſpecifies that theſe *ſpiritual creatures* are, at that very *inſtant* in which Adam ſpeaks, walking upon the earth unſeen. In like manner, in the ſecond ſentence, if the word WALKS were changed to IS WALKING, it denotes, that hypocriſy, at that *particular inſtant* in which the ſentence was pronounced, was walking inviſible upon the earth. And in the ſame manner, WAS WALKING, or WILL BE WALKING, each of them denote, that theſe energies *were* or *will be* exerted at a particular ſpecified time. Theſe, therefore, form ſo many diſtinct definite tenſes, under whatever technical name theſe may be known.

47. Here then we may ſee the uſe of that diſtinction of the different ſtates of the verb, into the *verb properly ſo called*, and *participles*. For as the verb itſelf exhibits the word as altogether *indefinite*; when this is joined to its proper energizer, it forms all theſe INDEFINITE TENSES which our language requires. Thus, *I write, I did write, I will write, I may write, I can write*, &c. each of them, although they repreſent the attribute as united to the energizer in ſome *paſt*, *preſent*, or *future* time, do not ſpecify any particular inſtant, and are therefore ſo many aoriſts or indefinite tenſes. Whereas in the *participle* the attribute is repreſented as in a ſtate of exertion, it neceſſarily follows, that if it be ever united to its energizer, it muſt point out the particular inſtant when that union took effect, and of conſequence form as great a variety of DEFINITE TENSES as the verb forms of indefinite. Thus, *I am writing*, neceſſarily implies that I am actually exerting this particular energy at the *very inſtant* that I declare it. So likewiſe, if I ſay, *I was writing*, it indicates, that at one *particular inſtant* of paſt duration, to which this has a reference, I was actually employed in that particular occupation. This inſtant is generally fixed by ſome collateral circumſtance; as, "upon the twentieth day of Auguſt laſt, at twelve o'clock, *I was writing*;" or, "when the thunder broke upon the tower in my neighbourhood, *I was writing*," &c. And the ſame may be ſaid of future time; as, "to-morrow at ten o'clock *I ſhall be writing*," &c. In all of which caſes it is obvious, that a particular *now* or *inſtant* is pointed out, in which the attribute is repreſented as united to its proper energizer. We might here proceed to ſhew the various times that each of theſe different ſtates of the verb might be made to indicate; the number of *tenſes* that each mode admitted of; the ſeveral changes that might be produced by joining the *participle perfect* with any object; which cannot be here called the *energizer*, but the *ſubject*; for as the energy is by this participle repreſented as compleated, if it has any connection with any perſon, as the attribute cannot be affected by any energizer after it is compleated, it muſt of neceſſity affect the perſon, inſtead of being affected by it; and hence it is that the ſeveral variations produced by this participle perfect have been called the PASSIVE VOICE of the verb. But as all theſe particulars only relate to the conſtruction of one particular language, it would lead us a great deal too far from the particular ſubject of which this article treats. We ſhall therefore only obſerve, that beſides the above variations of the verb, which the Greeks and Romans have thought proper to make, the terms of which we have adopted; there are many others that they might with equal propriety have made, but which they rather choſe to expreſs by the help of other words called *adverbs*. But ſome other languages have gone further in this reſpect, and endowed their verbal word with ſeveral variations to expreſs ſeveral other circumſtances than they do. This is particularly the caſe with the Hebrew language, which, beſides the variation for gender above-mentioned, has allotted certain other variations of its verb to expreſs ſeveral other circumſtances. Thus, PAKAD in that language ſignifies *he viſited;* PAKEDA, *ſhe viſited*, &c.; PIKKED, *he viſited diligently;* HEPHKED, *he made him viſit;* and HETHPEKED, *he viſited himſelf*. In this manner is every verb in that language varied; and each of theſe different conjugations of their verb admits of a particular variation for the paſſive of each.—Hence, therefore,

fore, the conjugation of a verb in that language admits of a great many variations which neither the Greeks nor Romans were aquainted with: for beſides the diſtinctions of *modes*, *tenſes*, *perſons*, and *number*, they have divided their verb into ſo many diſtinct diviſions to anſwer for theſe diſtinctions above mentioned, which they have denominated KAL, PIHEL, HIPHIL, and HITHPAHEL. with their paſſives NIPHAL, PUHAL, and HOPHAL; each of which admit of variations through all the *modes*, *tenſes*, *perſons*, *numbers*, and *genders* which any of their verbs admit of.

48. The only uſe which we meant to make of theſe obſervations on the Hebrew verbs, is this: That as the authors, who have formed their idea of grammar from the forms which the ſeveral parts of ſpeech admit of in the Greek and Latin languages, have ſuppoſed that every variation which theſe languages admitted of was a natural and neceſſary part of language; and that therefore every languuge which did not admit of the ſame number of variations, with theirs, in every part of ſpeech, was in ſo far defective and incomplete; ſo, for the ſame reaſon, an author who had formed his idea of grammar upon the model of the Hebrew tongue, would as naturally ſuppoſe, that the ſeveral variations which the verb admitted of in his own favourite language were eſſential and neceſſary; and that, of conſequence, every language which did not admit of as many variations was imperfect and incomplete. But to any one who conſiders this matter with attention, it will appear, that there could be no end to theſe unneceſſary diſcuſſions and groundleſs claims of fancied ſuperiority: for if compound words have ſuch an advantage over ſimple, the Chineſe language, in which we are told almoſt every ſentence has a particular compound character to expreſs it, muſt be by far the moſt perfect in the world; but ſo far is this from being the caſe, that every one allows it to be the moſt imperfect and incomplete. The only method, therefore, which remains for us to conſider this ſubject is, to diſregard every particular form of language, and conſider the words in themſelves, as diveſted of every extraneous circumſtance, and obſerve what variations they neceſſarily require, allowing every particular language to compound theſe with one another in what manner it ſhall think proper. It is in this manner we have conſidered the verbal attributives, and endeavoured to diſentangle them from thoſe unneceſſary fetters with which they have been loaded, and reſtore them to their own original freedom.

49. Beſides the variations above-mentioned, verbs have been diſtinguiſhed from one another in a different manner; the names and nature of which may be thus explained.

We have already ſeen, that all verbs, as they denote *energies*, neceſſarily have reference to certain *energizing ſubſtances*. For, how could there be ſuch energies as *to love*, *to fly*, *to wound?* &c. were there not ſuch beings as *men*, *birds*, *ſwords*, &c. Farther, every energy not only requires an energizer, but is neceſſarily converſant about ſome ſubject. For example, if we ſay, *Brutus loves*, we muſt needs ſupply —loves *Cato*, *Caſſius*, or ſome one. And thus it is, that every energy is neceſſarily ſituated between two ſubſtantives, an energizer which is *active* and a ſubject which is *paſſive*. If the energizer leads the ſentence, the energy has been ſaid to follow its character, and becomes what we call a VERB ACTIVE: thus we ſay, BRUTUS AMAT, *Brutus loves.* On the contrary, if the paſſive ſubject be principal, it is ſaid to follow the character of this too, and becomes what we call a VERB PASSIVE: thus we ſay, PORTIA AMATUR, *Portia is loved.* But in ſome verbs it happens, that the energy *always keeps within the energizer*, and never paſſes out to any extraneous ſubject. Thus, when we ſay, *Cæſar walketh*, *Cæſar ſitteth*, it is impoſſible that the energy *ſhould paſs out*, becauſe both the *energizer* and the *paſſive ſubject* are united in the *ſame perſon*, For what is the cauſe of this walking or ſitting? it is the *will* and *vital powers* belonging to *Cæſar:* And what is the ſubject made ſo to move or ſit? it is the *body* and *limbs* belonging alſo to the ſame *Cæſar*. This ſpecies of verbs have been by grammarians diſtinguiſhed by the name of VERBS NEUTER, as if they were void both of *action* and *paſſion*, when perhaps they may be rather ſaid to imply both. It is in this manner, that verbs have been diſtinguiſhed into the three claſſes of *active*, *paſſive*, and *neuter*. Theſe, however, might with more propriety be divided into two claſſes, which might be called verbs TRANSITIVE, and NOT TRANSITIVE; the firſt claſs including all thoſe verbs which are uſually called *active*, with the *paſſives* belonging to them; for it is evident, that theſe paſſives are not verbs themſelves, but a variation only of a verb; and the ſecond claſs including thoſe verbs commonly called *neuter*.

Some languages, as the Greek and French, have another claſs of verbs, which are called by the firſt VERBS MIDDLE, and by the laſt RECIPROCAL VERBS; which are employed to denote that ſtate of any tranſitive verb, when the energizer himſelf becomes the ſubject; as thus, *Brutus killed himſelf*, &c. But as theſe only expreſs a ſlight variation of an accompaniment of a verb, they have no claim to be conſidered as a diſtinct ſpecies.

II. Of ADJECTIVES.

50. ADJECTIVES are all thoſe words which denote attributes whoſe eſſence does not conſiſt in motion or its privation: or, in other words, they are thoſe words which denote the attributes of quantity, quality, and relation; ſuch as, *many*, *few*, *great* and *little*, *black* and *white*, *good* and *bad*, *double*, *treble*, *quadruple*, &c.

As theſe attributes admit of no change of ſtate, nor can be effected by the variations of time, or any other accident, but are in their own nature perfectly fixed and invariable, the words which expreſs them ought to be in all ſituations and on all occaſions the ſame. For as the qualities *good* or *bad*, *black* or *white*, admit of no change in their own nature, whether they be applied to a *man*, to a *woman*, to *many* or to *few*; neither ought the word which expreſſes any one of theſe attributes in ſtrictneſs to admit of any alteration, whether it be joined to one or other of theſe ſubſtantives. So that although, in ſome languages, from the particular conſtruction of the other parts of ſpeech, it has been found neceſſary to endow their adjectives with the threefold diſtinction of *gender*, *number*, and *caſe;* yet this muſt only be conſidered as an accidental variation occaſioned by particular circumſtances, and not in the leaſt eſſential to language, but rather a deviation from the order of nature, which would require them to be kept invariably the ſame in all caſes. This order, the Engliſh language (which in this and almoſt every other caſe is moſt ſtrictly conformable to the nature of things than any other language we are acquainted with) moſt ſtrictly obſerves; as we ſay equally, *a good man*, or *a good woman*, *a good houſe*; or *good men*, *good houſes*, &c.

It has probably been from obſerving that the adjectives in ſome particular languages are endowed with variations conformable to the *gender*, *number*, and *caſe* of their ſubſtantives, that grammarians have been led into the ſtrange abſurdity of ranging them with nouns, and ſeparating them from verbs; though with reſpect to verbs they are perfectly homogeneous, and with reſpect to nouns they are quite the contrary. Adjectives are homogeneous with reſpect to verbs, as both ſorts denote *attributes*; they are hetergeneous with reſpect to nouns, as *never properly denoting ſubſtances*.

51. Beſides original adjectives, there is another claſs which are formed from ſubſtantives. Thus when we ſay, *the party of Pompey*, *the ſtyle of Cicero*, *the philoſophy of Socrates*; in theſe caſes, the party, the ſtyle, and philoſophy ſpoken of, receive a ſtamp and character from the perſons they reſpect, and actually paſs into attributives, and as ſuch aſſume the form of *adjectives*. And hence we ſay, *the Pompeian party*, *the Ciceronian ſtyle*, and *the Socratic philoſophy*. In like manner, for a trumpet of braſs, we ſay, *a braſen trumpet*; for a crown of gold, *a golden crown*, &c. Even pronomial ſubſtances admit the like mutation; as, inſtead of ſaying the book *of me*, *of thee*, or *of him*, we ſay, *my* book, *thy* book, *his* book, &c. Yet it muſt be acknowledged, that theſe, as they often ſerve rather to define a noun than to denote any quality appertaining to it; they partake more of the nature of *articles* than *adjectives*; ſo that it is in many caſes difficult to aſcertain exactly to which claſs they are to be refered. But of this we have already taken particular notice.

The nature of theſe variations of adjectives, which have been called *degrees of compariſon*, will be more properly explained under the following ſection.

SECT. II. *Of* Attributives of *the Second Order*, *called* ADVERBS.

52. As the Attributives hitherto mentioned denote the *attributes of ſubſtances*, ſo there is an inferior claſs of them which denote the *attributes* only of *attributes*. To explain theſe by examples of either kind: When we ſay, "*Cicero* and *Pliny* were both of them *eloquent*; *Statius* and *Virgil* both of them *wrote*;" in theſe inſtances, the attributes *eloquent* and *wrote*, are immediately referable to the ſubſtantives *Cicero*, *Virgil*, &c.: As, therefore, denoting the *attributes of ſubſtances*, we call them ATTRIBUTIVES OF THE FIRST ORDER. But when we ſay, "*Pliny* was *moderately* eloquent, but *Cicero exceedingly* eloquent; *Statius* wrote *indifferently*, but *Virgil* wrote *admirably*:" in theſe inſtances, the attributives *moderately*, *exceedingly*, *indifferently*, and *admirably*, are not referrable to *ſubſtantives*, but to *other attributes*; that is, to the words *eloquent* and *wrote*: As, therefore, denoting *attributes of attributes*, we call them ATTRIBUTIVES OF THE SECOND ORDER. Theſe have been by grammarians, called ADVERBS. And indeed, if we take the word VERB in its moſt comprehenſive ſignification, as including all the words which denote the *attributes* of *ſubſtances*, (which was the ſenſe in which Ariſtotle and many of the moſt ancient grammarians employed it), we ſhall find the name ADVERB to be a very juſt appellation, as denoting a *part of ſpeech the natural appendage of verbs*. So great is this dependence in grammatical ſyntax, that an *adverb* can no more ſubſiſt without its *verb*, than a *verb* can ſubſiſt without its *ſubſtantive*.

53. Among the attributes of ſubſtances are reckoned quantities and qualities. Thus we ſay, *a white garment*, *a high mountain*, &c. Now ſome of theſe quantities and qualities are capable of *intenſion* and *remiſſion*. Thus we ſay, *a garment* EXCEEDINGLY *white*, *a mountain* TOLERABLY or MODERATELY *high*. Hence, then, one copious ſource of ſecondary attributives, or adverbs, to denote theſe two, that is, *intenſion* and *remiſſion*; ſuch as, *greatly*, *vaſtly*, *extremely*, *ſufficiently*, *moderately*, *tolerably*, *indifferently*, &c.

But where there are different intenſions of the ſame attribute, they may be *compared* together: thus, if the garment A be EXCEEDINGLY *white*, and the garment B be MODERATELY *white*, we may ſay, the garment A is MORE *white* than the garment B. In theſe inſtances, the adverb MORE not only denotes intenſion, but *relative intenſion*. Nay, we ſtop not here, as we not only denote intenſion *merely relative*, but *relative intenſion than which there is none greater*. Thus we not only ſay, the *mountain* A *is* MORE *high than the mountain* B, but that *it is the* MOST *high of all mountains*. Even *verbs* properly ſo called, as they admit of *ſimple intenſions*, ſo they admit alſo of theſe *comparative ones*. Thus, in the following example, *Fame he* LOVETH MORE *than riches*, *but virtue of all things he* LOVETH MOST; the words MORE and MOST denote the different *comparative intenſions* of the verbal attribute *loveth*.

54. Hence the riſe of COMPARISON of adjectives, and of its different *degrees*, which cannot well be more than the two ſpecies above-mentioned; one to denote *ſimple exceſs*, and one to denote *ſuperlative*. Were we indeed to introduce more degrees than theſe, we ought perhaps to introduce *infinite*, which is abſurd. For why ſtop at a limited number, when in all ſubjects ſuſceptible of intenſion the intermediate exceſſes are in a manner infinite? There are infinite degrees of *more white*, between the firſt *ſimple white*, and the ſuperlative *whiteſt*; and the ſame may be ſaid of *more* great, *more* ſtrong, *more* minute, &c. The doctrine of grammarians about three ſuch degrees of compariſon, which they call the *poſitive*, the *comparative*, and the *ſuperlative*, muſt be abſurd; both becauſe in their poſitive there is no compariſon at all, and becauſe their ſuperlative is a comparative as much as their comparative itſelf. Examples to evince this may be met with every where; *Socrates was the* MOST WISE *of all the Athenians*; *Homer was the* MOST SUBLIME *of all poets*, &c.

55. The authors of language have in ſome inſtances contrived a way to retrench theſe comparative adverbs, by expreſſing their force by an inflection of the

primary attributive. Thus, inſtead of *more fair*, they ſay FAIRER; inſtead of *moſt fair*, FAIREST: and the ſame method of compoſition takes place both in the Greek and Latin languages; with this difference, however, between the genius of theſe languages and ours, that we are at liberty to form the compariſon either in the one method or the other: but, in theſe languages, the compariſon is almoſt never formed by the aſſiſtance of the adverb, but always by the inflection of the adjective; and hence this inflection is always conſidered by them as a neceſſary accident of the adjective. But this method of expreſſing the power of the adverb has reached no farther than to adjectives, or to their participles, which are ſo nearly allied to adjectives. Verbs were perhaps thought to be too much diverſified, to admit of more variations without perplexity.

56. Some qualities admit of compariſon, others admit of none: ſuch, for example, are thoſe which denote *that quality of bodies ariſing from their figure*; as when we ſay, a *circular* table, a *quadrangular* court, a *conical* piece of metal, *&c.* The reaſon is, that a million of things participating the ſame figure, participate it *equally* if they do it all. To ſay, therefore, that while A and B are both quadrangular, that A is more or leſs quadrangular than B, is abſurd. The ſame holds in all attributives denoting *definite quantities*, of whatever nature. For as there can be no *compariſon* without *intenſion* or *remiſſion*, and as there can be no intenſion or remiſſion in things *always definite*, therefore theſe attributives can admit of no compariſon. By the ſame method of reaſoning, we diſcover the cauſe why *why no ſubſtantive is ſuſceptible of theſe degrees of compariſon*. A *mountain* cannot be ſaid MORE TO BE OR TO EXIST than a *mole-hill*; nor the *lion* A cannot be *more a lion* than the lion B: but the *more or leſs* muſt be ſought for in their quantities and qualities; a mountain is more *bulky* than a mole-hill, and the lion A is *more fierce* than the lion B; the exceſs being always derived from their attributes.

57. Of the adverbs or ſecondary qualities already mentioned, thoſe denoting intenſion and remiſſion may be called adverbs of QUANTITY CONTINUOUS; *once*, *twice*, *thrice*, &c. are adverbs of QUANTITY DISCRETE; *more* and *moſt*, *leſs* and *leaſt*, to which may be added *equally*, *proportionally*, &c. are adverbs of RELATION. There are others of QUALITY; as when we ſay, HONESTLY *induſtrious*, PRUDENTLY *brave*; *they fought* BRAVELY, *he painted* FINELY, *&c.*

58. The adverbs hitherto mentioned, are common *to verbs of every ſpecies*; but there are ſome which are confined to *verbs* properly ſo called, that is to ſay, to ſuch as denote *motions* or *energies* with their *privations*. All *motion* and *reſt* imply *time* and *place* as a kind of neceſſary coincidence. Hence, if we would expreſs the *place* or *time* of either, we muſt needs have recourſe to adverbs formed for this purpoſe; of PLACE, as when we ſay, *he ſtood* THERE, *he went* HENCE, *he travelled* FAR, *&c.*; or of TIME, as when we ſay, *he ſtood* THEN, *he went* AFTERWARD, *he travelled* FORMERLY, *&c.* Should it be aſked, Why *adverbs of time*, when verbs have *tenſes?* The anſwer is, though tenſes may be ſufficient to denote the greater diſtinctions of time, yet to denote them all by tenſes would be a perplexity without end. What a variety of forms would be neceſſary to denote *yeſterday*, *to-day*, *to-morrow*, *formerly*, *juſt now*, *now*, *immediately*, *preſently*, *ſoon*, *hereafter?* &c.

59. To theſe adverbs juſt mentioned may be added thoſe which denote the *intenſions* and *remiſſions peculiar to* MOTION, ſuch as *ſpeedily*, *haſtily*, *ſwiftly*, *ſlowly*, &c.; as alſo adverbs of *place* made out of *prepoſitions*, ſuch as *upward* and *downward*, from *up* and *down*. In ſome inſtances the prepoſition ſuffers no change, but becomes an adverb by nothing more than its application; as when we ſay, *he rides* ABOUT, *he was* NEAR *falling*, &c.

60. There are likewiſe adverbs of INTERROGATION: ſuch as, *where*, *whence*, *whither*, *how*, &c. of which there is this remarkable, that when they loſe their *interrogative power*, they aſſume that of a *relative*, ſo as to repreſent the *relative* or *ſubjunctive pronoun*; as in this doggerel tranſlation of a line from Virgil,

And corn doth grow WHERE *Troy town ſtood*;

that is to ſay, *corn groweth in that place* IN WHICH *Troy ſtood*, the power of the relative being implied in the adverb. It is in like manner that the *relative pronoun* becomes an *interrogative*; as in this line from Milton,

WHO *firſt ſeduc'd them to that foul revolt?*

The reaſon of this is as follows: the *pronoun* and *adverbs* here mentioned are all, in their original character, RELATIVES. Even when they become interrogatives, they loſe not this character, but are ſtill relatives as much as ever: the difference is, that, *without* an interrogation, they have reference to a ſubject which is *antecedent*, *definite*, and *known*; *with* an interrogation, to a ſubject which is *ſubſequent*, *indefinite*, and *unknown*, and which it is expected the anſwer ſhould expreſs and aſcertain. WHO *firſt ſeduc'd them?* The queſtion itſelf ſuppoſes a ſeducer, to which, though *unknown*, the pronoun *who* has a reference—*Th' infernal ſerpent*. Here, in the anſwer, we have the ſubject, which was *indefinite*, aſcertained; ſo that we ſee WHO, in the *interrogation*, is as much a *relative* as if it had been ſaid originally, without any interrogation at all, *It was the infernal ſerpent who firſt ſeduced them:* and thus interrogatives and relatives mutually paſs into one another.

Having thus conſidered all thoſe parts of ſpeech which ARE SIGNIFICANT OF THEMSELVES, we proceed to thoſe AUXILIARY PARTS which are ONLY SIGNIFICANT WHEN ASSOCIATED WITH OTHERS, which we have already ſaid are either DEFINITIVES or CONNECTIVES. Of which in their order.

Chapter III.

Concerning DEFINITIVES commonly called ARTICLES.

61. The knowledge of man is at beſt but limited and confined. Although we have invented words to denominate almoſt all the ſubſtances which exiſt, yet as it is impoſſible for any perſon to be acquainted with all of theſe, it was neceſſary to fall upon ſome contrivance in language to obviate the difficulties which would ariſe from this cauſe. With this view, we have already ſeen, that ſubſtances have been divided into general claſſes, each of which includes under it ſeveral leſſer in

ſubdiviſions; the names of which general claſſes, being but few, may be more eaſily retained, as *animal, edifice, motion,* &c. for by referring the ſeveral objects that we may accidentally ſee, and with which we are unacquainted, to the ſeveral claſſes to which they may belong, we are in ſome meaſure enabled to communicate our ideas without the knowledge of the particular names. But as this particular object muſt in ſome manner be diſtinguiſhed from others of the ſame claſs to which it belongs, a particular claſs of words was found neceſſary to define and aſcertain theſe individuals; which has given riſe to this order of words of which we now treat, and which we have called *definitives,* becauſe they ſerve to *define and aſcertain any particular object, ſo as to ſeparate it from the general claſs to which it does belong, and of courſe denote its individuality.* The principal of theſe definitives have been uſually called ARTICLES, the nature of which may be explained as follows.

62. Suppoſing I ſee an object with which I am totally unacquainted, having a head and limbs, and appearing to poſſeſs the powers of ſelf-motion and ſenſation. If I know it not as an individual, I refer it to its proper ſpecies, and call it *a dog, a horſe, a lion,* or the like; and if none of the names of any ſpecies with which I am acquainted fit it, I refer it to the genus, and call it *an animal.*

But this is not enough. The object at which we are looking, and want to diſtinguiſh, is perhaps an individual.—Of what kind? *Known* or *unknown?* Seen now *for the firſt time,* or *ſeen before* and now remembered? It is here we ſhall diſcover the uſe of the two articles A and THE; for the article A reſpects our *primary* perception, and denotes individuals as *unknown;* whereas THE reſpects our *ſecondary* perception, and denotes individuals as *known.* To explain this by an example, I ſee an object paſs by which I never ſaw till then: What do I ſay? *There goes* A *beggar with* A *long beard.* The man departs, and returns a week after: What do I then ſay? *There goes* THE *beggar with* THE *long beard.* Here the article only is changed, the reſt remains unaltered. Yet mark the force of this apparently minute change. The individual *once vague* is now recogniſed as *ſomething known,* and that merely by the efficacy of this latter article, which tacitly inſinuates a kind of *previous* acquaintance, by referring a preſent perception to a like perception already paſt. Hence therefore we ſee, that although the articles A and THE are both of them *definitives,* as they circumſcribe the latitude of genera and ſpecies, by reducing them, for the moſt part, to denote individuals; yet they differ in this reſpect, that the article A leaves the individual itſelf *unaſcertained,* but the article THE *aſcertains the individual alſo,* and is for that reaſon the more accurate definitive of the two. They differ likewiſe in this reſpect, that as the article A ſerves only to ſeparate one particular object from the general claſs to which it belongs, it cannot be applied to plurals. But as the article THE ſerves to define objects, or refer to them as already known, without relation to number, or any other circumſtances, it is applicable to both numbers indiſcriminately, as well as nouns of every *gender,* without ſuffering any ſort of change; for it is evident, that no variation of the nature of the noun can make any difference in thoſe words which ſerve to define or denote a certain reference to them. So that although we find ſome modern languages which admit of a variation of their article, which relates to the gender of the noun with which it is aſſociated, yet this cannot be conſidered as eſſential to this ſpecies of words: and ſo far is this from being an improvement to the language, that it only ſerves to perplex and confuſe, as it always preſents a particular idea of ſex, where in many caſes it is not in the leaſt neceſſary.

63. Of all the parts of ſpeech which may be conſidered as eſſential to language, there is none in which we find ſo many languages defective as in this. For we know of no language, except our own, which has the particular article A; and the Latin language has no word of the ſame import with the word THE. The reaſon of which deficiency is, that as other parts of ſpeech may be ſo eaſily converted from their original meaning, and be made to aſſume the character of definitives, they have made ſome of theſe perform both of theſe offices: and as the article A only ſeparates a particular object, and is therefore ſo nearly allied to a *numeral,* many languages, as the *French, Italian, Spaniſh,* and *German,* have made the numeral word ONE ſupply its office; while others, as the Greek, have denoted this particular object by a mere negation of the other article; and as the article THE agrees with pronouns in this reſpect, that they both *denote reference,* the Latins made their pronoun, by a forced periphraſis, ſupply the place of this. But all of theſe methods of ſupplying the want of the genuine article are defective, as will appear more particularly by and by.

64. As articles are by their nature definitives, it follows of courſe, that they cannot be united with ſuch words as are in their own nature *as definite as they may be;* nor with ſuch words as, *being indefinite, cannot properly be made otherwiſe;* but only with thoſe words *which, though indefinite, are yet capable, through the article, of becoming definite.* Hence we ſee the reaſon why it is abſurd to ſay THE I, or THE THOU, becauſe nothing can make theſe pronouns more *definite* than they are; and the ſame may be ſaid of proper names. Neither can we ſay THE BOTH, becauſe theſe words are *in their own nature* each of them perfectly defined. Thus, if it be ſaid, "I have read BOTH poets," this plainly indicates *a definite pair,* of whom ſome mention has been made already. On the contrary, if it be ſaid, "I have read TWO poets," this may mean *any pair,* out of all that ever exiſted. And hence this numeral, being in this ſenſe *indefinite,* (as indeed are all others as well as itſelf,) is forced *to aſſume the article* whenever it would become *definite.* Hence alſo it is, that as TWO, when taken alone, has reference to ſome *primary* and *indefinite* perception, while the article THE has reference to ſome perception *ſecondary* and *definite,* it is bad language to ſay TWO THE MEN, as this would be *blending of incompatibles,* that is to ſay, of *a defined ſubſtantive* with an *undefined attributive.* On the contrary, to ſay BOTH THE MEN, is good and allowable; becauſe the ſubſtantive cannot poſſibly be leſs apt, by being defined, to coaleſce with an attributive which is defined as well as itſelf. So likewiſe it is correct to ſay, THE TWO MEN; becauſe here the article, being placed at the beginning, *extends*

its power as well through ſubſtantive as attibutive, and equally tends to *define* them both.

65. As ſome of the above words admit of no article, *becauſe they are by nature as definite as may be*; ſo there are others which admit it not, *becauſe they are not to be defined at all.* Of this ſort are all INTERROGATIVES. If we queſtion about ſubſtantives, we cannot ſay THE WHO IS THIS; but WHO IS THIS? And the ſame as to *qualities*, and both kinds of *quantities*: for we ſay without an article, WHAT SORT OF, HOW MANY, HOW GREAT? The reaſon is, the article THE reſpects beings *already known*, and interrogatives reſpect beings *about which we are ignorant*; for as to what we know, interrogation is ſuperfluous. In a word, the *natural aſſociators with articles* are ALL THOSE COMMON APPELLATIVES WHICH DENOTE THE SEVERAL GENERA AND SPECIES OF BEINGS. It is theſe, which, by aſſuming a different article, ſerve either to explain an individual upon its firſt being perceived, or elſe to indicate, upon its return, a recognition or repeated knowledge.

66. But although proper names do not admit of the article, being in their own nature *definite*; yet as theſe often fall into *homonymic*, that is, different perſons often go by the ſame name, it is neceſſary to diſtinguiſh theſe from one another, to prevent the ambiguity that this would occaſion. For this purpoſe we are obliged to have recourſe to *adjectives* or *epithets*. For example, there were two *Grecian chiefs* who bore the name of *Ajax*; and it was not without reaſon that *Mneſtheus* uſes *epithets*, when his intention was to diſtinguiſh the one from the other: "If both *Ajaxes* "cannot be ſpared, (ſays he), at leaſt let mighty *Telamonian Ajax* come." But as epithets are in their own nature perfectly *indefinite*, ſeeing the ſame adjective may be applied to infinite ſubjects, it is neceſſary to define theſe when we want to apply them to any particular object; ſo that it is neceſſary to endow theſe with an article, that they may have a *reference to ſome ſingle perſon only*. And thus it is we ſay, *Trypho* THE *grammarian*, *Apollodorus* THE *Cyrenian*, &c. It is with reaſon, therefore, that the article is here alſo added, *as it brings the adjective to an individuality as preciſe as the proper name*. Even common appellatives, by the help of an article, come to have the force of proper names, without the aſſiſtance of any epithet whatever. Thus, in Engliſh, *city* is a name common to many places, and *ſpeaker* a name common to many men. Yet if we prefix the article, THE CITY means our metropolis; and the THE SPEAKER, a high officer in the Britiſh parliament. And hence, by an eaſy tranſition, the article, from denoting *reference*, comes to denote *eminence* alſo; that is to ſay, from implying an *ordinary* pre-acquaintance, to preſume a kind of *general and univerſal notoriety*. Thus, among the Greeks, THE POET meant *Homer*, and THE STAGYRITE meant *Ariſtotle*; not but that there were many *poets* beſides *Homer*, and many *ſtagyrites* beſides *Ariſtotle*, but none equally illuſtrious.

67. The articles already mentioned are thoſe ſtrictly ſo called; but, beſide theſe, there are the PRONOMIAL ARTICLES, ſuch as *this*, *that*, *any*, *ſome*, *all*, *other*, *none*, &c. Of theſe we have already ſpoken in the chapter upon *Pronouns*, where we have ſhewn when they may be taken as pronouns, and when as articles. Yet, in truth, if the eſſence of an article be to *define* and *aſcertain*, they are much more ſtrictly articles than any thing elſe, and ought to be conſidered as ſuch in univerſal grammar. Thus, when we ſay, "THIS picture I approve, but THAT I diſlike;" what do we perform by the help of theſe definitives, but bring down the common appellatives to denote individuals? So when we ſay, "SOME men are virtuous, but ALL men are mortal;" what is the natural effect of this ALL and SOME, but to define that *univerſality* and *particularity* which would remain indefinite were we to take them away? The ſame is evident in ſuch ſentences as theſe: "SOME ſubſtances have ſenſation, OTHERS want it; chooſe ANY way of acting, and SOME men will find fault, &c." For here, SOME, OTHER, and ANY, ſerve all of them to *define* different parts of a given whole; SOME, to denote a *definite part*; ANY, to denote an *indefinite*; and OTHER, to denote the *remaining part*, when a part has been already aſſumed. Even the attributive pronouns, *my*, *thy*, *his*, *her's*, &c. are, in ſtrictneſs, more properly articles than any thing elſe, ſeeing each of them ſerves only to define and aſcertain the individual object to which it is applied. As when we ſay, "MY houſe is leſs commodious than YOUR's; HER form is more elegant than HIS, &c." For, in theſe examples, what do the words MY and YOUR's do, but aſcertain two individual *houſes*? or the words HIS and HER's, but aſcertain two individual *forms*, which are compared with one another? In the ſame manner, we have already ſeen nouns ſometimes lay aſide their own proper character, and become definitives, as in the words ALEXANDER's, CÆSAR's, POMPEY's, &c. which may be ſaid to form ſo many NOMIAL ARTICLES. But of theſe we have ſpoken ſo fully in the chapter of *Nouns*, that it is unneceſſary to ſay more of them in this place.

68. Before we leave this ſubject, we ſhall produce one example to ſhew the utility of this ſpecies of words; which, although of themſelves inſignificant and ſeemingly of ſmall importance, yet, when properly applied, ſerve to make a few general terms be ſufficient for the accurate expreſſion of a great variety of particulars, and thus makes language capable of expreſſing things *infinite*, without wandering into infinitude itſelf.——To explain this: Let the general term be MAN, which I have occaſion to employ for the denoting of ſome particular. Let it be required to expreſs this particular, as *unkown*; I ſay, A *man*:—*Known*; I ſay, THE *man*:—*Definite*; A CERTAIN *man*:—*Indefinite*; ANY *man*:—*Preſent, and near*; THIS *man*:—*Preſent, and diſtant*; THAT *man*:—*Like to ſome other*; SUCH A *man*:—*Different from ſome other*; ANOTHER *man*:—*An indefinite multitude*; MANY *men*:—*A definite multitude*; A THOUSAND *men*:—*The ones of a multitude, taken throughout*; EVERY *man*:—*The ſame ones, taken with diſtinction*; EACH *man*:—*Taken in order*; FIRST *man*, SECOND *man*, &c.—*The whole multitude of particulars taken collectively*; ALL *men*:—*The negation of that multitude*: NO *man*:---*A number of particulars preſent, and at ſome diſtance*; THESE *men*:---*At a greater diſtance, or oppoſed to others*, THOSE *men*:---*A number preſent and near*; THESE *men*;---*A number of individuals from another number*; OTHER *men*:---*A great number of individuals taken collectively*; MANY *men*:---*A ſmall number*; FEW *men*:---*A proportionally greater number*;

MORE *men* :---*Smaller number* ; FEWER *men* :---And ſo on we might go almoſt to infinitude. But not to dwell longer upon this article, we ſhall only remark, "that minute changes in PRINCIPLES, lead to mighty changes in EFFECTS ; ſo that PRINCIPLES are well intitled to regard, however trivial they may appear."

CHAPTER IV.

OF CONNECTIVES.

69. CONNECTIVES, according as they connect either *ſentences* or *words*, are called by the different names of CONJUNCTIONS or PREPOSITIONS. Of theſe names, that of the *prepoſition* is taken from a mere accident, as it commonly ſtands in connection before the part which it connects. The *conjunction*, as is evident, has reference to its *eſſential character*. We ſhall treat of theſe two ſeparately.

Sect. I. *Of* CONJUNCTIONS.

70. A CONJUNCTION *is a part of ſpeech void of ſignification itſelf, but ſo formed as to help ſignification, by making* TWO *or more ſignificant ſentences to be one ſignificant ſentence.* As, therefore, it is the *eſſence* of conjunctions to *connect ſentences*; at the ſame time that they do this, they muſt either *connect* their *meaning* or *not*. For example, let us take theſe two ſentences, *Rome was enſlaved—Cæſar was ambitious*, and connect them together by the conjunction BECAUSE ; *Rome was enſlaved*, BECAUSE *Cæſar was ambitious*. Here the *meanings*, as well as the *ſentences*, appear to be connected. But if I ſay, *manners muſt be reformed*, OR *liberty will be loſt* ; here the conjunction OR, though it join the ſentences, yet, as to their reſpective *meanings*, is a perfect *disjunctive*. And thus it appears, that though all conjunctions *conjoin ſentences*, yet, with reſpect to the *ſenſe*, ſome are CONJUNCTIVE, and others are DISJUNCTIVE.

Thoſe *conjunctions which conjoin both ſentences and their meanings* are either COPULATIVES or CONTINUATIVES. The principal copulative in *Engliſh* is AND. The continuatives are much more numerous ; IF, BECAUSE, THEREFORE, WHEREFORE, HENCE, THAT, *&c.* The difference between theſe is this : The *copulative* does no more than barely *couple* ſentences, and is therefore applicable to all ſubjects whoſe natures are *not incompatible : Continuatives*, on the contrary, by a more intimate connection, conſolidate ſentences *into one continuous whole* ; and are therefore applicable only to ſubjects which have an *eſſential coincidence* : For example, it is noway improper to ſay, *Lyſippus was a ſtatuary*, AND *Priſcian a grammarian* ; *the ſun ſhineth*, AND *the ſky is clear* ; becauſe theſe are things that may co-exiſt, and yet imply no abſurdity. But it would be abſurd to ſay, *Lyſippus was a ſtatuary*, BECAUSE *Priſcian was a grammarian* ; though not to ſay, *the ſun ſhineth* BECAUSE *the ſky is clear*. The reaſon is, with reſpect to the firſt, the *coincidence* is merely *accidental* : with reſpect to the laſt, it is *eſſential*, and founded in nature.

As to the *continuatives*, they are SUPPOSITIVE, ſuch as *if* ; or POSITIVE, ſuch as *becauſe, therefore, as, &c.* Take examples of each :—*You will live happily* IF *you live honeſtly* : *You live happily* BECAUSE *you live honeſtly* :—*You live honeſtly*, THEREFORE *you live happily.* The difference between theſe *continuatives* is this : The *ſuppoſitives* denote *connection*, but do not aſſert actual exiſtence ; the *poſitives* imply both the *one* and the *other*.

Theſe *poſitives* above mentioned are either CASUAL, ſuch as *becauſe, ſince, as, &c.* or COLLECTIVE, ſuch as *therefore, wherefore, &c.* The difference between which is this : The *caſuals* ſubjoin *cauſes* to *effects* ; " *the ſun is in eclipſe*, BECAUSE *the moon intervenes* ;". The *collectives* ſubjoin *effects* to *cauſes* ; " *the moon intervenes*, THEREFORE *the ſun is in eclipſe*." We therefore uſe *caſuals* in thoſe inſtances where the *effect* being conſpicuous we ſeek for its *cauſe* ; and *collectives*, in demonſtrations and ſcience, properly ſo called, where the *cauſe* being firſt known, by its help we diſcern *effects*.

All theſe *continuatives* are reſolvable into *copulatives* : For, inſtead of ſaying, BECAUSE *it is day, it is light* ; we may ſay, *It is day*, AND *it is light*. Inſtead of IF *it is day, it is light* ; we may ſay, *It is at the ſame time neceſſary to be day*, AND *to be light*. The reaſon is, That the power of the *copulative* extends to all connections, as well to the *eſſential* as to the *caſual*. Hence the continuative may be reſolved into a *copulative and ſomething more* ; that is to ſay, into a *copulative* implying an *eſſential* coincidence in the ſubjects conjoined.

As to *caſual conjunctions*, we may further obſerve, that there is no one of the four ſpecies of cauſes which they are not capable of denoting. For example, the MATERIAL *cauſe* ; *The trumpet ſounds*, BECAUSE *it is made of metal*. The FORMAL ; *The trumpet ſounds*, BECAUSE *it is long and hollow*. The EFFICIENT ; *The trumpet ſounds*, BECAUSE *an artiſt blows it*. The FINAL ; *The trumpet ſounds*, THAT *it may rouſe our courage*. It is worth obſerving, that the three firſt cauſes are expreſſed by the ſtrongeſt affirmation ; becauſe, if the *effect* actually be, that muſt be alſo. But this is not the caſe with reſpect to the laſt, which is only affirmed as a thing that *may* happen. The reaſon is, That however this may be the end which ſet the artiſt firſt to work, it may ſtill be beyond his power to obtain, and which, like all other contingents, may either happen or not. Hence alſo it is connected by a particular conjunction, THAT, abſolutely confined to this *cauſe*.

We now come to the DISJUNCTIVE CONJUNCTIONS ; a ſpecies of words which bear this contradictory name, becauſe, while they DISJOIN *the ſenſe*, they CONJOIN *the ſentences*.

With reſpect to theſe, we may obſerve, that as there is a principle of UNION diffuſed through all things by which THIS WHOLE is kept together and preſerved from diſſipation ; ſo there is, in like manner, a principle of DIVERSITY diffuſed through all, the ſource of *diſtinction*, of *number*, and of *order*. Now, it is to expreſs in ſome degree the *modifications of this diverſity*, that DISJUNCTIVE CONJUNCTIONS ſeem at firſt to have been invented.

Of theſe *disjunctives*, ſome are SIMPLE, ſome ADVERSATIVE. *Simple* ; as when we ſay, EITHER *it is day*, OR *it is night* :—*Adverſative* ; as when we ſay, *It is not day*, BUT *it is night*. The difference between theſe is, that the *ſimple* do no more than *merely* disjoin ; the *adverſative* disjoin with a concomitant *oppoſition*. Add to this, that the *adverſative* are *definite* ; the *ſimple indefinite*. Thus, when we ſay, *the number*

Conjunctions.

three is not an even number, BUT *an odd;* we not only *disjoin* two oppoſite attributes, but we *definitely* affirm one, and deny the other. But, when we ſay, *the number of the ſtars is* EITHER *even* OR *odd*; though we aſſert one attribute *to be*, and the other *not to be*, yet the alternative is, notwithſtanding, left *indefinite*.

As to *adverſative disjunctives*, it has been already ſaid, that they imply OPPOSITION. Now, there can be no oppoſition of the *ſame* attribute in the *ſame* ſubject; as when we ſay, *Nereus was beautiful.* But the oppoſition muſt be either of the *ſame* attribute in different ſubjects; as when we ſay, "*Brutus* was a *patriot*, BUT *Cæſar* was not:" Or of *different* attributes in the *ſame* ſubject; as when we ſay, "*Gorgius* was a *ſophiſt*, BUT not a *philoſopher*:" Or of *different* attributes in *different* ſubjects; as when we ſay, "*Plato* was a *philoſopher*, BUT *Hippias* was a *ſophiſt*." The conjunctions uſed for all theſe purpoſes may be called *abſolute* adverſatives.

But there are *other* adverſatives beſides theſe: as when we ſay, "*Nereus* was more beautiful THAN *Achilles*,—*Virgil* was as great a *poet* as *Cicero* was an *orator*." The character of theſe latter is, that they go farther than the former, by marking not only *oppoſition*, but that *equality* or *exceſs* which ariſes from the compariſon of ſubjects; and therefore they may be called *adverſatives of compariſon*.

Beſides the adverſatives here mentioned, there are two other ſpecies, of which the moſt eminent are UNLESS and ALTHOUGH: For example, "*Troy* will be taken, UNLESS the *Palladium* be preſerved; *Troy* will be taken, ALTHOUGH *Hector* defend it." The nature of theſe adverſatives may be thus explained. As every *event* is naturally allied to its *cauſe*, ſo, by parity of reaſon, it is oppoſed to its *preventive*; and as every cauſe is either *adequate* or *inadequate*, (inadequate, when it endeavours, without being effectual), ſo in like manner is every *preventive*. Now, *adequate* preventives are expreſſed by ſuch adverſatives —as UNLESS: "*Troy* will be taken, UNLESS the *Palladium* be preſerved;" that is, that this alone is *ſufficient* to prevent it. The *inadequate* are expreſſed by ſuch adverſatives as ALTHOUGH: "*Troy* will be taken, ALTHOUGH *Hector* defend it;" that is, *Hector's* defence will prove *ineffectual*. Theſe may be called adverſatives ADEQUATE and INADEQUATE.

Before we leave this ſubject, we may obſerve, that the words *when* and *where*, and all others of the ſame nature, ſuch as *whence, whether, whenever, where-ever, &c.* may be called ADVERBIAL conjunctions; becauſe they participate the nature both of adverbs and conjunctions; of *conjunctions*, as they *conjoin* ſentences; of *adverbs*, as they denote the attributes either of *time* or *place*. And theſe *adverbial* conjunctions (contrary to the character of *acceſſary* words, which have ſtrictly no ſignification but when aſſociated with other words), have a kind of *obſcure* ſignification when taken alone, by denoting theſe attributes of time and place. And hence it is, that they appear in grammar like *zoophytes* in nature, a kind of middle beings, of amphibious character, which, by ſharing the attributes of the higher and the lower, conduce to link the whole together.

SECT. II. *Of thoſe* Connectives, *called* PREPOSITIONS.

A PREPOSITION *is a part of ſpeech devoid itſelf of ſignification, but ſo formed as to unite two words that are ſignificant, and that refuſe to coaleſce of themſelves.* This connective power (which relates to words only, and not to ſentences) will be better underſtood by the following obſervations.

Some things naturally coaleſce and unite of *themſelves*, while others refuſe to do ſo *without help*, and as it were by compulſion. For example, all quantities and qualities coaleſce immediately with their ſubſtances: thus it is we ſay, *a fiere lion, a vaſt mountain*, &c. In like manner actions coaleſce with their agents, and paſſions with their patients: thus it is we ſay, *Alexander conquers, Darius is conquered.* Nay, as every energy is a kind of medium between its agent and patient, the whole three, agent, energy, and patient, coaleſce with the ſame facility; as when we ſay, *Alexander conquers Darius.* Farther than this, as the greateſt part of attributives themſelves may be characteriſed, as when we ſay of ſuch attributives as *ran, beautiful, learned*, &c. "he ran *ſwiftly*, ſhe was *very* beautiful, he was *moderately* learned," &c. theſe muſt readily coaleſce with the attributes which they thus characteriſe. From all which it appears, that *thoſe parts of ſpeech unite of themſelves in grammar, whoſe original archetypes unite of themſelves in nature.* Hence, therefore, it is, that although ſubſtances naturally coincide with their attributes, yet they abſolutely refuſe doing ſo one with another: and hence thoſe known maxims in phyſics, that *body is impenetrable*, that *two bodies cannot poſſeſs the ſame place*, &c.

From theſe principles it follows, that when we form a ſentence, the ſubſtance without difficulty coincides with the verb, from the natural coincidence of ſubſtance with energy; *the* SUN WARMETH: ſo likewiſe the energy with the ſubject on which it operates; WARMETH *the* EARTH: ſo likewiſe both ſubſtance and energy with their proper attributes; *the* SPLENDID SUN GENIALLY WARMETH *the* FERTILE EARTH. But ſuppoſe we are to add other ſubſtantives, as, for inſtance, *air*, or *beams*; how could theſe coincide, or under what character be introduced? Not either as the *energizer* of the verb, nor as *the ſubject on which it operates*; for both of theſe places are already filled up, the firſt by the word SUN, and the laſt by the ſubſtance EARTH: not as *attributes* to theſe laſt, or to any other thing; for attributes by nature they neither *are* nor *can be made*. Here, then, we perceive the riſe and uſe of *prepoſitions*: by theſe we connect thoſe ſubſtantives to ſentences, which at the time are unable to *coaleſce of themſelves*. Let us aſſume, for inſtance, a pair of theſe connectives, THROUGH and WITH, and mark their effect upon the ſubſtances here mentioned; *the ſplendid ſun* WITH *his beams genially warmeth* THROUGH *the air the fertile earth*: the ſentence, as before, remains entire and one; the ſubſtantives required are both introduced, and not a word which was there before is diſplaced from its proper ſtation.

It muſt be here obſerved, that *moſt* if not *all* prepoſitions ſeem originally formed to denote the relations of *place*; becauſe this is that grand *relation* which *bodies*

dies or *natural ſubſtances* maintain at all times to one another, whether they are contiguous or remote, whether in motion or at reſt. Thus we have prepoſitions to denote the *contiguous relation of body*; as when we ſay, *Caius walked* WITH *a ſtaff*; *the ſtatue ſtood* UPON *a pedeſtal*; *the river ran* OVER *a precipice*. Others, for the *detached relation*; as when we ſay, *he is going* TO *Italy*; *the ſun is riſen* ABOVE *the hills*; *theſe figs came* FROM *Turkey*. So, as to *motion* and *reſt*: only with this difference, that here the prepoſition varies its character with the verb: thus if we ſay, *that lamp hangs* FROM *the ceiling*, the prepoſition FROM aſſumes the character of *quieſcence*; but if we ſay, *that lamp is falling* FROM *the ceiling*, the prepoſition aſſumes a character of *motion*. So in Milton;

——*To ſupport uneaſy ſteps*
OVER *the burning marle*——

Again,

——*He with looks of cordial love*
Hung OVER *her enamour'd*.——

In the firſt of theſe examples, OVER denotes *motion*, and in the laſt it denotes *reſt*.

But though the original uſe of prepoſitions was to denote the relations of *place*, they could not be confined to this office only; but by degrees extended themſelves to ſubjects *incorporeal*, and came to denote relations as well *intellectual* as *local*. Thus becauſe, in *place*, he who is *above* has commonly the advantage of him who is *below*, we transfer OVER and UNDER to *dominion* and *obedience*: of a king we ſay, *he ruled* OVER *his people*; of a common ſoldier, *he ſerved* UNDER *ſuch a general*: ſo too we ſay, WITH *thought*; WITHOUT *attention*; *thinking* OVER *a ſubject*; UNDER *anxiety*; FROM *fear*; OUT OF *love*; THROUGH *jealouſy*, &c. All which inſtances, with many of the like kind, ſhew, that the *firſt words* of men, like their *firſt ideas*, had an immediate reference to *ſenſible objects*; and that, in after days, when they began to diſcern with their *intellect*, they took theſe words which they found already made, and transferred them, by *metaphor*, to *intellectual conceptions*. There is indeed no method to expreſs new ideas, but either by *metaphor*, or by *coining new words*; both which have been practiſed by philoſophers, according to the nature and exigence of the occaſion.

In the foregoing uſe of prepoſitions, we have ſeen how they are employed by way of *juxta-poſition*; that is to ſay, where they are prefixed to a word without becoming a part of it: But they may be alſo uſed by way of *compoſition*; that is, they may be prefixed to a word ſo as to become a part of it: thus, to UNDER*ſtand*, to FORE*tell*, to OVER*act*, to UNDER*value*, to OUT*go*, &c. are ſo many diſtinct words formed by prepoſitions joined intimately with ſome other word: in all which caſes, the prepoſitions commonly transfuſe ſomething of their own meaning into the word with which they are compounded; and this imparted meaning, in moſt inſtances, will be found reſolvable into ſome of the relations of *place*, as uſed either in its *proper* or *metaphorical* acceptation.

Interjections.

BESIDES the above parts of ſpeech, there is another, which cannot be comprehended under any of the foregoing claſſes, called INTERJECTIONS: of this kind are the words, AH! ALAS! FIE! &c. *This ſpecies of words coincide with no part of ſpeeeh, but are either uttered alone, or elſe thrown into a ſentence, without altering its form either in ſyntax or ſignification.* It It may be therefore objected, that as we ſay, that all language is divided into the ſeveral parts above enumerated, and this claſs cannot be comprehended in any of theſe diviſions; of courſe, the analyſis that we have made cannot be juſt, becauſe it does not comprehend the whole. To this objection it may be anſwered, that the language of which we have been treating, is that which has been formed by mutual compact, for the purpoſes of reaſoning and ſpeculation; that, beſides this artificial language, man, like every other ſenſitive animal, is endowed with a natural language, by which he can expreſs any ſtrong ſenſation. This language does not owe its characteriſtical expreſſion to the arbitrary form of articulation; but derives its whole force from the tone of voice, and modification of countenance and geſture: and of conſequence theſe tones and geſtures expreſs the ſame meaning without any relation to the articulation which they may aſſume, and are therefore univerſally underſtood by all mankind. Now, *interjection* is the name by which we diſtinguiſh theſe natural expreſſions: theſe cannot be properly called words, or parts of ſpeech; but certain adventitious ſounds, or voices of nature, expreſſing thoſe paſſions and natural emotions which ſpontaneouſly ariſe in the mind upon the view or narrative of intereſting events. We muſt, therefore, ſtill conclude, that all language properly ſo called is compoſed of *words*, all of which may be arranged into the ſeveral claſſes above-mentioned; and as a recapitulation of the whole that we have ſaid, we have annexed a TABLE, which preſents at one view the ſeveral claſſes and ſubdiviſions of words.

GRAMMARIAN, one that is ſkilled in, or teaches grammar.

Anciently the name *grammarian* was a title of honour, literature, and erudition, being given to perſons accounted learned in any art or faculty whatever. But it is otherwiſe now, being frequently uſed as a term of reproach, to ſignify a dry plodding perſon, employed about words and phraſes, but inattentive to the true beauties of expreſſion and delicacy of ſentiment. The ancient grammarians, called alſo *philologers*, muſt not be confounded with the grammatiſts, whoſe ſole buſineſs was to teach children the firſt elements of language. Varro, Cicero, Meſſala, and even Julius Cæſar, thought it no diſhonour to be ranked grammarians, who had many privileges granted to them by the Roman emperors.

GRAMMONT, a town of France, in the Limoſine, remarkable for its abbey, which is the chief of the order. E. Lon. 133. N. Lat. 45. 56.

GRAMPOUND, a town of Cornwall in England, ſeated on the river Valle in W. Lon. 5. 25. N. Lat. 50. 20. The inhabitants have a conſiderable manufacture of gloves. It ſends two members to parliament.

GRAMPUS, in ichythology; a ſpecies of delphinus. See DELPHINUS.

GRANADA, a province of Spain, which for a long time was a kingdom diſtinct from the reſt of that country, the hiſtory of which is given under the article of SPAIN. At preſent it is ſometimes called Upper Andaluſia. It is bounded to the ſouth and eaſt by the Mediterranean, to the weſt and north by Lower Andaluſia, and to the north-eaſt by Murcia. Its extent from weſt to eaſt is two hundred and ten miles; but its greateſt breadth exceeds not eighty. The air here is temperate and healthy; and though there are many mountains in the province, and ſome of them very high, yet they are almoſt every where covered with vines and fruit-trees, together with laurel, myrtle, ſweet-baſil, thyme, lavender, marjoram, and other aromatic herbs, which give an exquiſite taſte to the fleſh of their ſheep and cattle. A great deal of ſilk and ſugar, flax and hemp, honey and wax, is alſo produced here; beſides dates and acorns, ſuperior to the fineſt nuts; good ſtone for building; ſeveral ſorts of gems; ſumach, uſed in dreſſing goat-ſkins; and galls, of which a dye is made for leather. The valleys, with which the mountains are interſperſed, are extremely beautiful and fertile. The inhabitants of ſome of the higheſt mountains are ſaid to be deſcendants of the Moors; and, though they are become Roman-catholics, retain, in a great meaſure, their ancient cuſtoms, manners, and language. The principal rivers in the province are the Xenil and Guadalantin, beſides which there are many leſſer ſtreams. Abundance of ſalt is made in this province; which, though neither ſo populous nor ſo well cultivated as when ſubject to the Moors, yet is as much ſo as any in Spain. It was the laſt of the kingdoms poſſeſſed by the Moors, and was not reduced and annexed to the crown of Caſtile until 1492.

GRANADA, the capital of the above province, ſtands at the conflux of the Xenil and Dario, in a wholeſome air and fruitful country, an hundred and eighty miles ſouth of Madrid, in W. Long. 2. 30. N. Lat. 36. 56. It is large and magnificent, containing a great number of very handſome public and private buildings. Its walls, which are adorned with many towers at equal diſtances, are ſaid to be ten miles in compaſs. Here are two caſtles; the one built by the Moors, and the other by Charles V. and Philip II. They both command a very fine proſpect; and the firſt is ſo large, that it looks like a city by itſelf, and, it is ſaid, has room enough to accommodate forty thouſand people, excluſive of the royal palace, and the convent of St. Francis. Here is alſo a court of inquiſition; a royal tribunal; and an univerſity, founded in 1531; with the ſee of an archbiſhop, who has a revenue of forty thouſand ducats per annum. A great many noblemen, clergymen, and wealthy citizens, reſide in this city, of which the ſilk trade and manufacture is very great, and the arſenal is ſaid to be the beſt furniſhed of any in Spain. The inhabitants, who are partly deſcended of the Moors, are well ſupplied with water. There are ſeveral fine ſquares, particularly that called the Bivaramba or Plaça Mayor, where the bull-fights are held; and without the city is a large plain, full of towns and villages, called La Vega de Granada.

GRANADA, or GRENADA, one of the Caribbee iſlands. See GRENADA.

GRANADA, a town of America, in the province of Nicaragua, and in the audience of Guatimala, ſeated on the lake Nicaragua, 70 miles from the S. Sea. It was taken twice by the French buccaneers, and pillaged. The inhabitants carry on a great trade by means of the lake, which communicates with the N. Sea. W. Lon. 85. 10. N. Lat. 11. 8.

GRANADA, NEW, a province of South America, in Terra Firma, about 75 miles in length, and as much in breadth. It is bounded on the N. by Carthagena and St. Martha, on the E. by Venezuela, on the S. by Popayan, and on the W. by Darien. It contains mines of gold, copper, and iron; horſes, mules, good paſtures, corn, and fruits. It belongs to the Spaniards, and Santa-Fe-de-Bagota is the capital town.

GRANADILLOES, the name of ſome iſlands of the Caribbees, in America, having St Vincent to the N. and Granada to the S. They are ſo inconſiderable that they are quite neglected; but were ceded to England by the treaty of peace in 1763.

GRANADIER, a ſoldier armed with a ſword, a firelock, a bayonet, and a pouch full of hand-granadoes. They wear high caps, are generally the talleſt and briſkeſt fellows, and are always the firſt upon all attacks.

Every battalion of foot has generally a company of grenadiers belonging to it; or elſe four or five granadiers belong to each company of the battalion, which, on occaſion, are drawn out, and form a company of themſelves. Theſe always take the right of the battalion.

GRANADO or GRENADE, (in the art of war, a hollow ball or ſhell of iron or other metal, of about $2\frac{1}{2}$ inches diameter, which being filled with fine powder, is ſet on fire by means of a ſmall fuſe, driven into the fuſe-hole, made of well-ſeaſoned beech-wood, and thrown by the grenadiers into thoſe places where the men ſtand thick, particularly into the trenches and other lodgements made by the enemy. As ſoon as the compoſition within the fuſe gets to the powder in the grenado, it burſts into many pieces, greatly to the damage of all who happen to be in its way. Granados were invented about the year 1594. The author of the Military Dictionary has the following remark on the uſe of granados. "Grenades have unaccountably ſunk into diſuſe; but I am perſuaded there is nothing more proper than to have grenades to throw among the enemy who have jumped into the ditch. During the ſiege of Caſſel under the Count de La Lippe, in the campaign of 1762, a young engineer undertook to carry one of the outworks with a much ſmaller detachment than one which had been repulſed, and ſuceeded with eaſe from the uſe of grenades; which is a proof that they ſhould not be neglected, either in the attack or defence of poſts."—The word *Granado* takes its riſe from hence, that the ſhell is filled with grains, of powder as a pomegranate is with kernels.

GRANARY, a building to lay or ſtore corn in, eſpecially that deſigned to be kept a conſiderable time.

Sir Henry Wotton adviſes to make it look towards the north, becauſe that quarter is the cooleſt and moſt temperate,

A
GRAMMATIC

EXHIBIT

A Syſtematic View of WORDS naturally arranged into di

All LANGUAGE is compoſed of WORDS; each of which may be thus defined, A SOUND SIGNIFICANT OF WHICH NO PART IS OF ITSELF SIGNIFICANT. --- Theſe may be arranged into two general diviſions; which may be called

- PRINCIPALS, comprehending all ſuch words as ARE SIGNIFICANT OF THEMSELVES; which muſt be either
  - SUBSTANTIVES, which are all thoſe words that ARE EXPRESSIVE OF THOSE BEINGS WHICH EXIST OF THEMSELVES, AND NOT AS THE ENERGIES OF ANY THING ELSE. Theſe may be divided into two orders, *viz.*
    - NOUNS, properly ſo called, being the NAMES OF ALL THOSE BEINGS WHICH EXIST. Theſe may be divided into three kinds, each of which admit of the ſubdiviſions after-mentioned, *viz.*
      - NATURAL, or thoſe which are THE NAMES OF NATURAL SUBSTANCES; ſuch as — GENUS. ANIMAL, — SPECIES. MA
        DO
      - ARTIFICIAL. The ſeveral names of ARTIFICIAL OBJECTS; ſuch as — GENUS. EDIFICE, — SPECIES. HO
        CHU
      - ABSTRACT, or thoſe which are ABSTRACTED FROM QUALITIES; ſuch as — GENUS. MOTION. — SPECIES. FLI
        COU
    - Or
    - PRONOUNS, which are a ſpecies of words invented for SUPPLYING THE PLACE OF NOUNS IN CERTAIN CIRCUMSTANCES. They are of two kinds, *viz.*
      - PREPOSITIVE. So called becauſe they are capable of LEADING A SENTENCE. Theſe are divided into three orders, called the pronouns of the
        - FIRST PERSON; in
          ing *I* when the
        - SECOND PERSON,---
          THOU when it i
        - THIRD PERSON,----
          may be either a
          which admits of
        - IMPROPER; ſo calle
          theſe are employ
          MY, MINE, T
      - Or
      - SUBJUNCTIVE. So called, becauſe it cannot lead a ſentence, but ſerves to SUBJOIN SOME OTHER WHICH WAS PREVIOUS. Of this kind are,
        - WHICH, WHO, and
          WHO, *Alexand*
          WHO *ſpoke, &c.*
  - Or
  - ATTRIBUTIVES, which are thoſe words that ARE EXPRESSIVE OF THOSE THINGS WHICH EXIST AS THE ATTRIBUTES OF SOMETHING ELSE. Theſe may be divided into two diſtinct claſſes, *viz.*
    - ATTRIBUTIVES of the FIRST ORDER, which comprehends all thoſe words that are expreſſive of the ATTRIBUTES OF SUBSTANCES. And as all attributes are either MUTABLE, as in the objects of ſenſation, or IMMUTABLE, as in the objects of intellection and ſcience; therefore theſe are divided into
      - VERBS, or thoſe words expreſſive of any attribute WHOSE ESSENCE CONSISTS IN MOTION OR ITS PRIVATION. Every attribute of this kind may be repreſented as exiſting in three different ſtates, to which grammarians have given theſe names;
        1. INFINITIVE MO
           is exhibited in a
           MERELY AS
           MAY BE JOINE
           as in the words
        2. PARTICIPLE AC
           which the attri
           ally in a STATE
           word *writing*.
        3. PARTICIPLE PE
           the attribute i
           FINISHED IT
           word *written*.
      - And
      - ADJECTIVES, or thoſe words which denote any attribute WHOSE E
        QUALITIES OF ALL THINGS; ſuch as *good* and *bad*, *black* an
        ſo that where-ever we meet with variations of this ſort, we ought
    - ATTRIBUTIVES of the SECOND ORDER, or thoſe words which denote the ATTRIBUTES OF ATTRIBUTES. Theſe are commonly called
      - ADVERBS, which may be divided into two kinds, *viz.*
        - I. Thoſe that are co
          TIVES OF T
          may be divided
        - II. Thoſe confined to
          and are of the
- ACCESSORIES, comprehending all thoſe words which ONLY BECOME SIGNIFICANT BY RELATION TO OTHERS. Theſe are divided into
  - DEFINITIVES, which are all thoſe words which ſerve to DEFINE AND ASCERTAIN ANY PARTICULAR OBJECT, SO AS TO SEPARATE IT FROM OTHERS OF THE SAME CLASS, AND THUS DENOTE ITS INDIVIDUALITY. Theſe are commonly called
    - ARTICLES, which may be divided into two kinds, *viz.*
      - PROPER, or thoſe words which ALWAYS APPEAR AS ARTICLES ON ALL OCCASIONS. Theſe are, in Engliſh,
        - A, or AN, And THE — Theſe are
          A *houſ*
      - Or
      - IMPROPER, or thoſe words which only SOMETIMES APPEAR AS ARTICLES. Theſe are either
        - PRONOMIAL, or t
          employed as *a*
          ſupply the plac
          ſerve to define
        - Or
        - NOMIAL; ſo we cou
          define and *aſce*
          only ſerve to a
  - And
  - CONNECTIVES, or thoſe words which are employed TO CONNECT OTHER WORDS, AND OUT OF SEVERAL DISTINCT PARTS TO MAKE ONE COMPLETE WHOLE. Theſe may be divided into two kinds, *viz.*
    - CONJUNCTIONS; by which name are diſtinguiſhed all thoſe connectives whoſe office it is to CONJOIN SENTENCES. Theſe are divided into two kinds, *viz.*
      - CONJUNCTIVE, properly ſo called; or thoſe words which CONJOIN SENTENCES, AND THEIR MEANING ALSO. Theſe are either
        - COPULATIVE. Th
          only *accidental*
        - Or
        - CONTINUATIVE, w
          more intimately
          plicable where t
          as when we fa
          CAUSE the ſky
          divided into tw
      - And
      - DISJUNCTIVE, or thoſe words which, at the ſame time that they CONJOIN SENTENCES, DISJOIN THEIR MEANINGS. They are either
        - SIMPLE, or thoſe wh
        - Or
        - ADVERSATIVE, or
          time that they
          Theſe are either
    - And
    - PREPOSITIONS, or thoſe auxiliary words, whoſe office it is to CONJOIN WORDS WHICH OF THEMSELVES REFUSE TO COALESCE. All of them denote ultimately ſome relation of PLACE; and are either
      - PROPER, or thoſe which literally denote different relations of PLACE, either
        - CONTIGUOUS; as w
        - DETACHED; as wh
        - Of MOTION; as in
        - Of REST; as in this
          In theſe inſtanc
      - Or
      - METAPHORICAL. For, as thoſe who are above others in *place* ha
        of a ſoldier, "*he* ſerved UNDER ſuch a *general*," &c.

INTERJECTIONS are a ſpecies of words which are not included under any of the
man is endowed in common with other animals, by which we expreſs thoſe pa
for their meaning; but are expreſſions of nature, and therefore univerſally und
the words, *Ha! Alas! Fie!* &c.

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To face p. 3378.

CAL TABLE,

ITING

into diſtinct CLASSES, with their ſeveral Subdiviſions.

	SPECIES.	INDIVIDUAL.
IMAL,	MAN,	ALEXANDER, CYRUS, *&c.*
	DOG,	CERBERUS, ARGUS, *&c.*
DIFICE,	HOUSE,	THE VATICAN, *&c.*
	CHURCH,	ST PAUL's, THE ROTUNDO, *&c.*
OTION.	FLIGHT,	THE FALCON's FLIGHT, *&c.*
	COURSE.	THE COURSE OF A GRE-HOUND, *&c.*

Nouns of all kinds admit of the following ACCIDENTS, *viz.*

GENDER, which is a certain affection of nouns relating to the ſex of the ſubſtance whoſe names they are. For in nature every object is either a male or a female, or ſomething neither the one nor the other. Grammarians, therefore, following this idea, have divided the names of beings into three claſſes; calling thoſe that denote *males*, of the MASCULINE *gender;* thoſe which denote *females*, they have called of the FEMININE *gender;* and thoſe which denote neither one nor other, of the NEUTER *gender*.

NUMBER. As there is no object in nature ſingle and alone, it is evident, that every noun ought to have ſome variation to expreſs, whether it is one object of which mention is made, or more than one;---and accordingly we find, that nouns in every language have ſome method of expreſſing this. ---If one is mentioned, it is called the SINGULAR *number;* if more, it is called the PLURAL *number*. Some languages have a variation, called CASES; but this is only accidental, not eſſential.

T PERSON; in Engliſh, I: ſo called, becauſe it is ſubſtituted in the name of the ſpeaker, who is always principal with reſpect to his own diſcourſe. It appears under two different forms, being *I* when the ſpeaker is the active cauſe of any effect, and ME when it is the paſſive ſubject.---Each of theſe admit of a plural; *I* has the plural WE, and ME the plural US.

ND PERSON,----THOU: ſo called, becauſe it is employed to denote the party addreſſed, who may be conſidered as the ſecond in diſcourſe. It likewiſe admits of two different forms; being THOU when it is the active cauſe, and THEE when it is the paſſive ſubject.---Each of theſe alſo admit of a plural; THOU having the plural YE, and THEE the plural YOU.

RD PERSON,----HE, SHE, IT; which words are employed to denote any object which may be the ſubject of the converſation, different from either the ſpeaker or party addreſſed: and as this ſubject may be either a *male*, or a *female*, or ſome object neither one nor other, it admits of a word for each; HE, with its paſſive HIM, for *males*; SHE, with its paſſive HER, for *females*; and IT, which admits of no paſſive, for *neuters*.---All of theſe, like the other pronouns-perſonal, admit of plurals;---THEY being the plural for all three when active, and THEM when paſſive.

ROPER; ſo called, becauſe although they are ſometimes employed as pronouns, yet at other times they appear as ARTICLES. Of this kind are the words ALL, ANY, SOME, THIS, *&c.* When theſe are employed as pronouns, they aſſume the power, and ſupply the place, of a noun; when they are articles, they require the aſſiſtance of a noun as other articles do. The words, THY, MY, MINE, THINE, *&c.* have been improperly conſidered as pronouns, as they never are ſuch.

CH, WHO, and THAT. This ſubjunctive-pronoun may be ſubſtituted in the place of every noun whatever, whether expreſſive of *genus*, *ſpecies*, or *individual*; as, the *animal* WHICH, the *man* WHO, *Alexander* THAT, *&c.* Nay, this may even become the ſubſtitute of the *prepoſitive-pronouns themſelves;* as, when we ſay, *I* WHO *now write*, *you* WHO *now read*, *he* WHO *wrote*, *ſhe* WHO *ſpoke*, *&c.* Hence, therefore, this ſubjunctive is a real pronoun from ſubſtitution; and it has this peculiarity beſides, that it is not only a *ſubſtitute*, but withal a *connective*.

FINITIVE MODE: in which the attribute is exhibited in a manner perfectly indefinite, MERELY AS AN ATTRIBUTE WHICH MAY BE JOINED WITH A SUBSTANTIVE; as in the words *to walk*, *to write*, &c.

ARTICIPLE ACTIVE, or PRESENT: in which the attribute is repreſented as actually in a STATE OF EXERTION; as in the word *writing*.

ARTICIPLE PERFECT, or PAST: in which the attribute is repreſented as HAVING FINISHED ITS EXERTION; as in the word *written*.

But although verbs do not in ſtrictneſs admit of any other variations, except theſe three above mentioned; yet, as the connection is ſo intimate between the attribute and its energizer, and the ſpeaker, who unites theſe together, the contrivers of ſome languages have conſidered them as the ſame, and have invented certain variations to expreſs theſe different relations. The names and meaning of which are as follows,

MODES are thoſe variations which denote a difference in the PERCEPTION or VOLITION of the ſpeaker; as, *I write*, *I* CAN *write*, *do* THOU *write*.

TENSES are thoſe variations to the TIME WHEN THE ACTION EXHIBITED BY THE VERB took place: which muſt be either paſt, preſent, or future; as, *I* DO *write*, *I* DID *write*, *I* SHALL *write*, *&c.*

PERSON, as the name implies, are the variations occaſioned by a difference of the energizer; as, I *wrote*, HE *wrote*, SHE *wrote*, *&c.*

NUMBER relates to the number of energizers, and is either ſingular or plural; as, I *write*, WE *write*, &c---Verbs have likewiſe been diſtinguiſhed into the following kinds, *viz.*

1ſt, ACTIVE, or thoſe where the energizer leads the ſentence; as when we ſay, *Cato loved.*

2d, PASSIVE, where the paſſive object leads; as, *Portia is loved.*

3d, NEUTER, where the energizer is always of neceſſity the paſſive ſubject; as, *Cæſar walketh.*

4th, RECIPROCAL, or VERBS MIDDLE, as the Greeks called them, where the energy returns upon the energizer; as, *Brutus killed himſelf.*---Of theſe different kinds of verbs, two diſtinctions only can be ſuppoſed neceſſary,---ACTIVE and NEUTER;----becauſe the paſſive is only a variation of theſe, as alſo the reciprocal.

tribute WHOSE ESSENCE DOES NOT CONSIST IN MOTION OR ITS PRIVATION. Or, in other words, all thoſe words are called adjectives WHICH EXPRESS the SEVERAL QUANTITIES and and *bad*, *black* and *white*, *large* and *ſmall*, &c.----As theſe attributes are in their own nature quite invariable, ſo the words which expreſs them can in ſtrictneſs admit of no variation whatever; his ſort, we ought to conſider them as accidents, not as eſſential to language.

hoſe that are common to ALL ATTRIBUTIVES OF THE FIRST ORDER; and may be divided into adverbs

- Of INTENSION and REMISSION, or of QUALITIES CONTINUOUS; as in the words MODERATELY, VASTLY, EXCEEDINGLY, *&c.* Theſe admit of the different degrees of compariſon.
- Of QUANTITY DISCRETE; as, ONCE, TWICE, THRICE, *&c.*
- Of RELATION; as, MORE, MOST, LESS, LEAST, EQUALLY, PROPORTIONALLY, *&c.*
- Of QUALITY; as, HONESTLY, PRUDENTLY, WISELY, BRAVELY, *&c.*

Thoſe confined to VERBS, properly ſo called; and are of the following kinds, *viz.*

- Of TIME; as, THEN, AFTERWARD, FORMERLY, JUST NOW, TO-DAY, TO-MORROW, *&c.*
- Of PLACE; as, THERE, FAR, HENCE, *&c.* As alſo adverbs derived from prepoſitions; as, UPWARD, DOWNWARD, *&c.*
- Of INTENSIONS and REMISSIONS PECULIAR to MOTION; as, SPEEDIDY, HASTILY, SLOWLY, *&c.*
- Of INTERROGATION or RELATION; as WHEN, WHERE, WHENCE, WHITHER, *&c.*

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Theſe are both of them employed to DEFINE and ASCERTAIN INDIVIDUALS belonging to the ſeveral GENERA or SPECIES of ſubſtances. Thus, *houſe* is a term totally indefinite; A *houſe* denotes a particular houſe, ſeparated from others with which we may be totally unacquainted; THE *houſe*, denotes that it is now recollected as an object formerly known.

ONOMIAL, or thoſe pronouns which ſtand as *definitives*, and ſometimes as *ſubſtitutes*. Of this kind may be reckoned THIS, ANY, ALL, SOME, and many others. Theſe, when they are employed as *articles*, never ſtand by themſelves, but require the aſſiſtance of a noun, which they define; whereas when they are pronouns, they muſt of neceſſity appear by themſelves, and ſupply the place of a noun. In this caſe likewiſe may be ranked theſe words which are commonly called *pronouns-poſſeſſive;* as, HIS, HERS, MY MINE THINE, *&c.* which, as they always ſerve to define a particular object, are more properly *definitives*, than either *pronouns* or *adjectives*.

MIAL; ſo we could call thoſe nouns, which, laying aſide their nature as *nouns*, aſſume the character and office of *articles*, like them requiring the aſſiſtance of another noun which they ſerve to *define* and *aſcertain*. Of this kind may be reckoned all nouns in that ſtate which is commonly called the *genitive caſe* in the Engliſh language; as, ALEXANDER's, POMPEY's, *&c.* for theſe only ſerve to aſcertain the individuality of the noun with which they are aſſociated.

PULATIVE. The principal of which is the word AND.----As this only *couples* ſentences, it is applicable to all ſuch ſubjects whoſe natures are *not incompatible*, or where the coincidence may be only *accidental*, not *eſſential*. As in the ſentence, " *Lyſippus* was a ſtatuary, AND *Priſcian* a grammarian;" here the coincidence is only accidental.

NTINUATIVE, which conſolidates ſentences more intimately; and therefore are only applicable where the coincidence is *eſſential;* as when we ſay, " The ſun ſhines BECAUSE the ſky is clear." Theſe may be divided into two kinds, *viz.*

- SUPPOSITIVE, as in the word IF, which denotes *connection*, but does not ſuppoſe *actual exiſtence;* as in the example, " You will live happily, IF you live honeſtly."
- POSITIVE; which not only denote connection, but alſo imply actual exiſtence. They are either
  - CASUAL, or thoſe which ſubjoin *effects* to *cauſes:* as the words BECAUSE, SINCE, *&c.* as in this example, " You live happily, BECAUSE you live honeſtly."
  - COLLECTIVE, or thoſe employed in demonſtrations and ſcience, properly ſo called, where the *cauſe* being firſt known, by its effects we diſcover the *conſequences;* as the words THEREFORE, THEN, *&c.* as in this example, " The moon intervenes, THEREFORE the ſun is in eclipſe."

PLE, or thoſe which do no more than merely disjoin; as, " EITHER it is day, OR it is night;" the alternative being left indefinite.

VERSATIVE, or thoſe which, at the ſame time that they disjoin, *oppoſe* and *define*. Theſe are either

- ABSOLUTE, as the word BUT; as in this example, " *Brutus* was a patriot, BUT *Cæſar* was not."
- COMPARATIVE; as in the words AS and THAN, *&c.* Theſe not only mark oppoſition, but that equality or exceſs which ariſes among ſubjects when compared; as for example, " *Virgil* was AS great a poet AS *Cicero* was an orator."
- ADEQUATE, where the cauſe is ſuppoſed adequate to the effect. The principal of theſe is the word UNLESS; as in this example, " *Troy* will be taken, UNLESS the *palladium* be preſerved." This ſuppoſes that the preſerving the palladium would be ſufficient to prevent it.
- INADEQUATE, where the cauſe is ſuppoſed not to be ſufficient to produce the effect; as the word ALTHOUGH, in this example, " *Troy* will be taken ALTHOUGH *Hector* defend it." Here the efforts of Hector are ſuppoſed to be inefficacious.

NTIGUOUS; as when we ſay, " *Caius* walked WITH a *ſtaff;* the *ſtatue* ſtood UPON a *pedeſtal*," *&c.*
TACHED; as when we ſay, " *he* is going TO *Italy;* the *ſun* is riſen ABOVE the *hills*," &c.
MOTION; as in this example, " to ſupport *uneaſy ſteps* OVER the *burning marle.*" Or
REST; as in this example, " *he*, with looks of cordial love, hung OVER *her* enamour'd."

In theſe inſtances it is obvious, that when theſe prepoſitions denote *motion* or *reſt*, they vary their character with the verb to which they are joined.

others in *place* have generally the advantage over them, theſe prepoſitions have been employed to denote that *ſuperiority* or *inferiority*. Thus, we ſay of a king, " *he* ruled OVER his *people.*"
" &c.

under any of the claſſes above-mentioned. And indeed theſe can hardly be conſidered as a part of artificial language: they may be rather called a part of that natural language with which we expreſs thoſe paſſions and natural emotions which ſpontaneouſly ariſe in the human ſoul upon the view of intereſting events.-----Theſe therefore do not, like other words, depend upon compact ore univerſally underſtood;---the form which they aſſume by articulation being no part of their eſſence,----the tone with which they are uttered conſtituting their whole eſſence.----Of this kind are

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temperate. Mr Worlidge obſerves, that the beſt granaries are built of brick, with quarters of timber wrought in the inſide, to which the boards may be nailed, with which the inſide of the granary muſt be lined ſo cloſe to the bricks, that there may not be any room left for vermin to ſhelter themſelves. There may be many ſtories one above another, which ſhould be near the one to the other; becauſe the ſhallower the corn lies, it is the better, and more eaſily turned.

GRANDEE, a deſignation given to a nobleman of Spain or Portugal.

The grandees are allowed to be covered before the king, who treats them like princes, ſtyling them Illuſtrious, in his letters; and in ſpeaking to them, or of them, they are ſtyled Eminences.

1 Double ſig-ification.

GRANDEUR *and* SUBLIMITY. Theſe terms have a double ſignification: they commonly ſignify the quality or circumſtance in objects by which the emotions of grandeur and ſublimity are produced; ſometimes the emotions themſelves.

In handling the preſent ſubject, it is neceſſary that the impreſſion made on the mind by the magnitude of an object, abſtracting from its other qualities, ſhould be aſcertained. And becauſe abſtraction is a mental operation of ſome difficulty, the ſafeſt method for judging is, to chooſe a plain object that is neither beautiful nor deformed, if ſuch a one can be found. The plaineſt that occurs, is a huge maſs of rubbiſh, the ruins perhaps of ſome extenſive building; or a large heap of ſtones, ſuch as are collected together for keeping in memory a battle or other remarkable event. Such an object, which in miniature would be perfectly indifferent, makes an impreſſion by its magnitude, and appears agreeable. And ſuppoſing it ſo large, as to fill the eye, and to prevent the attention from wandering upon other objects, the impreſſion it makes will be ſo much the deeper. See ATTENTION.

But though a plain object of that kind be agreeable, it is not termed *grand:* it is not entitled to that character, unleſs, together with its ſize, it be poſſeſſed of other qualities that contribute to beauty, ſuch as regularity, proportion, order, or colour: and according to the number of ſuch qualities combined with magnitude, it is more or leſs grand. Thus St Peter's church at Rome, the great pyramid of Egypt, the Alps towering bove the clouds, a great arm of the ſea, and above all a clear and ſerene ſky, are grand; becauſe, beſide their ſize, they are beautiful in an eminent degree. On the other hand, an overgrown whale, having a diſagreeable appearance, is not grand. A large building agreeable by its regularity and proportions, is grand; and yet a much larger building deſtitute of regularity, has not the leaſt tincture of grandeur. A ſingle regiment in battle-array, makes a grand appearance; which the ſurrounding crowd does not, though perhaps ten for one in number. And a regiment where the men are all in one livery and the horſes of one colour, makes a grander appearance, and conſequently ſtrikes more terror, than where there is confuſion of colour and dreſs. Thus greatneſs or magnitude is the circumſtance that diſtinguiſhes grandeur from beauty: agreeableneſs is the genus, of which beauty and grandeur are ſpecies.

2 randeur ſtinguiſh- from auty.

The emotion of grandeur, duly examined, will be found an additional proof of the foregoing doctrine. That this emotion is pleaſant in a high degree, requires no other evidence but once to have ſeen a grand object: and if an emotion of grandeur be pleaſant, its cauſe or object, as obſerved above, muſt infallibly be agreeable in proportion.

The qualities of grandeur and beauty are not more diſtinct, than the emotions are which theſe qualities produce in a ſpectator. It is obſerved in the article BEAUTY, that all the various emotions of beauty have one common character, that of ſweetneſs and gaiety. The emotion of grandeur has a different character: a large object that is agreeable, occupies the whole attention, and ſwells the heart into a vivid emotion, which, though extremely pleaſant, is rather ſerious than gay. And this affords a good reaſon for diſtinguiſhing in language theſe different emotions. The emotions raiſed by colour, by regularity, by proportion, and by order, have ſuch a reſemblance to each other, as readily to come under one general term, viz. *the emotion of beauty;* but the emotion of grandeur is ſo different from theſe mentioned, as to merit a peculiar name.

3 Demands not ſtrict regularity.

Though regularity, proportion, order, and colour, contribute to grandeur as well as to beauty, yet theſe qualities are not by far ſo eſſential to the former as to the latter. To make out that propoſition, ſome preliminaries are requiſite. In the firſt place, the mind, not being totally occupied with a ſmall object, can give its attention at the ſame time to every minute part; but in a great or extenſive object, the mind, being totally occupied with the capital and ſtriking parts, has no attention left for thoſe that are little or indifferent. In the next place, two ſimilar objects appear not ſimilar when viewed at different diſtances: the ſimilar parts of a very large object, cannot be ſeen but at different diſtances; and for that reaſon, its regularity, and the proportion of its parts, are in ſome meaſure loſt to the eye; neither are the irregularities of a very large object ſo conſpicuous as of one that is ſmall. Hence it is, that a large object is not ſo agreeable by its regularity, as a ſmall object; nor ſo diſagreeable by its irregularities.

4 Qualities contributing to grandeur.

Theſe conſiderations make it evident, that grandeur is ſatisfied with a leſs degree of regularity, and of the other qualities mentioned, than is requiſite for beauty; which may be illuſtrated by the following experiment. Approaching to a ſmall conical hill, we take an accurate ſurvey of every part, and are ſenſible of the ſlighteſt deviation from regularity and proportion. Suppoſing the hill to be conſiderably enlarged, ſo as to make us leſs ſenſible of its regularity, it will upon that account appear leſs beautiful. It will not, however, appear leſs agreeable, becauſe ſome ſlight emotion of grandeur comes in place of what is loſt in beauty. And at laſt, when the hill is enlarged to a great mountain, the ſmall degree of beauty that is left, is ſunk in its grandeur. Hence it is, that a towering hill is delightful, if it have but the ſlighteſt reſemblance of a cone; and a chain of mountains not leſs ſo, though deficient in the accuracy of order and proportion. We require a ſmall ſurface to be ſmooth; but in an extenſive plain, conſiderable inequalities are overlooked. In a word, regularity, proportion, order, and colour, contribute to grandeur as well as to beauty; but with a remarkable difference, that in paſſing from ſmall to great, they are not required in the ſame degree,

degree of perfection. This remark ſerves to explain the extreme delight we have in viewing the face of nature, when ſufficiently enriched and diverſified with objects. The bulk of the objects in a natural landſcape are beautiful, and ſome of them grand: a flowing river, a ſpreading oak, a round hill, an extended plain, are delightful; and even a rugged rock, or barren heath, though in themſelves diſagreeable, contribute by contraſt to the beauty of the whole; joining to theſe the verdure of the fields, the mixture of light and ſhade, and the ſublime canopy ſpread over all; it will not appear wonderful, that ſo extenſive a groupe of ſplendid objects ſhould ſwell the heart to its utmoſt bounds, and raiſe the ſtrongeſt emotion of grandeur. The ſpectator is conſcious of an enthuſiaſm which cannot bear confinement, nor the ſtrictneſs of regularity and order: he loves to range at large; and is ſo enchanted with magnificent objects, as to overlook ſlight beauties or deformities.

The ſame obſervation is applicable in ſome meaſure to works of art. In a ſmall building, the ſlighteſt irregularity is diſagreeable: but in a magnificent palace, or a large Gothic church, irregularities are leſs regarded. In an epic poem, we pardon many negligences that would not be permitted in a ſonnet or epigram. Notwithſtanding ſuch exceptions, it may be juſtly laid down for a rule, That in works of art, order and regularity ought to be governing principles; and hence the obſervation of Longinus, "In works of art "we have regard to exact proportion; in thoſe of na-"ture, to grandeur and magnificence."

5 **Sublimity.**

The ſame reflections are in a good meaſure applicable to ſublimity: particularly, that, like grandeur, it is a ſpecies of agreeableneſs; that a beautiful object placed high, appearing more agreeable than formerly, produces in the ſpectator a new emotion, termed *the emotion of ſublimity;* and that the perfection of order, regularity, and proportion, is leſs required in objects placed high, or at a diſtance, than at hand.

The pleaſant emotion raiſed by large objects, has not eſcaped the poets:

> ——————He doth beſtride the narrow world
> Like a Coloſſus; and we petty men
> Walk under his huge legs. *Julius Cæſar, act* 1. *ſc.* 3.

> *Cleopatra.* I dreamt there was an emp'ror Antony:
> Oh ſuch another ſleep, that I might ſee
> But ſuch another man!
> His face was as the heav'ns: and therein ſtuck
> A ſun and moon, which kept their courſe, and lighted
> The little O o'th' earth.
> His legs beſtrid the ocean, his rear'd arm
> Creſted the world. *Antony and Cleopatra, act* 5. *ſc.* 3.

> ———————————Majeſty
> Dies not alone; but, like a gulph, doth draw
> What's near it with it. It's a maſſy wheel
> Fix'd on the ſummit of the higheſt mount;
> To whoſe huge ſpokes ten thouſand leſſer things
> Are mortis'd and adjoin'd; which when it falls
> Each ſmall annexment, petty conſequence,
> Attends the boiſt'rous ruin. *Hamlet, act* 3. *ſc.* 8.

The poets have alſo made good uſe of the emotion produced by the elevated ſituation of an object:

> Quod ſi me lyricis vatibus inſeres,
> Sublimi feriam ſidera vertice. *Horat. Carm. l.* 2. *ode* 1.

> Oh thou! the earthly author of my blood,
> Whoſe youthful ſpirit, in me regenerate,
> Doth with a twofold vigour lift me up,
> To reach at victory above my head.
> *Richard* II. *act* 1. *ſc.* 4.

> Northumberland, thou ladder wherewithal
> The mounting Bolingbroke aſcends my throne.
> *Richard* II. *act* 5. *ſc.* 2.

> *Anthony.* Why was I rais'd the meteor of the world,
> Hung in the ſkies, and blazing as I travell'd,
> Till all my fires were ſpent; and then caſt downward
> To be trod out by Cæſar? *Dryden, All for Love, act* 1.

The deſcription of Paradiſe in the fourth book of *Paradiſe Loſt,* is a fine illuſtration of the impreſſion made by elevated objects:

> So on he fares, and to the border comes
> Of Eden, where delicious Paradiſe,
> Now nearer, crowns with her incloſure green,
> As with a rural mound, the champain head
> With a ſteep wilderneſs; whoſe hairy ſides
> Of thicket overgrown, groteſque and wild,
> Acceſs deny'd; and over head up grew
> Inſuperable height of loftieſt ſhade,
> Cedar, and pine, and fir, and branching palm,
> A ſylvan ſcene; and as the ranks aſcend,
> Shade above ſhade, a woody theatre
> Of ſtatelieſt view. Yet higher than their tops
> The verd'rous wall of Paradiſe up ſprung;
> Which to our general ſire gave proſpect large
> Into his nether empire, neighb'ring round.
> And higher than that wall a circling row
> Of goodlieſt trees, loaden with faireſt fruit,
> Bloſſoms and fruits at once of golden hue,
> Appear'd, with gay enamell'd colours mix'd. *l.* 131.

Though a grand object is agreeable, we muſt not infer that a little object is diſagreeable; which would be unhappy for man, conſidering that he is ſurrounded with ſo many objects of that kind. The ſame holds with reſpect to place: a body placed high is agreeable; but the ſame body placed low, is not by that circumſtance rendered diſagreeable. Littleneſs and lowneſs of place are preciſely ſimilar in the following particular, that they neither give pleaſure nor pain. And in this may viſibly be diſcovered peculiar attention in fitting the internal conſtitution of man to his external circumſtances. Were littleneſs and lowneſs of place agreeable, greatneſs and elevation could not be ſo: were littleneſs and lowneſs of place diſagreeable, they would occaſion uninterrupted uneaſineſs.

The difference between great and little with reſpect to agreeableneſs, is remarkably felt in a ſeries when we paſs gradually from the one extreme to the other. A mental progreſs from the capital to the kingdom, from that to Europe—to the whole earth—to the planetary ſyſtem—to the univerſe, is extremely pleaſant: the heart ſwells, and the mind is dilated at every ſtep. The returning in an oppoſite direction is not poſitively painful, though our pleaſure leſſens at every ſtep, till it vaniſh into indifference: ſuch a progreſs may ſometimes produce pleaſure of a different ſort, which ariſes from taking a narrower and narrower inſpection. The ſame obſervation holds in a progreſs upward and downward. Aſcent is pleaſant becauſe it elevates us; but deſcent is never painful: it is for the moſt part pleaſant from a different cauſe, that it is according to the order of nature. The fall of a ſtone from

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and
ublimity.

from any height, is extremely agreeable by its accelerated motion. We feel it pleaſant to deſcend from a mountain, becauſe the deſcent is natural and eaſy. Neither is looking downward painful; on the contrary, to look down upon objects, makes part of the pleaſure of elevation: looking down becomes then only painful when the object is ſo far below as to create dizzineſs; and even when that is the caſe, we feel a ſort of pleaſure mixed with the pain: witneſs Shakeſpear's deſcription of Dover cliffs:

> ————————How fearful
> And dizzy 'tis, to caſt one's eye ſo low!
> The crows and choughs, that wing the midway air,
> Show ſcarce ſo groſs as beetles. Half-way down
> Hangs one that gathers ſamphire; dreadful trade!
> Methinks he ſeems no bigger than his head.
> The fiſhermen that walk upon the beach,
> Appear like mice; and yon tall anchoring bark
> Diminiſh'd to her cock; her cock, a buoy
> Almoſt too ſmall for ſight. The murmuring ſurge,
> That on th' unnumber'd idle pebbles chafes,
> Cannot be heard ſo high. I'll look no more,
> Leſt my brain turn, and the deficient ſight
> Topple down headlong. *King Lear, act 4. ſc. 6.*

A remark is made above, that the emotions of grandeur and ſublimity are nearly allied. And hence it is, that the one term is frequently put for the other: an increaſing ſeries of numbers, for example, producing an emotion ſimilar to that of mounting upward, is commonly termed *an aſcending ſeries*: a ſeries of numbers gradually decreaſing, producing an emotion ſimilar to that of going downward, is commonly termed *a deſcending ſeries*: we talk familiarly of going *up* to the capital, and of going *down* to the country: from a leſſer kingdom we talk of going *up* to a greater; whence the *anabaſis* in the Greek language, when one travels from Greece to Perſia. We diſcover the ſame way of ſpeaking in the language even of Japan; and its univerſality proves it the offspring of a natural feeling.

6
andeur
ſubli-
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ſe.

The foregoing obſervation leads us to conſider grandeur and ſublimity in a figurative ſenſe, and as applicable to the fine arts. Hitherto theſe terms have been taken in their proper ſenſe, as applicable to objects of ſight only: and it was of importance to beſtow ſome pains upon that article; becauſe, generally ſpeaking, the figurative ſenſe of a word is derived from its proper ſenſe, which holds remarkably at preſent. Beauty, in its original ſignification, is confined to obobjects of ſight; but as many other objects, intellectual as well as moral, raiſe emotions reſembling that of beauty, the reſemblance of the effects prompts us to extend the term *beauty* to theſe objects. This equally accounts for the terms *grandeur* and *ſublimity* taken in a figurative ſenſe. Every emotion, from whatever cauſe proceeding, that reſembles an emotion of grandeur or elevation, is called by the ſame name: thus generoſity is ſaid to be an *elevated* emotion, as well as great courage; and that firmneſs of ſoul which is ſuperior to misfortunes, obtains the peculiar name of *magnanimity*. On the other hand, every emotion that contracts the mind, and fixeth it upon things trivial or of no importance, is termed *low*, by its reſemblance to an emotion produced by a little or low object of ſight: thus an appetite for trifling amuſements, is called *a low taſte*. The ſame terms are applied to characters and actions: we talk familiarly of an *elevated* genius, of a *great* man, and equally ſo of *littleneſs* of mind: ſome actions are *great* and *elevated*, and others are *little* and *groveling*. Sentiments, and even expreſſions, are characteriſed in the ſame manner: an expreſſion or ſentiment that raiſes the mind, is denominated *great* or *elevated*; and hence the SUBLIME in poetry. In ſuch figurative terms, we loſe the diſtinction between *great* and *elevated* in their proper ſenſe; for the reſemblance is not ſo entire, as to preſerve theſe terms diſtinct in their figurative application. We carry this figure ſtill farther. Elevation, in its proper ſenſe, imports ſuperiority of place; and lowneſs, inferiority of place: and hence a man of *ſuperior* talents, of *ſuperior* rank; of *inferior* parts, of *inferior* taſte, and ſuch like. The veneration we have for our anceſtors, and for the ancients in general, being ſimilar to the emotion produced by an elevated object of ſight, juſtifies the figurative expreſſion, of the ancients being *raiſed* above us, or poſſeſſing a *ſuperior* place. The notes of the gamut, proceeding regularly from the blunter or groſſer ſounds, to the more acute and piercing, produce in the hearer a feeling ſomewhat ſimilar to what is produced by mounting upward; and this gives occaſion to the figurative expreſſions, *a high note*, *a low note*.

Grandeur
and
Sublimity.

7
The ſublime in poetry.

8
Real and
figurative
grandeur
intimately
connected.

Such is the reſemblance in feeling between real and figurative grandeur, that among the nations on on the eaſt coaſt of Afric, who are directed purely by nature, the officers of ſtate are, with reſpect to rank, diſtinguiſhed by the length of the batoon each carries in his had; and in Japan, princes and great lords ſhew their rank by the length and ſize of their ſedanpoles. Again, it is a rule in painting, that figures of a ſmall ſize are proper for groteſque pieces; but that an hiſtorical ſubject, grand and important, requires figures as great as the life. The reſemblance of theſe feelings is in reality ſo ſtrong, that elevation in a figurative ſenſe is obſerved to have the ſame effect, even externally, with real elevation:

> *K. Henry*. This day is call'd the feaſt of Criſpian.
> He that outlives this day, and comes ſafe home,
> Will ſtand a-tiptoe when this day is nam'd,
> And rouſe him at the name of Criſpian.
> *Henry V. act 4. ſc. 8.*

The reſemblance in feeling between real and figurative grandeur, is humorouſly illuſtrated by Addiſon in criticiſing upon Engliſh tragedy*: "The ordinary method of making an hero, is to clap a huge plume of feathers upon his head, which riſes ſo high, that there is often a greater length from his chin to the top of his head, than to the ſole of his foot. One would believe, that we thought a great man and a tall man the ſame thing. As theſe ſuperfluous ornaments upon the head, make a great man; a princeſs generally receives her grandeur, from thoſe additional incumbrances that fall into her tail: I mean the broad ſweeping train, that follows her in all her motions; and finds conſtant employment for a boy, who ſtands behind her to open and ſpread it to advantage." The Scythians, impreſſed with the fame of Alexander, were aſtoniſhed when they found him a little man.

A gradual progreſs from ſmall to great, is not leſs

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* *Spectator*, N° 42.

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remarkable in figurative than in real grandeur or elevation. Every one muſt have obſerved the delightful effect of a number of thoughts or ſentiments, artfully diſpoſed like an aſcending ſeries, and making impreſſions deeper and deeper: ſuch diſpoſition of members in a period, is termed a *climax*.

Within certain limits grandeur and ſublimity produce their ſtrongeſt effects, which leſſen by exceſs as well as by defect. This is remarkable in grandeur and ſublimity taken in their proper ſenſe: the grandeſt emotion that can be raiſed by a viſible object is where the object can be taken in at one view; if ſo immenſe as not to be comprehended but in parts, it tends rather to diſtract than ſatisfy the mind *: in like manner, the ſtrongeſt emotion produced by elevation, is where the object is ſeen diſtinctly; a greater elevation leſſens in appearance the object, till it vaniſh out of ſight with its pleaſant emotions. The ſame is equally remarkable in figurative grandeur and elevation; which ſhall be handled together, becauſe, as obſerved above, they are ſcarce diſtinguiſhable.

Figurative grandeur.

Sentiments may be ſo ſtrained, as to become obſcure, or to exceed the capacity of the human mind: againſt ſuch licence of imagination, every good writer will be upon his guard. And therefore it is of greater importance to obſerve, that even the true ſublime may be carried beyond that pitch which produces the higheſt entertainment. We are undoubtedly ſuſceptible of a greater elevation than can be inſpired by human actions, the moſt heroic and magnanimous; witneſs what we feel from Milton's deſcription of ſuperior beings: yet every man muſt be ſenſible of a more conſtant and ſweet elevation, when the hiſtory of his own ſpecies is the ſubject; he enjoys an elevation equal to that of the greateſt hero, of an Alexander, or a Cæſar, of a Brutus, or an Epaminondas: he accompanies theſe heroes in their ſublimeſt ſentiments and moſt hazardous exploits, with a magnanimity equal to theirs; and finds it no ſtretch, to preſerve the ſame tone of mind for hours together, without ſinking. The caſe is not the ſame in deſcribing the actions or qualities of ſuperior beings: the reader's imagination cannot keep pace with that of the poet; the mind, unable to ſupport itſelf in a ſtrained elevation, falls as from a height; and the fall is immoderate like the elevation: where that effect is not felt, it muſt be prevented by ſome obſcurity in the conception, which frequently attends the deſcriptions of unknown objects. Hence the St Franciſes, St Dominics, and other tutelary ſaints among the Roman Catholics. A mind unable to raiſe itſelf to the Supreme Being ſelf-exiſtent and eternal, or to ſupport itſelf in a ſtrained elevation, finds itſelf more at eaſe in uſing the interceſſion of ſome ſaint whoſe piety and penances while on earth are ſuppoſed to have made him a favourite in heaven.

A ſtrained elevation is attended with another inconvenience, that the author is apt to fall ſuddenly as well as the reader; becauſe it is not a little difficult, to deſcend, ſweetly and eaſily, from ſuch elevation, to the ordinary tone of the ſubject. The following paſſage is a good illuſtration of that obſervation:

> Sæpe etiam immenſum cœlo venit agmen aquarum,
> Et fœdam glomerant tempeſtatem imbribus atris
> Conlectæ ex alto nubes. Ruit arduus æther,
> Et pluvia ingentia ſata læta boumque labores
> Diluit. Implentur foſſæ, et cava flumina creſcunt
> Cum ſonitu, fervetque fretis ſpirantibus æquor.
> Ipſe Pater, media nimborum in nocte, coruſca
> Fulmina molitur dextra. Quo maxuma motu
> Terra tremit: fugere feræ! et mortalia corda
> Per gentes humilis ſtravit pavor. Ille flagranti
> Aut Atho, aut Rhodopen, aut alta Ceraunia telo
> Dejicit: *ingeminant auſtri, et denſiſſimus imber.*
>
> *Virg. Georg. l.* 1.

In the deſcription of a ſtorm, to figure Jupiter throwing down huge mountains with his thunderbolts, is hyperbolically ſublime, if we may uſe the expreſſion: the tone of mind produced by that image, is ſo diſtant from the tone produced by a thick ſhower of rain, that the ſudden tranſition muſt be unpleaſant.

Objects of ſight that are not remarkably great nor high, ſcarce raiſe any emotion of grandeur or of ſublimity: and the ſame holds in other objects; for we often find the mind rouſed and animated, without being carried to that height. This difference may be diſcerned in many ſorts of muſic, as well as in ſome muſical inſtruments: a kettle-drum rouſes, and a hautboy is animating; but neither of them inſpires an emotion of ſublimity: revenge animates the mind in a conſiderable degree; but it never produceth an emotion that can be termed *grand* or *ſublime*; and perhaps no diſagreeable paſſion ever has that effect.

No deſire is more univerſal than to be exalted and honoured; and upon that account, chiefly, are we ambitious of power, riches, titles, fame, which would ſuddenly loſe their reliſh did they not raiſe us above others, and command ſubmiſſion and deference: and it may be thought, that our attachment to things grand and lofty, proceeds from their connection with our favourite paſſion. This connection has undoubtedly an effect; but that the preference given to things grand and lofty muſt have a deeper root in human nature, will appear from conſidering, that many beſtow their time upon low and trifling amuſements, without having the leaſt tincture of this favourite paſſion: yet theſe very perſons talk the ſame language with the reſt of mankind; and prefer the more elevated pleaſures: they acknowledge a more refined taſte, and are aſhamed of their own as low and groveling. This ſentiment, conſtant and univerſal, muſt be the work of nature; and it plainly indicates an original attachment in human nature to every object that elevates the mind: ſome men may have a greater reliſh for an object not of the higheſt rank; but they are conſcious of the preference given by mankind in general to things grand and ſublime; and they are ſenſible, that their peculiar taſte ought to yield to the general taſte.

What is ſaid above ſuggeſts a capital rule for reaching to Grandeur of manner.

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* It is juſtly obſerved by Addiſon, that perhaps a man would have been more aſtoniſhed with the majeſtic air that appeared in one of Lyſippus's ſtatues of Alexander, though no bigger than the life, than he might have been with Mount Athos, had it been cut into the figure of the hero, according to the propoſal of Phidias, with a river in one hand and a city in the other. *Spectator*, N° 415.

reaching the ſublime in ſuch works of art as are ſuſceptible of it; and that is, to preſent thoſe parts or circumſtances only which make the greateſt figure, keeping out of view every thing low or trivial; for the mind, elevated by an important object, cannot, without reluctance, be forced down to beſtow any ſhare of its attention upon trifles. Such judicious ſelection of capital circumſtances, is by an eminent critic ſtyled *grandeur* of *manner* *. In none of the fine arts is there ſo great ſcope for that rule as in poetry; which, by that means, enjoys a remarkable power of beſtowing upon objects and events an air of grandeur: when we are ſpectators, every minute object preſents itſelf in its order; but in deſcribing at ſecond hand, theſe are laid aſide, and the capital objects are brought cloſe together. A judicious taſte in thus ſelecting the moſt intereſting incidents, to give them an united force, accounts for a fact that may appear ſurpriſing; which is, that we are more moved by ſpirited narrative at ſecond hand, than by being ſpectators of the event itſelf, in all its circumſtances.

Longinus * exemplifies the foregoing rule by a compariſon of two paſſages.

> Ye pow'rs, what madneſs! how on ſhips ſo frail
> (Tremendous thought!) can thoughtleſs mortals ſail?
> For ſtormy ſeas they quit the pleaſing plain,
> Plant woods in waves, and dwell amidſt the main.
> Far o'er the deep (a trackleſs path) they go,
> And wander oceans in purſuit of wo.
> No eaſe their hearts, no reſt their eyes can find,
> On heaven their looks, and on the waves their mind,
> Sunk are their ſpirits, while their arms they rear,
> And gods are wearied with their fruitleſs prayer.
>
> ARISTÆUS.

> Burſt as a wave that from the cloud impends,
> And ſwell'd with tempeſts on the ſhip deſcends.
> White are the decks with foam: the winds aloud
> Howl o'er the maſts, and ſing through every ſhroud.
> Pale, trembling, tir'd, the ſailors freeze with fears,
> And inſtant death on every wave appears. HOMER.

In the latter paſſage, the moſt ſtriking circumſtances are ſelected to fill the mind with terror and aſtoniſhment. The former is a collection of minute and low circumſtances, which ſcatter the thought and make no impreſſion: it is at the ſame time full of verbal antitheſes and low conceit, extremely improper in a ſcene of diſtreſs.

The following deſcription of a battle is remarkably ſublime, by collecting together, in the feweſt words, thoſe circumſtances which make the greateſt figure.

"Like autumn's dark ſtorms pouring from two echoing hills, toward each other approached the heroes; "as two dark ſtreams from high rocks meet and roar "on the plain, loud, rough, and dark in battle, meet "Lochlin and Iniſfail. Chief mixes his ſtrokes with "chief, and man with man: ſteel ſounds on ſteel, and "helmets are cleft on high: blood burſts and ſmokes "around: ſtrings murmur on the poliſh'd yew: darts "ruſh along the ſky: ſpears fall like ſparks of flame "that gild the ſtormy face of night.

"As the noiſe of the troubled ocean when roll the "waves on high, as the laſt peal of thundering hea-"ven, ſuch is the noiſe of battle. Though Cormac's "hundred bards were there, feeble were the voice of "a hundred bards to ſend the deaths to future times; "for many were the deaths of the heroes, and wide "poured the blood of the valiant." FINGAL.

The following paſſage in the 4th book of the Iliad is a deſcription of a battle, wonderfully ardent. "When now gathered on either ſide, the hoſts plunged together in fight; ſhield is harſhly laid to ſhield; "ſpears craſh on the brazen corſlets; boſſy buckler "with buckler meets; loud tumult rages over all; "groans are mixed with boaſts of men; the ſlain and "ſlayer join in noiſe; the earth is floating round with "blood. As when two ruſhing ſtreams from two "mountains come roaring down, and throw together "their rapid waters below, they roar along the gul-"phy vale. The ſtartled ſhepherd hears the ſound, "as he ſtalks o'er the diſtant hills; ſo, as they mixed "in fight, from both armies clamour with loud ter-"ror aroſe." But ſuch general deſcriptions are not frequent in Homer. Even his ſingle-combats are rare. The fifth book is the longeſt account of a battle that is in the Iliad; and yet contains nothing but a long catalogue of chiefs killing chiefs, not in ſingle combat neither, but at a diſtance with an arrow or a javelin; and theſe chiefs named for the firſt time and the laſt. The ſame ſcene is continued through a great part of the ſixth book. There is at the ſame time a minute deſcription of every wound, which for accuracy may do honour to an anatomiſt, but in an epic poem is tireſome and fatiguing. There is no relief from horrid languor but the beautiful Greek language and melody of Homer's verſification.

In the twenty-firſt book of the Odyſſey, there is a paſſage which deviates widely from the rule above laid down: it concerns that part of the hiſtory of Penelope and her ſuitors, in which ſhe is made to declare in favour of him who ſhould prove the moſt dextrous in ſhooting with the bow of Ulyſſes:

> Now gently winding up the fair aſcent,
> By many an eaſy ſtep, the matron went:
> Then o'er the pavement glides with grace divine,
> (With poliſh'd oak the level pavements ſhine);
> The folding gates a dazzling light diſplay'd,
> With pomp of various architrave o'erlay'd.
> The bolt, obedient to the ſilken ſtring,
> Forſakes the ſtaple as ſhe pulls the ring;
> The wards reſpondent to the key turn'd round;
> The bars fall back; the flying valves reſound.
> Loud as a bull makes hill and valley ring;
> So roar'd the lock when it releas'd the ſpring.
> She moves majeſtic through the wealthy room,
> Where treaſur'd garments caſt a rich perfume;
> There from the column where aloft it hung,
> Reach'd, in its ſplendid caſe, the bow unſtrung.

Virgil ſometimes errs againſt this rule: in the following paſſages minute circumſtances are brought into full view; and what is ſtill worſe, they are deſcribed with all the pomp of poetical diction, *Æneid, L.* 1. *l.* 214, *to* 219. *L.* 6. *l.* 176, *to* 182. *L.* 6. *l.* 212, *to* 231.: and the laſt, which deſcribes a funeral, is the leſs excuſable, as the man whoſe funeral it is makes no figure in the poem.

The ſpeech of Clytemneſtra, deſcending from her chariot in the Iphigenia of Euripides *, is ſtuffed with a number of common and trivial circumſtances.

But of all writers, Lucan in this article is the moſt injudicious: the ſea-fight between the Romans and Maſſilians †, is deſcribed ſo much in detail, without exhibiting

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* *Spectator*, No 415.

* *Chap.* 8.

* *Act* 3.

† Lib. iii. 567.

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exhibiting any grand or total view, that the reader is fatigued with endleſs circumſtances, without ever feeling any degree of elevation; and yet there are ſome fine incidents, thoſe, for example, of the two brothers, and of the old man and his ſon, which, taken ſeparately, would affect us greatly. But Lucan, once engaged in a deſcription, knows no end. See other paſſages of the ſame kind, *L.* 4. *l.* 292, *to* 337. *L.* 4. *l.* 750, *to* 765. The epiſode of the ſorcereſs Erictho, end of book 6th, is intolerably minute and prolix.

This rule is alſo applicable to other fine arts. In painting it is eſtabliſhed, that the principal figure muſt be put in the ſtrongeſt light; that the beauty of attitude conſiſts in placing the nobler parts moſt in view, and in ſuppreſſing the ſmaller parts as much as poſſible; that the folds of the drapery muſt be few and large; that foreſhortenings are bad, becauſe they make the parts appear little; and that the muſcles ought to be kept as entire as poſſible, without being divided into ſmall ſections. Every one at preſent ſubſcribes to that rule as applied to gardening, in oppoſition to parterres ſplit into a thouſand ſmall parts in the ſtiffeſt regularity of figure. The moſt eminent architects have governed themſelves by the ſame rule in all their works.

11 General terms ought to be avoided where ſublimity is intended.

Another rule chiefly regards the ſublime, though it is applicable to every ſort of literary performance intended for amuſement; and that is, to avoid as much as poſſible abſtract and general terms. Such terms, ſimilar to mathematical ſigns, are contrived to expreſs our thoughts in a conciſe manner; but images, which are the life of poetry, cannot be raiſed in any perfection but by introducing particular objects. General terms that comprehend a number of individuals, muſt be excepted from that rule: our kindred, our clan, our country, and words of the like import, though they ſcarce raiſe any image, have, however, a wonderful power over our paſſions: the greatneſs of the complex object overbalances the obſcurity of the image.

Grandeur, being an extreme vivid emotion, is not readily produced in perfection but by reiterated impreſſions. The effect of a ſingle impreſſion can be but momentary; and if one feel ſuddenly ſomewhat like a ſwelling or exaltation of mind, the emotion vaniſheth as ſoon as felt. Single thoughts or ſentiments are often cited as examples of the ſublime; but their effect is far inferior to that of a grand ſubject diſplay'd in its capital parts. We ſhall give a few examples, that the reader may judge for himſelf. In the famous action of Thermopylæ, where Leonidas the Spartan king, with his choſen band, fighting for their country, were cut off to the laſt man, a ſaying is reported of Dieneces, one of the band, which, expreſſing cheerful and undiſturbed bravery, is well entitled to the firſt place in examples of that kind: talking of the number of their enemies, it was obſerved, that the arrows ſhot by ſuch a multitude would intercept the light of the ſun; "So much the better, ſays he, for we ſhall then fight in the ſhade."

Herodot. lib. 7.

> *Somerſet.* Ah! Warwick, Warwick, wert thou as we are,
> We might recover all our loſs again.
> The Queen from France hath brought a puiſſant power.
> Ev'n now we heard the news. Ah! couldſt thou fly!
> *Warwick.* Why, then I would not fly.
>
> *Third part, Henry VI. act* 5. *ſc.* 3.

Such a ſentiment from a man expiring of his wounds, is truly heroic; and muſt elevate the mind to the greateſt height that can be done by a ſingle expreſſion: it will not ſuffer in a compariſon with the famous ſentiment *Qu'il mourut* of Corneille: the latter is a ſentiment of indignation merely, the former of firm and cheerful courage.

To cite in oppoſition many a ſublime paſſage, enriched with the fineſt images, and dreſſed in the moſt nervous expreſſions, would ſcarce be fair. We ſhall produce but one inſtance, from Shakeſpear, which ſets a few objects before the eye, without much pomp of language: it operates its effect by repreſenting theſe objects in a climax, raiſing the mind higher and higher till it feel the emotion of grandeur in perfection:

> The cloud-capt tow'rs, the gorgeous palaces,
> The ſolemn temples, the great globe itſelf,
> Yea all which it inherit, ſhall diſſolve, &c.

The cloud-capt tow'rs produce an elevating emotion, heightened by the *gorgeous palaces;* and the mind is carried ſtill higher and higher by the images that follow. Succeſſive images, making thus ſtronger and ſtronger impreſſions, muſt elevate more than any ſingle image can do.

12 Grandeur and ſublimity employed indirectly to ſink the mind.

As, on the one hand, no means directly applied have more influence to raiſe the mind than grandeur and ſublimity; ſo, on the other, no means indirectly applied have more influence to ſink and depreſs it: for in a ſtate of elevation, the artful introduction of an humbling object, makes the fall great in proportion to the elevation. Of this obſervation Shakeſpear gives a beautiful example, in the paſſage laſt quoted:

> The cloud-capt tow'rs, the gorgeous palaces,
> The ſolemn temples, the great globe itſelf,
> Yea all which it inherit, ſhall diſſolve,
> And like the baſeleſs fabric of a viſion
> Leave not a rack behind.—— *Tempeſt, act* 4. *ſc.* 4.

The elevation of the mind in the former part of this beautiful paſſage, makes the fall great in proportion, when the moſt humbling of all images is introduced, that of an utter diſſolution of the earth and its inhabitants. The mind, when warmed, is more ſuſceptible of impreſſions than in a cool ſtate; and a depreſſing or melancholy object liſtened to, makes the ſtrongeſt impreſſion when it reaches the mind in its higheſt ſtate of elevation or cheerfulneſs.

But a humbling image is not always neceſſary to produce that effect: a remark is made above, that in deſcribing ſuperior beings, the reader's imagination, unable to ſupport itſelf in a ſtrained elevation, falls often as from a height, and ſinks even below its ordinary tone. The following inſtance comes luckily in view; for a better cannot be given: "God ſaid, Let there be light, and there was light." Longinus quotes this paſſage from Moſes as a ſhining example of the ſublime; and it is ſcarce poſſible, in fewer words, to convey ſo clear an image of the infinite power of the Deity: but then it belongs to the preſent ſubject to remark, that the emotion of ſublimity raiſed by this image is but momentary; and that the mind, unable to ſupport itſelf in an elevation ſo much above nature, immediately ſinks down into humility and veneration for a Being ſo far exalted above groveling mortals. Every one is acquainted with a diſpute about that paſſage between two French critics, the one poſitively affirming it to be ſublime, the other as poſitively denying. What has been remarked, ſhows, that both of them have reached the truth, but neither of them the whole truth: the primary effect of the paſſage is undoubtedly an emotion of grandeur; which ſo far juſtifies Boileau: but then every one muſt be ſenſible, that the emotion is merely a flaſh, which, vaniſhing inſtantaneouſly, gives way to humility and veneration. That indirect effect of ſublimity juſtifies Huet, on the other hand, who being a man of true piety, and probably not much carried by imagination, felt the humbling paſſions more ſenſibly than his antagoniſt did. And laying aſide difference of character, Huet's opinion may perhaps be defended as the more ſolid; becauſe in ſuch images, the depreſſing emotions are the more ſenſibly felt, and have the longer endurance.

* Boileau and Huet.

13 Falſe ſublime.

The ſtraining an elevated ſubject beyond due bounds, and beyond the reach of an ordinary conception, is not a vice ſo frequent as to require the correction of criticiſm. But falſe ſublime is a rock that writers of more fire than judgement commonly ſplit on; and therefore a collection of examples may be of uſe as a beacon to future adventurers. One ſpecies of falſe ſublime, known by the name of *bombaſt*, is common among writers of a mean genius: it is a ſerious endeavour, by ſtrained deſcription, to raiſe a low or familiar ſubject above its rank; which, inſtead of being ſublime, fails not to be ridiculous. The mind, indeed, is extremely prone, in ſome animating paſſions, to magnify its objects beyond natural bounds: but ſuch hyperbolical deſcription has its limits; and when carried beyond the impulſe of the propenſity, it degenerates into burleſque. Take the following examples:

Sejanus.——————Great and high
The world knows only two, that's Rome and I.
My roof receives me not: 'tis air I tread,
And at each ſtep I feel my advanc'd head
Knock out a ſtar in heav'n. *Sejanus, Ben Johnſon, act 5.*

A writer who has no natural elevation of mind, deviates readily into bombaſt: he ſtrains above his natural powers; and the violent effort carries him beyond the bounds of propriety.

Guilford. Give way, and let the guſhing torrent come;
Behold the tears we bring to ſwell the deluge,
Till the flood riſe upon the guilty world
And make the ruin common.
Lady Jane Gray, act 4. near the end.

Another ſpecies of falſe ſublime, is ſtill more faulty than bombaſt: and that is, to force elevation by introducing imaginary beings without preſerving any propriety in their actions; as if it were lawful to aſcribe every extravagance and inconſiſtence to beings of the poet's creation. No writers are more licentious in that article than Johnſon and Dryden:

Methinks I ſee Death and the Furies waiting
What we will do, and all the heaven at leiſure
For the great ſpectacle. Draw then your ſwords:
And if our deſtiny envy our virtue
The honour of the day, yet let us care
To ſell ourſelves at ſuch a price, as may
Undo the world to buy us, and make Fate,
While ſhe tempts ours, to fear her own eſtate.
Catiline, act 5.

——————The furies ſtood on hills
Circling the place, and trembled to ſee men
Do more than they: whilſt Piety left the field,
Griev'd for that ſide, that in ſo bad a cauſe
They knew not what a crime their valour was.
The Sun ſtood ſtill, and was, behind the cloud
The battle made, ſeen ſweating to drive up
His frighted horſe, whom ſtill the noiſe drove backward.
Ibid, act 5.

Oſmyn. While we indulge our common happineſs,
He is forgot by whom we all poſſeſs,
The brave Almanzor, to whoſe arms we owe
All that we did, and all that we ſhall do;
Who like a tempeſt that outrides the wind,
Made a juſt battle ere the bodies join'd
Abdalla. His victories we ſcarce could keep in view,
Or poliſh 'em ſo faſt as he rough drew.
Abdemelech. Fate after him below with pain did move,
And Victory could ſcarce keep pace above.
Death did at length ſo many ſlain forget,
And loſt the tale, and took 'em by the great.
Conqueſt of Granada, act 2. at beginning.

An actor on the ſtage may be guilty of bombaſt as well as an author in his cloſet: a certain manner of acting, which is grand when ſupported by dignity in the ſentiment and force in the expreſſion, is ridiculous where the ſentiment is mean and the expreſſion flat.

GRANGE, a houſe or farm, not only furniſhed with neceſſary places for all manner of huſbandry, as ſtables for horſes, ſtalls for cattle, &c. but where there are granaries and barns for corn, hay-lofts, &c. And by the grant of a grange, ſuch places will paſs, without being particularly mentioned.—The word is formed of the Latin *granea* or *granum*, grain, corn, &c. Hence alſo *granger*, or *grangier*, a grange-keeper or farmer.

GRANICUS, a ſmaller river near the Helleſpont in Leſſer Aſia, remarkable for the firſt victory gained by Alexander the Great over the armies of Darius.—Authors diſagree very much about the number of the Perſians, though all agree that they were vaſtly more numerous than the Greeks. Juſtin and Oroſius tell us, that the Perſian army conſiſted of 600,000 foot and 20,000 horſe; Arrian makes the foot amount to 200,000; but Diodorus tells us, that they were not more than 100,000 foot, and 10,000 horſe. The Macedonian army did not exceed 30,000 foot and 5000 horſe. The Perſian cavalry lined the banks of the Granicus, in order to oppoſe Alexander wherever he ſhould attempt a paſſage; and the foot were poſted behind the cavalry on an eaſy aſcent. Parmenio would have had Alexander to allow his troops ſome time to refreſh themſelves; but he replied, that, after having croſſed the Helleſpont, it would be a diſgrace to him and his troops to be ſtopped by a rivulet. Accordingly a proper place for croſſing the river was no ſooner found, than he commanded a ſtrong detachment of horſe to enter, he himſelf following with the right wing which he commanded in perſon; the trumpets in the mean time ſounding, and loud ſhouts of joy being heard through the whole army. The Perſians let fly ſuch ſhowers of arrows againſt the detachment of Macedonian horſe, as cauſed ſome confuſion; ſeveral of their horſes being killed or wounded. As they drew near the bank a moſt bloody engagement enſued; the Macedonians attempting to land, and the Perſians puſhing them back into the river. Alexander, who obſerved the confuſion they were in, took the command

mand of them himſelf; and landing in ſpite of all oppoſition, obliged the Perſian cavalry, after an obſtinate reſiſtance, to give ground. However, Spithrobates, governor of Ionia, and ſon-in-law to Darius, ſtill maintained his ground, and did all that lay in his power to bring them back to the charge. Alexander advanced full gallop to engage him; neither did he decline the combat, and both were ſlightly wounded at the firſt encounter. Spithrobates having thrown his javelin without effect, advanced ſword in hand to meet his antagoniſt, who ran him through with his pike as he raiſed his arm to diſcharge a blow with his ſcymitar. But Roſaces, brother to Spithrobates, at the ſame time gave Alexander ſuch a furious blow on the head with his battle-ax, that he beat off his plume, and ſlightly wounded him through the helmet. As he was ready to repeat the blow, Clitus with one ſtroke of his ſcymitar cut off Roſaces's head, and thus in all probability ſaved the life of his ſovereign. The Macedonians then, animated by the example of their king, attacked the Perſians with new vigour, who ſoon after betook themſelves to flight. Alexander did not purſue them; but immediately charged the enemy's foot with all his forces, who had now paſſed the river. The Perſians, diſheartened at the defeat of their cavalry, made no great reſiſtance. The Greek mercinaries retired in good order to a neighbouring hill, whence they ſent deputies to Alexander deſiring leave to march off unmoleſted. But he, inſtead of coming to a parley with them, ruſhed furiouſly into the middle of this ſmall body; where his horſe was killed under him, and he himſelf in great danger of being cut in pieces. The Greeks defended themſelves with incredible valour for a long time, but were at laſt almoſt entirely cut off.—In this battle the Perſians are ſaid to have loſt 20,000 foot and 2,500 horſe, and the Macedonians only 55 foot and 60 horſe.

GRANITE, in natural hiſtory, a diſtinct genus of ſtones, compoſed of ſeparate and very large concretions rudely compacted together; of great hardneſs, giving fire with ſteel, not fermenting with acids, and ſlowly and imperfectly calcinable in a great fire.

Of this genus there are three ſpecies: 1. The hard white granite with black ſpots, commonly called moorſtone. This is a very valuable kind, conſiſting of a beautiful congeries of very variouſly conſtructed and differently coloured particles, not diffuſed among or running into one another, but each pure and diſtinct, though firmly adhering to whichever of the others it comes in contact with, and forming a very firm maſs. It is much uſed in London for the ſteps of public buildings, and on other occaſions where great ſtrength and hardneſs are required. 2. The hard red granite variegated with black and white, and common in Egypt and Arabia. 3. The pale whitiſh granite, variegated with black and yellow. This is ſometimes found in ſtrata, but more frequently in looſe nodules, and is uſed for paving the ſtreets.

Some of theſe kinds of ſtones are found in almoſt every country, and in many places they are found of immenſe bigneſs. The largeſt maſs of this kind in the known world, lying as an unconnected ſtone, is found near the Cape of Good Hope in Africa, and of which we have the following deſcription in the Philop. Tranſact. vol. 68. p. 102, given by Mr Anderſon in a letter to Sir John Pringle. "The ſtone is ſo remarkable, that it is called by the people here the *Tower of Babel*, and by ſome the *Pearl Diamond*. It either takes the laſt name from a place near which it is ſituated, or it gives name to the tract of cultivated land called the Pearl. It lies upon the top of a ridge of low hills, beyond a large plain, at the diſtance of about thirty miles from the Cape Town; beyond which, at a little diſtance, is a range of hills of a much greater height. It is of an oblong ſhape, and lies north and ſouth. The ſouth end is higheſt; the eaſt and weſt ſides are ſteep and high; but the top is rounded, and ſlopes away gradually to the north end, ſo that you can aſcend it by that way, and enjoy a moſt extenſive proſpect of the whole country. I could not preciſely determine its circumference, but it took us above half an hour to walk round it; and by making every allowance for the rugged way, and ſtopping a little, I think the moſt moderate computation muſt make it exceed half a mile. The ſame difficulty occurred with reſpect to knowing its height: but I think, that, at the ſouth-end, it is nearly equal to half its length; or, were I to compare it to an object you are acquainted with, I ſhould ſay it equalled the dome of St Paul's Church.

"I am uncertain whether it onght to be conſidered as the top of the hill, or a detached ſtone, becauſe there is no poſitive proof of either, unleſs we were to dig about its baſe; but it would certainly empreſs every beholder, at firſt ſight, with the idea of its being one ſtone, not only from its figure, but becauſe it is really one ſolid uniform maſs from top to bottom, without any interruption; which is contrary to the general character of the high hills of this country, they being commonly divided, or compoſed of different ſtrata, at leaſt if we may judge from the rows of plants or ſhrubs which grow on the ſides of the ſteepeſt, and, as I ſuppoſe, are produced from the ſmall quantity of earth interpoſed between them. It has indeed a few fiſſures, or rather impreſſions, which do not reach deeper than four or five feet; and near its north end a ſtratum of a more compact ſtone runs acroſs, which is not above twelve or fourteen inches thick, with its ſurface divided into little ſquares, or oblongs, diſpoſed obliquely. This ſtratum is perpendicular; but whether it cuts the other to its baſe, or is ſuperficial, I cannot determine. Its ſurface is alſo ſo ſmooth, that it does not appear to have formerly been joined to, or ſeparated from, any other part by violence, as is the caſe with many other large fragments; but enjoys the exact ſituation where it was originally placed, and has undergone little change from being expoſed for ſo many ſucceſſive ages to the calcining power of a very hot climate."—A part of this ſtone being examined by Sir William Hamilton, he determined it to be a granite, and of the ſame nature with the tops of ſome of the Alps; and ſuppoſes both of them to have been elevated by volcanic exploſions.

GRANIVOROUS, an appellation given to animals which feed on corn or ſeeds. Theſe are principally of the bird kind.

GRANT, in law, a conveyance in writing of ſuch things as cannot paſs or be conveyed by word only; ſuch are rents, reverſions, ſervices, &c.

GRANT (Francis), Lord Cullen, an eminent lawyer and judge in Scotland, was deſcended from a younger branch of the family of the Grants of Grant in that kingdom, and was born about the year 1660. When he commenced advocate he made a diſtinguiſhed figure at the revolution, by oppoſing the opinion of the old lawyers, who warmly argued on the inability of the convention of eſtates to make any diſpoſition of the crown. The abilities he ſhewed in favour of the revolution recommended him to an extenſive practice; in which he acquired ſo much honour, that when the union between the two kingdoms was in agitation, queen Anne unexpectedly, and without application, created him a baronet, with a view of ſecuring his intereſt in that meaſure; and upon the ſame principle, ſhe ſoon after created him a judge, or one of the lords of ſeſſion. From this time, according to the cuſtom of Scotland, he was ſtyled, from the name of his eſtate, Lord Cullen; and the ſame good qualities that recommended him to this honourable office, were very conſpicuous in the diſcharge of it; which he continued for 20 years with the higheſt reputation, when a period was put to his life by an illneſs which laſted but three days. He expired without any agony on March 16th 1726.

His character is drawn to great advantage in the Biographia Britannica; where it is obſerved, among other remarks to his honour, "That as an advocate he was indefatigable in the management of buſineſs; but at the ſame time that he ſpared no pains, he would uſe no craft. He had ſo high an idea of the dignity of his profeſſion, that he held it equally criminal to neglect any honeſt means of coming at juſtice, or to make uſe of any arts to elude it.

"In reſpect to fortune, though he was modeſt and frugal, and had a large practice, yet he was far from being avaritious. His private charities were very conſiderable, and grew in the ſame proportion with his profits. He was, beſides, very ſcrupulous in many points; he would not ſuffer a juſt cauſe to be loſt through a client's want of money. He was ſuch an enemy to oppreſſion, that he never denied his aſſiſtance to ſuch as laboured under it; and with reſpect to the clergy of all profeſſions (in Scotland) his conſcience obliged him to ſerve them without a fee. He ſaw their wrongs required aſſiſtance, and he knew their circumſtances would not admit of expence. His additions, therefore, to his paternal eſtate were much inferior to what might have been expected, and a large acceſſion of character was the principal produce of that activity and diligence by which he was diſtinguiſhed at the bar.

"When his merit had raiſed him to the bench, he thought himſelf accountable to God and man for his conduct in that high office; and that deep ſenſe of his duty, at the ſame time that it kept him ſtrictly to it, encouraged and ſupported him in the performance. The pleadings in Scotland are carried on chiefly in writing, which renders them ſometimes very prolix, ſo as to take up much of a judge's time, and to exerciſe alike his parts and his patience in going through and making himſelf maſter of them. In this the diligence and dexterity of lord Cullen were equally conſpicuous: he went through every thing that came into his hands very carefully, and ſifted it thoroughly; ſo that the lawyers at the bar never found themſelves too ſtrong for the bench, but on the contrary were often told many things by his lordſhip, which had either eſcaped their notice, or which the intereſt of their client had engaged them to conceal. As his attention to the pleadings guided him to the real merits of the cauſe; ſo when he was once maſter of theſe, his ſecond care was to diſpatch it. He knew, that, in judicature, the next fault to denying, was delaying juſtice; by which families are always injured, and too often ruined. Whenever, therefore, he had provided againſt being miſtaken, he was deſirous of bringing the matter to a ſhort deciſion; and as he was very ſolicitous about the former, ſo the parties themſelves helped him not a little as to the latter. Whenever he ſat as lord ordinary; the paper of cauſes was remarkably full, for his reputation being equally eſtabliſhed for knowledge and integrity, there were none, who had a good opinion of their own pretenſions, but were deſirous of bringing them before him, and not many who did not ſit down ſatisfied with his deciſion. This prevailed more eſpecially after it was found that few of his ſentences were reverſed; and when they were, it was commonly owing to himſelf: for if, upon mature reflection, or upon new reaſons offered at the re-hearing, he ſaw any juſt ground for altering his judgment, he made no ſcruple of declaring it; being perſuaded, that it was more manly, as well as more juſt, to follow truth, than to ſupport opinion: and his conduct in this reſpect had a right effect; for inſtead of leſſening, it raiſed his reputation.

"He would not, however, with all this great ſtock of knowledge, experience, and probity, truſt himſelf in matters of blood, or venture to decide in criminal caſes on the lives of his fellow-creatures; which was the reaſon, that, though often ſolicited, he could never be prevailed upon to accept of a ſeat in the juſticiary court.

"He was ſo true a lover of learning, and was ſo much addicted to his ſtudies, that, notwithſtanding the multiplicity of his buſineſs while at the bar, and his great attention to his charge when a judge, he nevertheleſs found time to write various treatiſes, on very different and important ſubjects: Some political, which were remarkably well-timed, and highly ſerviceable to the government: others of a moſt extenſive nature, ſuch as his eſſays on law, religion, and education, which were dedicated to his preſent majeſty when prince of Wales; by whoſe command, his then ſecretary, Mr. Samuel Molyneaux, wrote him a letter of thanks, in which were many gracious expreſſions, as well in relation to the piece, as to its author. He compoſed, beſides theſe, many diſcourſes on literary ſubjects, for the exerciſe of his own thoughts, and for the better diſcovery of truth; which went no farther than his own cloſet, and from a principle of modeſty were not communicated even to his moſt intimate friends.

"In his lordſhip's private character he was as amiable as he was reſpectable in his public. There were certain circumſtances that determined him to part with an eſtate that was left him by his father; and it being foreſeen that he would employ the produce of it, and the money he had acquired by his profeſſion, in a new purchaſe, there were many decayed families who ſolicited him to take their lands upon his own terms, relying entirely on that equity, which they conceived to be the rule of his actions. It appeared that their opinion of him was perfectly well grounded. For being at length prevailed upon to lay out his money on the eſtate of an unfortunate family, who had a debt upon it of more than it was worth; he firſt put their affairs into order, and by claſſing the different demands, and compromiſing a variety of claims, ſecured ſome thouſand pounds to the heirs, without prejudice to any, and of which they had never been poſſeſſed but from his interpoſition and vigilance in their behalf: So far was he either from making any advantage to himſelf of their neceſſities, or of his own ſkill in his profeſſion; a circumſtance juſtly mentioned to his honour, and which is an equal proof of his candor, generoſity, and compaſſion. He was charitable without oſtentation, diſintereſted in his friendſhips, and beneficent to all who had any thing to do with him. He was not only ſtrictly juſt; but ſo free from any ſpecies of avarice, that his lady, who was a woman of great prudence and diſcretion, finding him more intent on the buſineſs committed o him by others, than on his own, took upon herſelf the care of placing out his money; and to prevent his poſtponing, as he was apt to do, ſuch kind of affairs, when ſecurities offered, ſhe cauſed the circumſtances of them to be ſtated in the form of caſes, and ſo procured his opinion upon his own concerns, as if they had been thoſe of a client. Theſe little circumſtances are mentioned as more expreſſive of his temper, than actions of another kind could be; becauſe, in matters of importance, men either act from habit, or from motives that the world cannot penetrate; but, in things of a trivial nature, are leſs upon their guard, ſhew their true diſpoſition, and ſtand confeſſed for what they are."

GRANVILLE (George), lord Lanſdowne, was deſcended from a very ancient family, derived from Rollo the firſt duke of Normandy. At eleven years of age he was ſent to Trinity College in Cambridge, where he remained five years: but at the age of 13 was admitted to the degree of maſter of arts; having, before he was 12, ſpoken a copy of verſes of his own compoſition to the ducheſs of York at his college, when ſhe paid a viſit to the Unverſity of Cambridge. In 1696, his comedy called the *She-gallants* was acted at the theatre-royal in Lincolns-inn-fields, as his tragedy called *Heroic Love* was in the year 1698. In 1702 he tranſlated into Engliſh the *ſecond Olynthian of Demoſthenes*. He was member for the county of Cornwall in the parliament which met in 1710; was afterwards ſecretary of war, comptroller of the houſehold, then treaſurer, and ſworn one of the privy-council. The year following, he was created baron Lanſdowne. On the acceſſion of king George I. in 1714, he was removed from his treaſurer's place; and the next year entered his proteſt againſt the bills for attainting lord Bolingbroke and the duke of Ormond. He entered deeply into the ſcheme for raiſing an inſurrection in the weſt of England; and being ſeized as a ſuſpected perſon, was committed to the tower, where he continued two years. In 1719, he made a ſpeech in the houſe of Lords, againſt the bill to prevent occaſional conformity. In 1722, he withdrew to France, and continued abroad almoſt ten years. At his return in 1732, he publiſhed a fine edition of his works in 2 vols quarto. He died in 1735, leaving no male iſſue.

Granville, a ſea-port town of France, in Lower Normandy, partly ſeated on a rock and partly on a plain. It gives a title to an Engliſh earl. W. Long. 1. 32. N. Lat. 48. 58.

GRANULATED, ſomething that has undergone granulation. See the next article.

GRANULATION, in chemiſtry, an operation by which metallic ſubſtances are reduced into ſmall grains, or roundiſh particles; the uſe of which is, to facilitate their combination with other ſubſtances.—This operation is very ſimple; it conſiſts only in pouring a melted metal ſlowly into a veſſel filled with water, which is in the mean time to be agitated with a broom. With melted copper, however, which is apt to explode with great violence on the contact of water, ſome precautions are to be obſerved, of which an account is given under the article Chemistry, n° 406. Lead or tin may be granulated bypouring them when melted into a box, the internal ſurface of which is to be rubbed with powdered chalk, and the box ſtrongly ſhaken till the lead has become ſolid. Metals are granulated, becauſe their ductility renders them incapable of being pounded, and becauſe filing is long and tedious, and might render the metal impure by an admixture of iron from the file.

GRAPE, the fruit of the vine. See Vine.

Grape-*Shot*, in artillery, is a combination of ſmall ſhot put into a thick canvaſs bag, and corded ſtrongly together, ſo as to form a kind of cylinder, whoſe diameter is equal to that of the ball which is adapted to the cannon.

To form grape-ſhot, a bag of coarſe cloth is made juſt to hold the bottom which is put into it, then as many ſhot as the grape is to contain; and with a ſtrong pack-threed they are quilted, to keep the ſhot from moving; and when finiſhed they are put into boxes for carriage, to be tranſported wherever it is neceſſary.—The number of ſhot in a grape varies according to the ſervice or ſize of the guns. In ſea-ſervice the number is always nine; but by land it is increaſed to any number or ſize, from an ounce and a quarter in weight. It has not yet been determined with any accuracy, what number or ſize beſt anſwers in practice; for they often ſcatter ſo much, that only a ſmall number take place.

Proper charges for grape-ſhot have never yet been effectually determined. From ſome experiments, however, it appears, that for heavy ſix-pounders one third of the weight of the ſhot appears to be the beſt charge of powder; for the light ſix-pounders, one fourth of the weight of the ſhot; and, for howitzers, one eighth or one tenth anſwers very well.

This kind of fire ſeems yet not to have been enough reſpected or depended on. However, if cannon and howitzers can be made to throw one third or one fourth of their charge into a ſpace of 39 × 12 feet, at 200 and 300 yards diſtance, and thoſe fired ten or twelve times in a minute, it ſurely forms the thickeſt fire that can be produced from the ſame ſpace.

GRAPHOMETER, a mathematical inſtrument, otherwiſe called a *Semicircle*; the uſe of which is to obſerve any angle whoſe vertex is at the centre of the inſtrument in any plane, though it is moſt commonly horippling, Graſs.

horizontal, or nearly ſo), and to find how many degrees it contains. See Geometry, p. [12.]

GRAPPLING, a ſort of ſmall anchor, fitted with four or five flukes or claws, and commonly uſed to ride a boat or other ſmall veſſel.

Fire-Grappling, an inſtrument nearly reſembling the former, but differing in the conſtruction of its flukes, which are furniſhed with ſtrong barbs on their points. Theſe machines are uſually fixed on the yard-arms of a ſhip, in order to grapple any adverſary whom ſhe intends to board. They are, however, more particularly uſeful in *fire-ſhips* for the purpoſes deſcribed in that article.

GRASS, in botany, &c. a name given to ſeveral diſtinct plants; as the agroſtis or couch-graſs, the briza or quaking-graſs, &c. Under the term *graſs* alſo are comprehended all manner of herbaceous plants ſerving for the food of cattle, as clover, rye-graſs, &c. See Agriculture, and Gramina.

Grass-*Sowing*. See Agriculture, n° 51—57. and 133——137.

Grass-*Walks* are made, for the moſt part, not by ſowing graſs-ſeed, but by laying turfs: and indeed the turfs from a fine common or down are much preferable to ſown graſs: but if walks or plats are to be made by ſowing, the beſt way is to procure the ſeed from thoſe paſtures where the graſs is naturally fine and clear; or elſe the trouble of keeping it from ſpiry or benty graſs will be very great, and it will ſcarce ever look handſome.

In order to ſow graſs-walks, the ground muſt be firſt dug; and when it has been dreſſed and laid even, it muſt be very carefully raked over, and all the clods and ſtones taken off, and then covered over an inch thick with good mould.

This being done, the ſeed is to be ſown pretty thick, that it may come up cloſe and ſhort; it muſt then be raked over again, to cover the ſeed, that if the weather ſhould happen to be windy, it may not be blown away. It ought alſo to be obſerved, that where graſs is ſown in gardens, either for lawns or walks, there ſhould always be a good quantity of the white trefoil or dutch clover ſown with it; for this will make a fine turf much ſooner than any other ſown graſs, and will continue a better verdure than any other of the graſs-tribe.

In order to keep graſs-plats or walks handſome, and in good order, you may ſow in autumn freſh ſeed over any places that are not well filled, or where the graſs is dead: but nothing improves graſs ſo much as mowing and conſtant rolling.

When turf is laid in gardens, it is a generally practice to cover the ſurface of the ground under the turf, either with ſand or very poor earth: the deſign of this is to keep the graſs fine, by preventing its growing too rank. This is proper enough for very rich ground: but it is not ſo for ſuch land as is middling, or but poor; for when this is practiſed in ſuch places, the graſs will ſoon wear out and decay in patches.

When turf is taken from a common or down, ſuch ought to be choſen as is free from weeds: and when it is deſigned to remain for years without renewing, a dreſſing ſhould be laid upon it every other year, either of very rotten dung, aſhes, or, where it can be eaſily procured, very rotten tan; but theſe dreſſings ſhould be laid on early in the winter, that the rain may waſh them into the ground, otherwiſe they will occaſion the graſs to burn, when the warmth of the the ſummer begins.

When graſs is ſo dreſſed, and well rolled and mowed, it may be kept very beautiful for many years; but where it is not dreſſed, or fed with ſheep, it will rarely continue handſome more than eight or ten years.

Graſs-hopper.

GRASSHOPPER, in zoology, a ſpecies of Gryllus. This inſect breeds in ſuch plenty in our meadows, that it is known to every body. It is of the colour of green leaves, except a line of brown which ſtreaks the back, and two pale lines under the belly and behind the legs. It may be divided into the head, the corſlet, and the belly. The head is oblong, regarding the earth, and bearing ſome reſemblance to that of a horſe. Its mouth is covered by a kind of round buckler, jutting over it, and armed with teeth of a brown colour, hooked at the points. Within the mouth is perceivable a large reddiſh tongue, and fixed to the upper jaw. The antennæ are very long, tapering off to a point; and the eyes are like two black ſpecks, a little prominent. The corſlet is elevated, narrow, armed above and below by two ſerrated ſpines. The back is armed with a ſtrong buckler, to which the muſcles of the legs are firmly bound; and round theſe muſcles are ſeen the veſſels by which the animal breathes, as white as ſnow. The laſt pair of legs are much longer and ſtronger than the firſt two pair; fortified by thick muſcles, and well formed for leaping. It has four wings; the anterior ones ſpringing from the ſecond pair of legs, the poſterior from the third pair. The hinder wings are much finer and more expanſive than the foremoſt, and are the principal inſtruments of its flight. The belly is conſiderably large, compoſed of eight rings, and terminated by a forky tail, covered with down, like the tail of a rat. When examined internally, beſides the gullet, we diſcover a ſmall ſtomach; and behind that, a very large one, wrinkled and furrowed within-ſide. Lower down, there is ſtill a third: ſo that it is thought, and with ſome probability, that all the animals of this order chew the cud; as they ſo much reſemble ruminant animals in their internal conformation.

A ſhort time after the graſshopper aſſumes its wings, it fills the meadows with its note; which, like that among birds, is a call to courtſhip. The male only of this tribe is vocal; and, upon examining at the baſe of the wings, there will be found a little hole in its body, covered with a fine tranſparent membrane. This is thought, by Linnæus, to be the inſtrument it employs in ſinging; but others are of opinion the ſound is produced by rubbing its hinder legs againſt each other. But, however this may be, the note of one male is ſeldom heard, without being returned by another; and the two little animals, after many mutual inſults of this kind, are ſeen to meet and fight deſperately. The female is generally the reward of the victory; for, after the combat, the victor ſeizes her with his teeth behind the neck, and thus keeps her for ſeveral hours, till the buſineſs of fecundation is accompliſhed. At this time they are ſo ſtrongly united, that it is almoſt impoſſible to ſeparate them, without tearing their bodies aſunder. Towards the latter end of autumn, the

Graſs-hopper.

the female prepares to depoſit her burthen; and her body is then ſeen greatly diſtended with eggs, which ſhe carries to the number of 150. In order to make a proper lodgment in the earth for them, nature has furniſhed her with an inſtrument in her tail, ſomewhat reſembling a two-edged ſword, which ſhe can ſheath and unſheath at pleaſure: with this ſhe pierces the earth as deep as ſhe is able; and into the hole which the inſtrument has made, ſhe depoſits her eggs one after the other.

Having thus provided for the continuation of her poſterity, the animal herſelf does not long ſurvive; but, as winter approaches, ſhe dries up, ſeems to feel the effect of age, and dies from a total decay. Some, however, aſſert that ſhe is killed by the cold; others, that ſhe is eaten by worms: but certain it is, that neither male nor female are ever ſeen to ſurvive the winter. In the mean time, the eggs which have been depoſited, continue unaltered either by the ſeverity of the ſeaſon, or the retardation of the ſpring. They are of an oval figure, white, and of the conſiſtence of horn: their ſize nearly equals that of a grain of aniſe: they are enveloped in the body within a covering branched all over with veins and arteries: and when excluded, they crack on being preſſed between the fingers. Their ſubſtance within, is a whitiſh, viſcous, and tranſparent fluid. In this manner they remain depoſited within the ſurface of the earth during the whole winter, till the return of ſpring begins to hatch them. About the beginning of May, each egg produces an inſect about the bigneſs of a flea. Theſe are at firſt of a whitiſh colour; at the end of two or three days they turn black, and ſoon after they become of a reddiſh brown. They appear from the beginning like graſshoppers wanting wings, and hop among the graſs, as ſoon as excluded, with great agility. Yet ſtill they are by no means arrived at their full ſtate of perfection; although they bear a ſtrong reſemblance to the animal in its perfect form. They want, or ſeem to want, the wings which they at laſt aſſume; and can only hop among the graſs, without being able to fly. The wings, however, are not wanting, but are concealed within four little bunches that ſeem to deform the ſides of the animal. There they lie rolled up in a moſt curious manner, and occupying a ſmaller ſpace than one could conceive who ſaw them extended. Theſe wings, however, it has never been deſtitute of; though they remain folded up for 20 days, ſo that they cannot be ſeen. When it is to undergo this change, the animal ceaſes from its graſſy food, and ſeeks about for a convenient place beneath ſome thorn or thiſtle that may protect it from an accidental ſhower. It ſwells up its head and neck, and then draws them in again; and thus alternately for ſome time it endeavours to get free. At length, the ſkin covering the head and breaſt divides above the neck, and the head iſſues forth. The other parts follow ſucceſſively; ſo that the little animal, with its long feelers, legs, &c. works its way from the old ſkin, which remains fixed to the thiſtle or thorn. It is indeed inconceiveable how the inſect can extricate itſelf from ſuch an exact ſheath as that which covered every part of its body.

The graſshopper, thus diſengaged from its outer ſkin, appears in its perfect form; but is then ſo feeble, and its body ſo ſoft and tender, that it may be moulded like wax. It is no longer of the obſcure colour it had before; but is of a greeniſh white, which becomes more vivid, as the moiſture on the ſurface is dried away. Still, however, the animal continues to ſhew no ſigns of life; but appears quite ſpent and fatigued with its labour for more than an hour together. During this time the body is drying, and the wings unfolding to their greateſt expanſion; and the curious obſerver will perceive them, fold after fold, opening to the ſun, till at laſt they become longer than the two hinder legs. The inſect's body alſo is lengthened during this operation, and it becomes much more beautiful than before.

Theſe inſects are generally vocal in the midſt of ſummer; and they are heard at ſunſetting much louder than during the heats of the day. They are fed upon graſs; and if their belly be preſſed, they will be ſeen to return to the juices of the plants they have laſt fed upon. Though unwilling to fly, and ſlow of flight, particularly when the weather is moiſt or cool, they are ſometimes ſeen to fly to conſiderable diſtances. If they are caught by one of the hinder legs, they quickly diſengage themſelves from it, and leave the leg behind them. This, however, doth not grow again, as with crabs and ſpiders; for as they are animals of but a ſingle year's continuance, they have not ſufficient time for repairing theſe misfortunes. The loſs of their leg alſo prevents them from flying; for being unable to lift themſelves in the air, they have not room upon the ground for the proper expanſion of their wings. If they be handled roughly, they will bite very fiercely; and, when they fly, they make a noiſe with their wings. They generally keep in the plain, where the graſs is luxuriant, and the ground rich and fertile: there they depoſit their eggs, particularly in thoſe cracks which are formed by the heat of the ſun.

Theſe animals are ſometimes very miſchievous, by reaſon of their great numbers. Some time ago they appeared in Languedoc, and other places of France, in very formidable ſwarms, and eat up all the harveſt of ſeveral years. They took their flight like birds, were about an inch long, of a grey colour, and exactly ſhaped like the common ſort. They were found in many places covering the whole ſurface of the earth, four or five inches deep, and uſed to lie quiet towards noon; but when the ſun then ſhone warmly upon them, they uſed to ariſe and take wing, and, ſetting on the corn-fields, they would in a few hours eat up the whole produce, ears, leaves, and even the more tender parts of the ſtalks.—When they had deſtroyed one field in this manner, they uſed to take wing and fly to another. They uſually flew very high in the air, and directly againſt the wind; but as ſoon as they ſaw a new crop of corn, they dropped together in a ſwarm, and cleared it as they had done the firſt. This practice they continued the whole day; and towards evening they ſettled upon the ground, where they remained quiet till the heat of the following day raiſed them again. When they had deſtroyed all the corn in the country, they ſeized upon the vines, garden-herbs, and willows, and at laſt upon the hemp. Whole fields of this laſt they eat up, notwithſtanding its great bitterneſs Towards autumn, they left off feeding, and were then found in copulation; and ſoon after this, the females were every where ſeen laying their eggs, which they depoſited in the ground, making a hole with their tail, large enough to receive a gooſe-quill.

In theſe holes every female would lay 40 or 50 eggs, each of the ſize of a millet-ſeed; and when they had finiſhed the laying, they covered up the hole to keep out the water. After this they died apace; and the multitude of their carcaſes ſtunk intolerably, poiſoning the air. The next year they hatched in April: and from this one ſwarm ſuch prodigious numbers were hatched, that 15 tuns of them were deſtroyed while no bigger than flies, and nine tuns of their eggs before the hatching; and yet there remained enough of them to deſtroy, in a great meaſure, the ſucceeding harveſt. After this, they gradually decreaſed for ſeveral years, till they were not more numerous than elſewhere. This was attributed to the induſtry of the farmers in killing them; but it is more probable that unfavourable ſeaſons deſtroyed them.

GRATAROLUS (William), a learned phyſician in the 16th century, was born at Bergamo in Italy; and taught phyſic with reputation at Padua: but having embraced the Proteſtant religion, he retired to Switzerland, where he was made profeſſor of phyſic. He died at Baſil in 1568, aged 52. He wrote ſeveral curious works in Latin; amongſt which are, 1. The manner of preſerving and improving the memory. 2. Of preſerving in health travellers, men of letters, magiſtrates, and ſtudious perſons, &c.

GRATES *for* Fires, are compoſed of ribs of iron, placed at ſmall diſtances from one another, ſo that the air may have ſufficient acceſs to the fuel, and the accumulation of the aſhes, which would choke the fire, may be prevented.—Grates ſeem peculiarly adapted to the uſe of pit-coal, which requires a greater quantity of air to make it burn freely than other kinds of fuel. The hearths of the Britons ſeem to have been fixed in the centre of their halls, as is yet practiſed in ſome parts of Scotland, where the fire is nearly in the middle of the houſe, and the family ſit all around it. Their fire place was perhaps nothing more than a large ſtone, depreſſed a little below the level of the ground, and thereby adapted to receive the aſhes. About a century ago, it was only the floor of the room, with the addition of a back or hob of clay. But it was now changed among the gentlemen for a portable fire-pan, raiſed upon low ſupporters, and fitted with a circular grating of bars. Such were in uſe among the Gauls in the firſt century, and among the Welſh in the tenth.

GRATIAN, the ſon of Valentinian I. by his firſt wife, was declared Auguſtus by his father at the city of Amiens in 365, and ſucceeded him in 367; a prince equally extolled for his wit, eloquence, modeſty, chaſtity, and zeal againſt heretics. He aſſociated Theodoſius with him in the empire, and advanced the poet Auſonius to the conſulate. He made a great ſlaughter of the Germans at Straſburg *, and hence was ſurnamed *Alemannicus*. He was the firſt emperor who refuſed the title of *Pontifex Maximus*, upon the ſcore of its being a Pagan dignity. He was aſſaſſinated by Andragathius in 375, in the 24th year of his age.

* See Argentoratum.

Gratian, a famous Benedictine monk, in the 12th century, was born at Chiuſi, and employed near twenty-four years in compoſing a work, entitled, *Decretum*, or *Concordantia Diſcordantium Canonum*, becauſe he there endeavoured to reconcile the canons, which ſeemed contradictory to each other. This work he publiſhed in 1151. As he is frequently miſtaken, in taking one canon of one council, or one paſſage of one father, for another, and has often cited falſe decretals, ſeveral authors have endeavoured to correct his faults; and chiefly Anthony Auguſtine, in his excellent work, entitled, *De emendatione Gratiani*. To the decretals of Gratian, the popes principally owed the great authority they exerciſed in the thirteenth and following centuries.

GRATIUS, a Latin poet, cotemporary with Ovid, the author of a poem intitled *Cynegeticon*, or the *Manner of hunting with dogs*; the beſt edition of which is that of Leyden, 12mo, with the learned notes of Janus Ulitius.

GRATIOLA, HEDGE-HYSSOP; a genus of the monogynia order, belonging to the diandria claſs of plants. There are four ſpecies; the moſt remarkable of which is the officinalis, or common hedge-hyſſop. This grows naturally on the Alps and other mountainous parts of Europe. It hath a thick, fleſhy, fibrous, creeping root, which propagates very much, when planted in a proper ſoil and ſituation. From this ariſe ſeveral upright ſquare ſtalks, garniſhed with narrow ſpear-ſhaped leaves, placed oppoſite. The flowers are produced on the ſide of the ſtalks at each joint; they are ſhaped like thoſe of the fox-glove, but are ſmall, and of a pale yellowiſh colour.—This herb has an emetic and purgative virtue; to anſwer which intentions, it was formerly uſed by the common people in England, but was never much preſcribed by the phyſicians, and at laſt fell totally into diſuſe. Of late, however, it has been the ſubject of a diſſertation by Dr James Koſtrzewſki of Warſaw, in Poland; who gives ſome remarkable accounts of its effects in mania and obſtinate venereal caſes. It was given in powder, or in extract, to the quantity of half a drachm of the firſt, and a whole drachm of the ſecond, at each doſe. From the caſes related in his diſſertation, the author draws the following concluſions: 1. The gratiola may be given with ſafety both to male and female patients. 2. In all diſorders proceeding from a ſuperabundance of ſerum in the fluids, it appears to be a moſt effectual remedy. 3. In conſequence of this, it is had recourſe to with very great advantage in melancholy and mania ariſing from that ſtate of the ſyſtem. 4. It powerfully promotes purging, vomiting, ſweat, and urine; and is therefore much ſuperior to any of the uſual evacuating medicines, moſt of which prove only active in promoting one of theſe diſcharges at once. 5. The moſt obſtinate caſes of gonorrhœa, fluor albus, and venereal ulcers, are cured by the powder.—In ſome inſtances it has induced ſalivation; but whether or not it can always be made to produce that effect, is not as yet altogether certain. 6. The powder of gratiola prepared from the extract, and exhibited with ſugar, does not induce vomiting; and, on the contrary, the powder of the root always promotes that evacuation.

GRATZ, a handſome ſtrong town of Germany, and capital of Styria, with a caſtle ſeated on a rock, and an univerſity. The Jeſuits have a college here; and there are a great number of handſome palaces, and a fine arſenal. The caſtle ſtands on a very lofty hill, and communicates with the river by means of a deep well. The empreſs-dowager was obliged to retire hither during the war of 1741 and 1742. It is ſeated on the river Muer, in E. Lon. 16. 25. N. Lat. 47. 4.

GRAVE, in muſic, is applied to a ſound which is of a low or deep tone.

GRAVE. The names of places ending with this ſyllable come from the Saxon *graf*, a wood, thicket, den, or cave.

GRAVE, a very ſtrong town of the Netherlands, in Dutch Brabant, ſeated on the river Maeſe, beyond which there is a fort. E. Lon. 5. 41. N. Lat. 51. 46.

GRAVEL, in natural hiſtory and gardening, a congeries of pebbles, which, mixed with a ſtiff loam, makes laſting and elegant gravel-walks; an ornament peculiar to our gardens, and which gives them an advantage over thoſe of other nations.

GRAVEL, in medicine. See the Index ſubjoined to that article.

GRAVEL-*Walks*. To make theſe properly, the bottom ſhould be laid with lime-rubbiſh, large flint-ſtones, or any other hard matter, for eight or ten inches thick, to keep weeds from growing through, and over this the gravel is to be laid ſix or eight inches thick. This ſhould be laid rounding up in the middle, by which means the larger ſtones will run off to the ſides, and may be raked away; for the gravel ſhould never be ſcreened before it is laid on. It is a common miſtake to lay theſe walks too round, which not only makes them uneaſy to walk upon, but takes off from their apparent breadth. One inch in five feet is a ſufficient proportion for the riſe in the middle; ſo that a walk of 20 feet wide ſhould be four inches higher at the middle than at the edges, and ſo in proportion. As ſoon as the gravel is laid, it ſhould be raked, and the large ſtones thrown back again: then the whole ſhould be rolled both lengthwiſe and croſſwiſe; and the perſon who draws the roller ſhould wear ſhoes with flat heels, that he may make no holes; becauſe holes made in a new walk are not eaſily remedied. The walks ſhould always be rolled three or four times in very hard ſhowers, after which they will bind more firmly than otherwiſe they could ever be made to do.

Gravel, with ſome loam among it, binds more firmly than the rawer kinds; and when gravel is naturally very harſh and ſharp, it is proper to add a mixture of loam to it. The beſt gravel for walks is ſuch as abounds with ſmooth round pebbles, which, being mixed with a little loam, are bound ſo firmly together, that they are never afterwards injured either by wet or dry weather. Theſe are not ſo liable to be turned up by the feet in walking, as the more irregularly ſhaped pebbles, and remain much more firmly in their places after rolling.

GRAVELINES, a very ſtrong ſea-port town of the Netherlands in French Flanders, with a caſtle and harbour. It was ceded to France by the treaty of the Pyrenees, and is ſeated in a marſhy country on the river Aa, near the ſea, in E. Lon. 2. 13. N. Lat. 50. 59.

GRAVELLY LAND, or **SOIL**, that abounding with gravel or ſand, which eaſily admits of heat and moiſture; and the more ſtony ſuch lands are, the more barren they prove.

GRAVENAC, a town of Germany, in the circle of Swabia, and capital of a county of the ſame name. E. Lon. 8. 15. N. Lat. 48. 22.

GRAVER, in the art of engraving, a tool by which all the lines, ſcratches, and ſhades, are cut in copper, &c. See ENGRAVING.

GRAVESANDE (William James), was born of an ancient and honourable family at Delft in Holland, in 1688. He ſtudied the civil law at Leyden, but mathematical learning was his favourite amuſement. When he had taken his doctor's degree in 1707, he ſettled at the Hague, and practiſed at the bar, in which ſituation he cultivated an acquaintance with learned men; with a ſociety of whom, he publiſhed a periodical review entitled *Le Journal Litteraire*, which was continued without interruption from the year 1713 to the year 1722, when he died. The moſt conſiderable of his works are, *A treatiſe on perſpective*; *An introduction to the Newtonian philoſophy, or a treatiſe on the elements of phyſics confirmed by experiments*; *A treatiſe on the elements of algebra, for the uſe of young ſtudents*; and *A courſe of logic and metaphyſics*. He had intended to have preſented the public with a ſyſtem of morality, but his death prevented the execution. The miniſters of the republic conſulted him on all occaſions wherein his talents were requiſite; and his ſkill in calculation was often of ſervice to them; as was his addreſs in decyphering, for detecting the ſecret correſpondence of their enemies. As profeſſor of mathematics and aſtronomy at Leyden, none ever applied the powers of nature with more ſucceſs, or to more uſeful purpoſes.

GRAVESEND, a town of Kent in England, ſituated on the banks of the Thames. It is a place of great reſort, being the common landing-place for ſeamen and paſſengers in their journey to London. All outward-bound ſhips are obliged to come to an anchor here, till they have been viſited and examined by the cuſtom-houſe officers, and here they generally take in proviſions. Here is a blockhouſe well mounted with cannon, to command the ſhips and river, directly oppoſite to Tilbury fort in Eſſex. Both at Billingſgate and Graveſend a bell is rung for 15 minutes at high water by night and day, to give notice to the tilt-boats and wherries to put off. The town is commonly called *the corporation of Graveſend and Milton*, theſe two places being united under the government of a mayor, 12 aldermen, 24 common-council, a town-clerk, &c. Here is a very handſome charitable foundation; Mr Henry Pinnock having in 1624 given two dwelling-houſes, and a houſe for a maſter-weaver, to employ the poor; and a good eſtate is alſo ſettled for the repairs. The town was plundered and burnt by the French and Spaniards in the reign of Richard II. after which the king, at the requeſt of the abbot of St Mary-le-Grace of Tower-hill, to whom he had granted a manor there, called *Parrocks*, veſted it with the ſole privilege of carrying paſſengers thence by water. Great part of it was deſtroyed by fire in 1727, together with the church. The latter has ſince been rebuilt as one of the 50 new churches, and the houſes are much handſomer than before. The ſtreets are narrow, but paved with flints. The chief employment of the labouring people is ſpinning of hemp to make ropes and nets for fiſhing. The town is alſo famous for gardening; the beſt aſparagus in the kingdom being produced here.

GRAVINA, a town of Italy, in the kingdom of Naples, and Terra di Bori, with a biſhop's ſee, and the title of a duchy. E. Lon. 17°. N. Lat. 41°.

GRAVINA (John Vincent), an eminent ſcholar, and illuſtrious lawyer of Italy, born at Roggiana in 1664. He was profeſſor of the canon law in the college of Sapienzi at Rome; and though many foreign univerſities made propoſals to draw him to them, he never quitted that city, but died there in 1718. His works are both curious and uſeful; the greateſt of them is *De ortu et progreſſu Juris Civilis*. A collection of his works was printed in 4to. at Leipſic in 1737, with the notes of Maſcovius.

GRAVINA (Peter), an Italian poet, much eſteemed by the great general Gonſalvo, and Proſper Colonna. He wrote, in a pure Roman ſtyle, diſcourſes on matters relating to the law and to the belles letters, as well as poems. He died in 1527.

GRAVITATION, in natural philoſophy, is ſometimes diſtinguiſhed from *gravity*. Thus M. Maupertuis takes gravity for that force whereby a body would fall to the earth; but gravitation for the ſame diminiſhed by the centrifugal force. See NEWTONIAN *Philoſophy*.

GRAVITY, or GRAVITATION, (for the words are moſt commonly uſed ſynonimouſly,) ſignifies either the force by which bodies are preſſed towards the ſurface of the earth, or the manifeſt effect of that force; in which laſt ſenſe the word has the ſame ſignification with *weight*, or *heavineſs*.

Concerning gravity in the firſt ſenſe of the word, or that active power by which all bodies are impelled towards the earth, there have been great diſputes. Many eminent philoſophers, and among the reſt Sir Iſaac Newton himſelf, have conſidered it as the firſt of all ſecond cauſes; an incorporeal or ſpiritual ſubſtance, which never can be perceived any other way than by its effects; an univerſal property of matter, &c. Others have attempted to explain the phenomena of gravitation by the action of a very ſubtile etherial fluid; and to this explanation Sir Iſaac, in the latter part of his life, ſeems not to have been averſe. He hath even given a conjecture concerning the manner in which this fluid might occaſion theſe phenomena. But for a full account of the diſcoveries of this great philoſopher concerning the laws of gravitation, the conjectures made by him and others concerning its cauſe, the various objections that have been made to his doctrine, and the ſtate of the diſpute at preſent, ſee the articles NEWTONIAN *Philoſophy*, ASTRONOMY, ATMOSPHERE, EARTH, ELECTRICITY, FIRE, LIGHT, ATTRACTION, REPULSION, PLENUM, VACUUM, &c.

Specific GRAVITY, denotes the weight belonging to an equal bulk of every different ſubſtance. Thus the exact weight of a cubic inch of gold, compared with a cubic inch of water, tin, lead, &c. is called its *ſpecific gravity*. See HYDROSTATICS.

GRAUNT (John), author of a curious and celebrated book, entitled, *Natural and political obſervations made upon the bills of mortality*. He was a haberdaſher of ſmall wares; but laid down his trade, and all public employments, on account of his religion. He was educated a Puritan; afterwards profeſſed himſelf a Socinian; yet, in the latter part of his life, declared himſelf of the Roman Catholic religion. He was a member of the royal ſociety, and died in 1674.

GRAY, a town of France, in the Franch Compte, and capital of the bailiwick of Amont. It is a trading place, and ſeated on the river Saone, in E. Lon. 5. 41. N. Lat. 47. 30.

GRAY (Thomas), an admired Engliſh poet, was the youngeſt and only ſurviving ſon of a reputable citizen of London, and was born in Cornhill in 1716. He was educated at Eton, where he contracted a friendſhip with Mr Horace Walpole, and with Mr Richard Weſt ſon of the lord chancellor of Ireland. Mr Weſt and Mr Gray were both intended for the bar; but the former died early in life, and the latter was diverted from that purſuit by an invitation to accompany Mr Walpole in his travels; which he accepted without any determined plan for his future life. During Mr Gray's travels, he wrote a variety of letters to Mr Weſt and to his parents, which are printed with his poems; and when he returned, finding himſelf in narrow circumſtances, yet with a mind indiſpoſed for active employment, he retired to Cambridge, and devoted himſelf to ſtudy. Soon after his return, his friend Weſt died: and the melancholy impreſſed on him by this event may be traced in his admired "Elegy wrote a country churchyard;' which is thought to have been begun, if not finiſhed, at this time: tho' the concluſion, as it ſtands at preſent, is certainly different from what it was in the firſt manuſcript copy.

The firſt impulſe of his ſorrow for the death of his friend gave birth to a very tender ſonnet in Engliſh, on the Petrarchian model; and alſo to a ſublime apoſtrophe in hexameters, written in the genuine ſtrain of claſſical majeſty, with which he intended to begin one of his books *De Principiis cogitandi*.

From the winter of the year 1742, to the day of his death, his principal reſidence was at Cambridge: from which he was ſeldom abſent any conſiderable time, except between the years 1759 and 1762; when, on the opening of the Britiſh Muſeum, he took lodgings in Southampton-row, in order to have recourſe to the Harleian and other manuſcripts there depoſited, from which he made ſeveral curious extracts, amounting in all to a tolerably-ſized folio, at preſent in the hands of Mr Walpole.

About the year 1747, Mr Maſon, the editor of Mr Gray's poems, was introduced to him. The former had written, a year or two before, ſome imitations of Milton's juvenile poems, *viz.* A Monody on the death of Mr Pope, and two pieces, entitled, *Il Bellicoſo*, and *Il Pacifico*, on the peace of Aix-la-Chapelle; and the latter reviſed them, at the requeſt of a friend. This laid the foundation of an intimacy, which continued without interruption to the death of Mr Gray.

About the year 1750, Mr Gray had put his laſt hand to his celebrated Elegy written in a country church-yard, and had communicated it to his friend Mr Walpole, whoſe good taſte was too much charmed with it to ſuffer him to with-hold the ſight of it from his acquaintance. Accordingly it was ſhown about for ſome time in manuſcript, and received with all the applauſe it ſo juſtly merited.

At laſt the publiſher of one of the magazines having obtained a ſurreptitious copy of it, Mr Gray wrote to Mr Walpole, deſiring that he would put his own manuſcript into the hands of Mr Dodſley, and order him to print it immediately. This was the moſt popular of all our author's publications. It ran through eleven editions in a very ſhort ſpace of time; was finely tranſlated into Latin by Meſſrs Anſty and Roberts; and, in the ſame year, by Mr Lloyd.

From July 1759, to the year 1762, he generally reſided in London, with a view, as we have already obſerved, of having recourſe to the Britiſh Muſeum. In July 1768, his grace the duke of Grafton wrote him a polite letter, informing him, that his majeſty had been pleaſed to offer to him the profeſſorſhip of Modern Hiſtory in the univerſity of Cambridge, then vacant by the death of Mr Laurence Brocket. This place was valuable in itſelf, the ſalary being 400 l. a-year; but what rendered it particularly acceptable to Mr Gray was its being given him without any ſolicitation. He was indeed remarkably diſintereſted in all his purſuits. Though his income, before this addition, was very ſmall, he never read or wrote with a view of making his labours uſeful to himſelf. He may be ſaid to have been one of thoſe few perſonages in the annals of literature, eſpecially in the poetical claſs, who are devoid of ſelf-intereſt, and at the ſame time attentive to œconomy; and alſo was, among mankind in general, one of thoſe very few œconomiſts, who poſſeſs that talent, untinctured with the ſlighteſt ſtain of avarice. When his circumſtances were at the loweſt, he gave away ſuch ſums in private charity, as would have done credit to an ampler purſe. But what chiefly deterred him from ſeeking any advantage by his literary purſuits, was a certain degree of pride, which led him to deſpiſe the idea of being thought an author by profeſſion.

However, it is probable, that early in life he had an intention of publiſhing an edition of Strabo; for his papers contain a great number of notes and geographical diſquiſitions on that author, particularly with reſpect to that part of Aſia which comprehends Perſia and India. The indefatigable pains which he took with the writings of Plato, and the quantity of critical as well as explanatory obſervations which he has left upon almoſt every part of his works, plainly indicate, that no man in Europe was better prepared to republiſh and illuſtrate that philoſopher, than Mr Gray. Another work, on which he beſtowed uncommon labour, was the Anthologia. In an interleaved copy of that collection of Greek epigrams, he has tranſcribed ſeveral additional ones, which he ſelected in his extenſive reading; has inſerted a great number of critical notes and emendations, and ſubjoined a copious index. But, whether he intended this performance for the preſs or not, is uncertain. The only work, which he meditated upon, with this direct view from the beginning, was a hiſtory of Engliſh poetry, upon a plan ſketched out by Mr Pope. He has mentioned this himſelf in an advertiſement to thoſe three fine imitations of Norſe and Welch poetry, which he gave the world in the laſt edition of his Poems. But, after he had made ſome conſiderable preparations for the execution of this deſign, and Mr Maſon had offered him his aſſiſtance, he was informed, that Mr Warton, of Trinity College, Oxford, was engaged in a work of the ſame kind. The undertaking was therefore relinquiſhed, by mutual conſent; and, ſoon after, on that gentleman's deſiring a ſight of the plan, our author readily ſent him a copy of it.

Among other ſciences, Mr Gray had acquired a great knowledge of Gothic architecture. He had ſeen and accurately ſtudied in his youth, while abroad, the Roman proportions on the ſpot, both in ancient times, and in the works of Palladio. In his later years he applied himſelf to conſider thoſe ſtupendous ſtructures of more modern date that adorn our own country; which, if they have not the ſame grace, have undoubtedly equal dignity. He endeavoured to trace this mode of building, from the time it commenced, thro' its various changes, till it arrived at its perfection in the reign of Henry VIII. and ended in that of Elizabeth. For this purpoſe, he did not ſo much depend upon written accounts, as that internal evidence which the buildings themſelves give of their reſpective antiquity; ſince they conſtantly furniſh to the well informed eye, arms, ornaments, and other marks, by which their ſeveral ages may be aſcertained. On this account he applied himſelf to the ſtudy of heraldry, as a preparatory ſcience; and has left behind him a number of genealogical papers, more than ſufficient to prove him a complete maſter of it. By theſe means he arrived at ſo very extraordinary a pitch of ſagacity, as to be enabled to pronounce, at firſt ſight, on the preciſe time when every particular part of any of our cathedrals was erected.

But the favourite ſtudy of Mr Gray, for the laſt ten years of his life, was natural hiſtory, which he then rather reſumed than began; as, by the inſtructions of his uncle Antrobus, he was a conſiderable botaniſt at fifteen. The marginal notes, which he has left on Linnæus, and other writers on the vegetable, animal, and foſſile kingdoms, are very numerous: but the moſt conſiderable are on Hudſon's Flora Anglica, and the tenth edition of the *Syſtema Naturæ;* which latter he interleaved and filled almoſt entirely. While employed on zoology, he read Ariſtotle's treatiſe on that ſubject with great care, and explained many difficult paſſages of that obſcure ancient by the lights he had received from modern naturaliſts. In a word, excepting pure mathematics, and the ſtudies dependent on that ſcience, there was hardly any part of human learning, in which he had not acquired a competent ſkill, and in moſt of them a conſummate maſtery.

To this account of his literary character we may add, that he had a fine taſte in painting, prints, gardening, and muſic; and was moreover a man of good-breeding, virtue, and humanity.

He died in 1771; and an edition of his poems, with memoirs of his life and writings, were publiſhed in 4to, in 1775, by Mr Maſon. This gentleman, however, inſtead of employing his own pen in drawing Mr Gray's character, has adopted one drawn by the Rev. Mr Temple, rector of Mamhead in Devonſhire, in a letter to Mr Boſwell; to whom the public are indebted for communicating it.

" Perhaps (ſays Mr Temple) he was the moſt learned man in Europe. He was equally acquainted with the elegant and profound parts of ſcience, and that not ſuperficially but thoroughly. He knew every branch of hiſtory, both natural and civil; had read all the original hiſtorians of England, France, and Italy; and was a great antiquarian. Criticiſm, metaphyſics, morals, politics, made a principal part of his plan of ſtudy; voyages and travels of all ſorts were his favourite amuſement; and he had a fine taſte in painting, prints, architecture, and gardening. With ſuch a fund of knowledge, his converſation muſt have been equally inſtructing and entertaining; but he was alſo a good man, a well-bred man, a man of virtue and humanity. There is no character without ſome ſpeck, ſome imperfection; and I think the greateſt defect in his was an affectation in delicacy, or rather effeminacy, and a viſible faſtidiouſneſs, or contempt and diſdain of his inferiors in ſcience. He alſo had, in ſome degree, that weakneſs which diſguſted Voltaire ſo much in Mr Congreve: though he ſeemed to value others chiefly according to the progreſs they had made in knowledge, yet he could not bear to be conſidered himſelf merely as a man of letters; and though without birth, or fortune, or ſtation, his deſire was to be looked upon as a private independent gentleman, who read for his amuſement. Perhaps it may be ſaid, What ſignifies ſo much knowledge, when it produces ſo little? Is it worth taking ſo much pains to leave no memorial but a few poems? But let it be conſidered, that Mr Gray was, to others, at leaſt innocently employed; to himſelf, certainly beneficially. His time paſſed agreeably; he was every day making ſome new acquiſition in ſcience; his mind was enlarged, his heart ſoftened, and his virtue ſtrengthened; the world and mankind were ſhewn to him without a maſk; and he was taught to conſider every thing as trifling, and unworthy the attention of a wiſe man, except the purſuit of knowledge, and the practice of virtue in that ſtate wherein God hath placed us."

GRAYLING, in ornithology, a ſpecies of Salmo.

In angling for this fiſh your hook muſt be armed upon the ſhanks with a very narrow plate of lead, which ſhould be ſlendereſt at the bent of the hook, that the bait (which is to be a large graſhopper, the uppermoſt wing of which muſt be pulled off) may come over to it the more eaſily. At the point let there be a cad-bait in a continual motion. The jag-tail, which is a worm of a pale fleſh-colour, with a yellow tag on its tail, is an excellent bait for the grayling in March and April.

GREASE, a ſwelling and gourdineſs of the legs of a horſe. See Farriery, § xxxv.

GREATER tone, in muſic. See Tone.

GREAVES (John), an eminent phyſician and antiquary, was the eldeſt ſon of John Greaves rector of Colemore near Alresford in Hampſhire, and born in 1602. He was educated at Baliol college in Oxford, from which he removed to Merton. He was afterwards, on the foot of his great merit, choſen geometry profeſſor of Greſham college. His ardent thirſt of knowledge ſoon carried him into ſeveral parts of Europe, where he eagerly ſeized every opportunity of improving it. His next voyage was into the eaſtern countries; where nothing remarkable in the heavens, earth, or even ſubterraneous places, ſeems to have eſcaped his niece obſervation. He, with indefatigable induſtry, and even at the peril of his life, collected a conſiderable number of Arabic, Perſic, and Greek manuſcripts for archbiſhop Laud. Of theſe he well knew the value, as he was a maſter of the languages in which they were written. He alſo collected for that prelate many oriental gems and coins. He took a more accurate ſurvey of the pyramids than any traveller who went before him. On his return from the Eaſt, he viſited ſeveral parts of Italy a ſecond time. During his ſtay at Rome, he made a particular inquiry into the true ſtate of the ancient weights and meaſures. Soon after he had finiſhed his ſecond voyage, he was choſen Savilian profeſſor of aſtronomy at Oxford. He was eminently qualified for this profeſſorſhip, as the works of ancient and modern aſtronomers were familiar to him. His books relating to oriental learning, his *Pyramidographia*, or a deſcription of the pyramids in Egypt, his *Epocha Celebriores*, and other curious and uſeful pieces, of which Mr Ward has given us a catalogue, ſhew him to have been a great man. Thoſe which he intended to publiſh would have ſhewn him to be a greater; but he was ſtopped in his great career by death, in 1652.

GREBE, in ornithology. See Colymbus.

GREECE, the preſent Rumelia, and in many reſpects one of the moſt deſervedly celebrated countries in the world, was anciently bounded on the north by Macedonia, and the river Strymon; on the weſt by the Ionian ſea; on the ſouth by the Mediterranean; and on the eaſt by the Egean ſea and Archipelago. It extended from the Strymon, by which it was parted from Thrace, to the promontory of Tenarus, the ſouthmoſt point of the Peloponneſus, now the Morea, about 6° 20′ of latitude, or nearly 440 Engliſh miles, and in breadth from eaſt to weſt about 359 miles.

The general names by which the inhabitants of this country were known to the ancients, were thoſe of *Graioi*, or *Graicoi*, from whence the name of *Greece* is plainly derived. Theſe names are thought come from Græcus, the father, or (according to ſome) the ſon, of Theſſalus, who gave name to Theſſaly; but ſome modern critics chuſe to derive it from *Ragau*, the ſame with *Reu*, the ſon of Peleg, by the tranſpoſition of a letter to ſoften the ſound.—Theſe names were afterwards changed for *Achæi* and *Hellenes*; the firſt, as is ſuppoſed, from *Achæus*, the ſon of Xuthus, the ſon of Hellen, and father of Ion; or, according to the fable, the ſon of Jupiter: the other from Hellen, above-mentioned, the ſon of Deucalion, and father of Dorus, from whom came the *Dores*, afterwards a famous nation among the Greeks.—Another name by which the Greeks were known in ſome parts of the country, was that of *Pelaſgi*, which the Arcadians, the moſt ancient people in Greece, deduced from their pretended founder *Pelaſgus*; who is ſaid to have got ſuch footing in Peloponneſus, that the whole peninſula from him was called *Pelaſgia*. But the moſt ancient name of all is univerſally allowed to have been that of Iones, which the Greeks themſelves derived from Ion the ſon of Xuthus; or, as the fable hath it, of Apollo, by Creuſa the daughter of Erichtheus the grandſon of Deucalion. Joſephus, however, affirms, that their original is of much older date; and that Javan, the ſon of Japhet, and grandſon of Noah, was the firſt who peopled theſe countries; which Bochart hath alſo rendered very probable. It is true, indeed, that among the Greeks themſelves, only the Athenians, and ſuch colonies as ſprung from them, were called *Iones*; but it is alſo plain beyond exception, that other nations gave this name to all the inhabitants of Greece.

The inhabitants of Greece in the firſt ages, even by the confeſſion of their own hiſtorians, appear to have been ſavages ſcarce a degree removed from brutes. They lived indifferently on every fruit, herb, or root that came in their way; and lay either in the open fields, or at beſt ſheltered themſelves in dens, caves, and hollow trees; the country itſelf in the mean time remaining one continued uncultivated deſart.—The firſt improvement they made in their way of living, was the exchanging of their old food for the more wholeſome acorns, building huts for themſelves to ſleep in, and covering their bodies with the ſkins of beaſts. For all this, it ſeems, they were beholden to Pelaſgius above-mentioned, (ſuppoſed by ſome to be Peleg ſpoke of in Scripture), and who was highly reverenced by them on that account.—This reformation in their way of life, however, it ſeems wrought none in their manners. On the contrary, they who had nothing to fight for but a hole to ſleep in, began now to envy and rob one another of theſe ſlender acquiſitions. This, in proceſs of time, put them under a neceſſity of joining themſelves into companies under ſome head, that they might either more falſely plunder their neighbours, or preſerve what they had got. Laws they had none, except that of the ſword: ſo that thoſe only lived in ſafety who inhabited the moſt barren and craggy places; and hence Greece for a long time had no ſettled inhabitants, the weakeſt being always turned out by the ſtrongeſt. Their gigantic ſize and ſtrength, if we may believe Plutarch, added ſo much to their inſolence and cruelty, that they ſeemed to glory in committing the greateſt acts of violence and barbarity on thoſe that unhappily fell into their hands.

The next advance towards civilization, was their forming themſelves into regular ſocieties, to cultivate the lands, and build themſelves towns and cities for their ſafety. Their original barbarity and mutual violences againſt each other naturally prevented them from uniting as one nation, or even into any conſiderable community; and hence the great number of ſtates into which Greece was originally divided. The moſt remarkable of theſe ſmall principalities mentioned in hiſtory are the following:—In Peloponneſus were thoſe of Sicyon, Argos, and Meſſenia, Achaia Propria, Arcadia, and Laconia. In Grecia Propria, (that part of Greece which lay without Peloponneſus), were thoſe of Attica, Megara, Bœotia, Locris, Epichnemidia, Doris, Phocis, Locris, Ozolæa, and Ætolia. In Epirus were the Moloſſi, Amphilochi, Caſſiopæi, Dræopes, Chaoces, Threſpotii, Almeni, and Acarnani. In Theſſaly were thoſe of Theſſaliotis, Eſtiotis, Pelaſgiotis, Magneſia, and Phthia.—All theſe have at one time or other been ſeverally governed by kings of their own, though we only find the names of many of them mentioned in the hiſtories of the more conſiderable kingdoms of Sparta, Attica, Thebes, &c.—The erection of theſe kingdoms, however, for ſame time, did not much alter the caſe; the inhabitants of the new kingdoms plundered and deſtroyed one another without mercy. Attica was the only place in any degree free from theſe incurſions, becauſe it was naturally deſtitute of every thing that could invite a plundering enemy; but thoſe cities fared much worſe which were ſituated in the ſea-coaſts; becauſe they were in continual danger of being plundered either by ſea or land: for pirates at that time did not leſs infeſt all thoſe ſeas, than robbers did the land. And this was one main cauſe why moſt of the ancient cities of Greece were ſituated at ſome conſiderable diſtance from the ſhore; but even in theſe, as all their ſafety conſiſted in the reſiſtance they could make againſt an invader, their inhabitants were under a neceſſity of going conſtantly armed, and being ever on their guard.

Another miſchief ariſing from theſe continual piracies and robberies was, that they occaſioned the far greater part of the lands to lie uncultivated, ſo that the people only planted and ſowed as much as was barely neceſſary for their preſent ſupport; and where there was ſuch an univerſal neglect of agriculture, there could be as little room for any diſcoveries in other uſeful arts and trades. Hence, when other nations, as the Jews, Egyptians, Midianites, Phœnicians, &c. had improved themſelves to a very high degree, the Greeks ſeem to have been utter ſtrangers to every uſeful art.

During this period of ſavage barbarity, the moſt renowned Grecian heroes, as Hercules, Theſeus, &c. performed their exploits; which, however exaggerated by poetic fiction, no doubt had a foundation in truth. Some indeed are of opinion that the Grecian heroes are entirely fictitious, and their exploits derived from thoſe of the Hebrew worthies, ſuch as Samſon, Gideon, &c. Yet, conſidering the extreme degree of barbarity which at that time prevailed throughout Greece, it ſeems not at all improbable that ſome perſons of extraordinary ſtrength and courage might undertake the cauſe of the oppreſſed, and travel about like the more modern knights-errant in queſt of adventures.

The firſt expedition in which we find the Greeks united, was that againſt Troy, the particulars of which are recited under the article TROY. Their ſucceſs here (which happened about 1184 B. C.) coſt them very dear; vaſt numbers of their braveſt warriors being ſlain; great numbers of the ſurvivors being caſt away in their return; and many of thoſe who had the good luck to get back again, being ſoon after murdered, or driven out of their country. It is probable, however, that their having ſtaid for ſuch a long time in Aſia, might contribute to civilize the Greeks ſomewhat ſooner than what they otherwiſe would have been; and accordingly from this time, we find their hiſtory ſomewhat leſs obſcure, and as it were begin to emerge out of darkneſs. The continual wars, indeed, in which they were engaged among themſelves, no doubt, for a long time, prevented them from making any conſiderable progreſs in thoſe arts in which they afterwards made ſo great progreſs. Theſe wars, which indeed never ceaſed as long as the Greeks preſerved their liberty, rendered them brave, and ſkilled in the military art, above all other nations; but at the ſame time they effectually prevented them from making permanent conqueſts, and confined them within the bounds of their own country; while the different ſtates were one way or other ſo equally balanced, that ſcarce one of them was able perfectly to ſubdue another. The Spartans, however, having, with great difficulty, reduced the kingdom of Meſſene, and added its territories to their own, became the leading people in Greece. Their ſuperiority was long diſputed by Athens; but the Peloponneſian war at laſt determined that point in favour of the Spartans, when the city of Athens was taken, and its walls demoliſhed by Lyſander the Spartan general. See Attica, n° 164.—By the battle of Leuctra, the Spartans loſt that ſuperiority which they had maintained for 500 years, and which now devolved on the Thebans. After the death of Epaminondas, the celebrated Theban general, however, as no perſon was found poſſeſſed of his abilities, the Thebans were again obliged to yield the ſuperiority to the Spartans. But by this time the Greeks had become acquainted with the luxuries and elegancies of life; and all the rigour of their original laws could not prevent them from valuing theſe as highly as other people. This did not indeed abate their valour, but it heightened their mutual animoſities; at the ſame time that, for the ſake of a more eaſy and comfortable life, they became more diſpoſed to ſubmit to a maſter. The Perſians, whoſe power they had long dreaded, and who were unable to reſiſt them by force of arms, at laſt found out (by the advice of Alcibiades) the proper method of reducing the Grecian power; namely, by aſſiſting them by turns, and ſupplying one ſtate with money to fight againſt another, till they ſhould all be ſo much reduced, that they might become an eaſy prey. Thus the Greeks were weakened, though the Perſians did not reap any benefit from their weakneſs. Philip of Macedon entered into the ſame political views; and partly by intrigue, partly by force, got himſelf declared Generaliſſimo of Greece. His ſucceſſor Alexander the Great completed their ſubjection; and by deſtroying the city of Thebes, and exterminating its inhabitants, ſtruck ſuch a terror throughout Greece, that he was as fully obeyed by all the ſtates, as by any of the reſt of his ſubjects. During his abſence in Perſia, however, they attempted to ſhake off the Macedonian yoke, but were quelled by his general Antipater. The news of Alexander's death was to them a matter of the utmoſt joy; but their mutual animoſities prevented them from joining in any ſolid plan for the recovery of their liberties, and hence they continued to be oppreſſed by Alexander's ſucceſſors, or other tyrants, till Aratus, an Achæan, about 268 B. C. formed a deſign of ſetting his country free from theſe oppreſſors. He perſuaded a number of the ſmall republics to enter into a league for their own defence, which was called the *Achæan league;* and notwithſtanding that the republics, taken ſingly, had very little ſtrength, they not only maintained their independency, but ſoon became formidable when united. This aſſociation continued to become daily more and more powerful; but received a ſevere check from Cleomenes, king of Sparta, which obliged them to call in Antigonus to their aſſiſtance. This prince overcame Cleomenes at the battle of Sellaſia, and afterwards made himſelf maſter of Sparta. Thus he became a more formidable enemy than the one he had conquered, and the recovery of the Grecian liberties was incomplete.

Soon after this, the Greeks began to feel the weight of a power more formidable than any which they had yet experienced; namely, that of the Romans. That inſidious and haughty republic firſt intermeddled with the Grecian affairs, under pretence of ſetting them at liberty from the oppreſſion of Philip of Macedon. This, by a proper union among themſelves, they might have accompliſhed: but in this they acted as though they had been infatuated; receiving with the utmoſt joy the decree of the Roman conſul, who declared them free; without conſidering, that he who had thus given them liberty, might take it away at his pleaſure. This leſſon, however, they were ſoon taught, by the total reduction of their country to a Roman province; yet this can ſcarce be called a misfortune, when we look back to their hiſtory, and conſider their outrages upon one another: nor can we ſympathiſe with them for the loſs of that liberty which they only made uſe of to fill their country with ſlaughter and bloodſhed. After their conqueſt by the Romans, they made no united effort to recover their liberty. They continued in quiet ſubjection till the beginning of the 15th century. About that time, they began to ſuffer under the tyranny of the Turks, and their ſufferings were completed by the taking of Conſtantinople in 1453. Since that time, they have groaned under the yoke of a moſt deſpotic government; ſo that all traces of their former valour, ingenuity, and learning, are now in a manner totally extinct.

Modern Greece comprehends Macedonia; Albania, now called Arnaut; Epirus; Theſſaly, now Jana; Achaia, now Livadia; the Peloponneſus, now Morea; together with the iſlands on its coaſt, and in the Archipelago. The continent of Greece is ſeated betwixt the 36th and 43d degrees of north latitude; and between the 19th and 27th degrees of longitude, eaſt of London. To the north it is bounded, by Bulgaria and Servia, from which it is divided by a ridge of mountains; to the ſouth, by the Mediterranean ſea; to the eaſt, by Romania and the Archipelago; and to the weſt, by the Adriatic, or gulph of Venice. Its length is ſaid to be about four hundred miles, and its utmoſt breadth about three hundred and fifty. The air is extremely temperate and healthy: and the ſoil fruitful, though badly cultivated, yielding corn; wine, delicious fruits, and abounding with cattle, fowls, and veniſon. As to religion, Chriſtianity was planted in Greece ſoon after the death of our Saviour, and flouriſhed there for many ages in great purity; but ſince the Greeks became ſubject to the Turkiſh yoke, they have ſunk into the moſt deplorable ignorance, in conſequence of the ſlavery and thraldom under which they groan, and their religion is now greatly corrupted. It is indeed little better than a heap of ridiculous ceremonies and abſurdities. The head of the Greek church is the patriarch of Conſtantinople; who is choſen by the neighbouring archbiſhops and metropolitans, and confirmed by the emperor or grand vizir. He is a perſon of great dignity, being the head and director of the eaſtern church. The other patriarchs are thoſe of Jeruſalem, Antioch, and Alexandria, Mr. Tournefort tells us, that the patriarchates are now generally ſet to ſale, and beſtowed upon thoſe who are the higheſt bidders. The patriarchs, metropolitans, archbiſhops, and biſhops, are always choſen from among the Caloyers or Greek monks. Before

fore the patriarchs receive their patents and the caftan, which is a veſt of linſey-woolſey, or ſome other ſtuff, preſented by the grand ſignior to ambaſſadors and other perſons newly inveſted with ſome conſiderable dignity, they are obliged to make large preſents to the vizir, &c. The income of the patriarch of Conſtantinople is ſaid to amount to no leſs than one hundred and twenty thouſand guilders, of which he pays the one half by way of annual tribute to the Ottoman Porte, adding ſix thouſand guilders beſides as a preſent at the feaſt of Bairam. The next perſon to a biſhop among the clergy is an archimandrite, who is the director of one or more convents, which are called mandren; then come the abbot, the arch-prieſt, the prieſt, the deacon, the under-deacon, the chanter, and the lecturer. The ſecular clergy are ſubjected to no rules, and never riſe higher than high-prieſt. They are allowed to marry once; but it muſt be with a virgin, and before they are ordained. They have neither glebe nor tythes, but depend on the perquiſites that ariſe from their office; and they ſeldom preach but in Lent. The Greeks have few nunneries; but a great many convents of monks, who are all prieſts, and, ſtudents excepted, obliged to follow ſome handicraft employment, and lead a very auſtere life. The Greeks deny the ſupremacy of the pope, and abhor the worſhip of images; but have a multitude of pictures of ſaints in their churches, whom they pray to as mediators. Their faſts are very ſevere. They believe alſo in the doctrine of tranſubſtantiation, and that the Holy Ghoſt does not proceed from the Son. They admit not of purgatory, ſays Mr. Thevenot: but yet they allow a third place, where they ſay the bleſſed remain, in expectation of the day of judgment. At maſs they conſecrate with leavened bread; and communicate under both kinds, as well laics as prieſts, and as well women and children as men. When they carry the ſacrament to the ſick, they do not proſtrate themſelves before it, nor expoſe it to be adored: neither do they carry it in proceſſion, or have any particular feaſt in honour of it. Baptiſm is performed among them by plunging the whole body of the child thrice into water. Immediately after baptiſm, they give it confirmation and the communion; and ſeven days after that, it undergoes the ceremony of ablution. When a prieſt is married, among other ceremonies, the bridegroom and bride drink each two glaſſes of wine; then the glaſs is given to the prieſt, who merrily drinks off the reſt of the wine, and breaking the glaſs, ſays, So may the bridegroom break the virginity of the bride. As to the character of the modern Greeks, they are ſaid to be very covetous, hypocritical, treacherous, great pederaſts, and at the ſame time revengeful to the higheſt degree; but very ſuperſtitious. They are ſo much deſpiſed by the Turks, that theſe do not value even a Greek who turns Mahometan. The Turks are remarkable for their taciturnity; they never uſe any unneceſſary words: but the Greeks, on the contrary, are very talkative and lively. The Turks generally practiſe what their religion enjoins, but the Greeks do not; and their miſery puts them upon a thouſand mean ſhifts and ſcandalous practices, authorized by bad example, and perpetuated from father to ſon. The Greek women have fine features and beautiful complexions: their countenances ſtill very much reſemble thoſe of the ancient Greek ſtatues.

GREEK, or GRECIAN, any thing belonging to ancient Greece.

The Greek language, as preſerved in the writings of the celebrated authors of antiquity, as Homer, Heſiod, Demoſthenes, Ariſtotle, Plato, Xenophon, &c. has a great variety of terms and expreſſions, ſuitable to the genius and occaſions of a polite and learned people, who had a taſte for arts and ſciences. In it, proper names are ſignificative; which is the reaſon that the modern languages borrow ſo many terms from it. When any new invention, inſtrument, machine, or the like, is diſcovered, recourſe is generally had to the Greek for a name to it; the facility wherewith words are there compounded, affording ſuch as will be expreſſive of its uſe: ſuch are, barometer, hygrometer, microſcope, teleſcope, thermometer, &c. But of all ſciences, medicine moſt abounds with ſuch terms; as diaphoretic, diagnoſis, diarrhœa, hæmorrhage, hydrophobia, phthiſis, atrophy, &c. Beſides the copiouſneſs and ſignificancy of the Greek, wherein it excels moſt, if not all, other languages, it has alſo three numbers, *viz.* a ſingular, dual, and plural: alſo abundance of tenſes in its verbs, which makes a variety in diſcourſe, prevents a certain dryneſs that always accompanies too great an uniformity, and renders that language peculiarly proper for all kinds of verſe. The uſe of the participles, of the aoriſt and preterite, together with the compound words already mentioned, give it a peculiar force and brevity without taking any thing from its perſpicuity.

It is no eaſy matter to aſſign the preciſe difference between the modern and ancient Greek; which conſiſts in the terminations of the nouns, pronouns, verbs, &c. not unlike what obtains between ſome of the dialects of the Italian or Spaniſh. There are alſo in the modern Greek many new words, not to be met with in the ancient. We may therefore diſtinguiſh three ages of the Greek tongue: the firſt of which ends at the time when Conſtantinople became the capital of the Roman empire; the ſecond laſted from that period to the taking of Conſtantinople by the Turks; and the third, from that time to this.

GREEK *Bible.* See BIBLE.

GREEK *Church.* See GREECE.

GREEK *Monks* and *Nuns*, of whatever order, conſider St Baſil as their founder and common father, and eſteem it the higheſt crime to deviate in the leaſt from his conſtitutions. There are ſeveral beautiful convents with churches, in which the monks perform divine ſervice day and night. Some of the monks are cœnobites, or live together, wear the ſame habit, eat at the ſame table, and perform the ſame exerciſes and employments.

GREEN, one of the original priſmatic colours, exhibited by the refraction of the rays of light. See OPTICS.

GREEN, among painters. See COLOUR-*Making*, n° 26.

GREEN *Cloth*, a board or court of juſtice held in the compting-houſe of the kings houſehold, compoſed of the Lord Steward and officers under him, who ſit daily. To this court is committed the charge and overſight of the king's houſehold in matters of juſtice and government, with a power to correct all offenders, and to maintain the peace of the verge, or juriſdiction of the court-royal; which is every way about 200 yards from the laſt gate of the palace where his majeſty reſides.

It takes its name, *board of green cloth*, from a green cloth ſpread over the board where they ſit.

Without a warrant firſt obtained from this court, none of the king's ſervants can be arreſted for debt.

Clerks of the Green *Cloth* are two officers of the board of green cloth, who appoint the diet of the king and his houſehold; and keep all records, legers, and papers relating thereto; make up bills, parcels, and debentures for ſalaries, and proviſions and neceſſaries for the officers of the buttery, pantry, cellar, &c.

They alſo wait upon foreign princes when entertained by his majeſty.

Green-*Finch* in ornithology, the Engliſh name of the greeniſh fringilla, with the wings and tail variegated with yellow. See Fringilla.

Green-*Houſe*, or *Conſervatory*, a houſe in a garden, contrived for ſheltering and preſerving the moſt curious and tender exotic plants, which in our climate will not bear to be expoſed to the open air, eſpecially during the winter ſeaſon. Theſe are generally large and beautiful ſtructures, equally ornamental and uſeful.

Green-*Silver*, the name of an ancient cuſtom within the manor of Writtel in the county of Eſſex in England; which is, that every tenant whoſe foredoor opens to Greenbury, ſhall pay an half-penny yearly to the lord, by the name of *green-ſilver*.

Green *Wax*, is uſed where eſtates are delivered to the ſheriffs out of the exchequer, under the ſeal of that court, made in green wax, to be levied in the ſeveral counties. This word is mentioned the 43d ſtat. Ed. III. c. 9. and 7 Hen. IV. c. 4.

GREENLAND, a general name by which are denoted the moſt eaſterly parts of America, ſtretching towards the north pole, and likewiſe ſome iſlands to the northward of the continent of Europe, lying in very high latitudes.

1 eſt eenland ſcribed.

This country is divided into Weſt and Eaſt Greenland.—Weſt Greenland is now determined by our lateſt maps to be a part of the continent of America, though upon what authority is not very clear. That part of it which the Europeans have any knowledge of is bounded on the weſt by Baffin's bay, on the ſouth by Davis's ſtraits, and on the eaſt by the northern part of the Atlantic Ocean. It is a very mountainous country, and ſome parts of it ſo high that they may be diſcerned thirty leagues off at ſea. The inland mountains, hills, and rocks, are covered with perpetual ſnow: but the low lands on the ſea-ſide are clothed with verdure in the ſummer ſeaſon. The coaſt abounds with inlets, bays, and large rivers; and is ſurrounded with a vaſt number of iſlands of different dimenſions. In a great many places however, on the eaſtern coaſt eſpecially, the ſhore is inacceſſible by reaſon of the floating mountains of ice. The principal river, called *Baal*, falls into the ſea in the 64th degree of latitude, where the firſt Daniſh lodge was built in 1721; and has been navigated above 40 miles up the country.

2 Peopled by a colony from Iceland.

Weſt Greenland was firſt peopled by Europeans in the eighth century. At that time a company of Icelanders, headed by one Ericke Rande, were by accident driven on the coaſt. On his return he repreſented the country in ſuch a favourable light, that ſome families again followed him thither, where they ſoon became a thriving colony, and beſtowed on their new habitation the name of *Groenland*, or *Greenland*, on account of its verdant appearance. This colony was converted to Chriſtianity by a miſſionary from Norway, ſent thither by the celebrated Olaf, the firſt Norwegian monarch who embraced the true religion. The Greenland ſettlement continued to increaſe and thrive under his protection; and, in a little time, the country was provided with many towns, churches, convents, biſhops, &c. under the juriſdiction of the archbiſhop of Drontheim. A conſiderable commerce was carried on between Greenland and Norway; and a regular intercourſe maintained between the two countries till the year 1406, when the laſt biſhop was ſent over. From that time all correſpondence was cut off, and all knowledge of Greenland has been buried in oblivion.

3 All correſpondence with it ſuddenly cut off.

This ſtrange and abrupt ceſſation of all trade and intercourſe has been attributed to various cauſes; but the moſt probable is the following. The colony, from its firſt ſettlement, had been haraſſed by the natives, a barbarous and ſavage people, agreeing in cuſtoms, garb, and appearance, with the Eſquimaux found about Hudſon's Bay. This nation, called *Schrellings*, at length prevailed againſt the Iceland ſettlers who inhabited the weſtern diſtrict, and exterminated them in the 14th century: inſomuch, that when their brethren of the eaſtern diſtrict came to their aſſiſtance, they found nothing alive but ſome cattle and flocks of ſheep running wild about the country. Perhaps they themſelves afterwards experienced the ſame fate, and were totally deſtroyed by theſe Schrellings, whoſe deſcendants ſtill inhabit the weſtern parts of Greenland, and from tradition confirm this conjecture. They affirm that the houſes and villages whoſe ruins ſtill appear, were inhabited by a nation of ſtrangers, whom their anceſtors deſtroyed. There are reaſons, however, for believing that there may be ſtill ſome deſcendants of the ancient Iceland colony remaining in the eaſtern diſtrict, though they cannot be viſited by land, on account of the ſtupendous mountains, perpetually covered with ſnow, which divide the two parts of Greenland; while they have been rendered inacceſſible by ſea, by the vaſt quantity of ice driven from Spitzbergen, or Eaſt Greenland. One would imagine that there muſt have been ſome conſiderable alteration in the northern parts of the world ſince the 15th century, ſo that the coaſt of Greenland is now become almoſt totally inacceſſible, though formerly viſited with very little difficulty. It is alſo natural to aſk, By what means the people of the eaſtern colony ſurmounted the above-mentioned obſtacles when they went to the aſſiſtance of their weſtern friends, how they returned to their own country, and in what manner hiſtorians learned the ſucceſs of their expedition? Concerning all this we have very little ſatisfactory information. All that can be learned from the moſt authentic records is, that Greenland was divided into two diſtricts, called *Weſt Bygd*, and *Eaſt Bygd*: that the weſtern diviſion contained four pariſhes, and 100 villages: that the

4 Colony ſuppoſed to be exterminated.

5 Account of the colony.

6 Attempts to rediſcover the country.

the eaſtern diſtrict was ſtill more flouriſhing, as being nearer to Iceland, ſooner ſettled, and more frequented by ſhipping from Norway. There are alſo many accounts, though moſt of them romantic and ſlightly atteſted, which render it probable that part of the eaſtern colony ſtill ſubſiſts, who, at ſome time or other, may have given the imperfect relation above-mentioned. This colony, in ancient times, certainly comprehended twelve extenſive pariſhes, one hundred and ninety villages, a biſhop's ſee, and two monaſteries. The preſent inhabitants of the weſtern diſtrict are entirely ignorant of this part, from which they are divided by rocks, mountains, and deſerts, and ſtill more effectually by their apprehenſion: for they believe the eaſtern Greenlanders to be a cruel, barbarous nation, that deſtroy and eat all ſtrangers who fall into their hands. About a century after all intercourſe between Norway and Greenland had ceaſed, ſeveral ſhips were ſent ſucceſſively by the kings of Denmark, in order to diſcover the eaſtern diſtrict; but all of them miſcarried. Among theſe adventurers, Mogens Heinſon, after having ſurmounted many difficulties and dangers, got ſight of the land, which, however, he could not approach. At his return, he pretended that the ſhip was arreſted in the middle of her courſe, by certain rocks of loadſtone at the bottom of the ſea. The ſame year, 1576, in which this attempt was made, has been rendered remarkable by the voyage of Captain Martin Frobiſher, ſent upon the ſame errand by Queen Elizabeth. He likewiſe deſcried the land; but could not reach it, and therefore returned to England; yet not before he had ſailed ſixty leagues in the ſtrait which ſtill retains his name, and landed on ſeveral iſlands, where he had ſome communication with the natives. He had likewiſe taken poſſeſſion of the country in the name of Queen Elizabeth; and brought away ſome pieces of heavy black ſtone, from which the refiners of London extracted a certain proportion of gold. In the enſuing ſpring, he undertook a ſecond voyage, at the head of a ſmall ſquadron, equipped at the expence of the public; entered the ſtraits a ſecond time; diſcovered upon an iſland a gold and ſilver mine; beſtowed names upon different bays, iſlands, and headlands; and brought away a lading of ore, together with two natives, a male and a female, whom the Engliſh kidnapped.

Such was the ſucceſs of this voyage, that another armament was fitted out under the auſpices of Admiral Frobiſher, conſiſting of fifteen ſail, including a conſiderable number of ſoldiers, miners, ſmelters, carpenters, and bakers, to remain all the winter near the mines in a wooden fort, the different pieces of which they carried out in the tranſports. They met with boiſterous weather, impenetrable fogs, and violent currents upon the coaſt of Greenland, which retarded their operations until the ſeaſon was far advanced. Part of their wooden fort was loſt at ſea; and they had neither proviſion nor fuel ſufficient for the winter. The admiral therefore determined to return with as much ore as he could procure: of this they obtained large quantities out of a new mine, to which they gave the name of the Counteſs of Suſſex. They likewiſe built an houſe of ſtone and lime, provided with ovens; and here, with a view to conciliate the affection of the natives, they left a quantity of ſmall morrice-bells, knives, beads, looking-glaſſes, leaden pictures, and other toys, together with ſeveral loaves of bread. They buried the timber of the fort where it could be eaſily found next year; and ſowed corn, peaſe, and other grain, by way of experiment, to know what the country would produce. Having taken theſe precautions, they ſailed from thence in the beginning of September; and after a month's ſtormy paſſage, arrived in England: but this noble deſign was never proſecuted.

Chriſtian IV. king of Denmark, being deſirous of diſcovering the old Greenland ſettlement, ſent three ſhips thither, under the command of Captain Godſke Lindenow; who is ſaid to have reached the eaſt coaſt of Greenland, where he traded with the ſavage inhabitants, ſuch as they are ſtill found in the weſtern diſtrict, but ſaw no ſigns of a civilized people. Had he actually landed in the eaſtern diviſion, he muſt have perceived ſome remains of the ancient colony, even in the ruins of their convents and villages. Lindenow kidnapped two of the natives, who were conveyed to Copenhagen; and the ſame cruel fraud * was practiſed by other two ſhips which ſailed into Davis's Straits, where they diſcovered divers fine harbours, and delightful meadows covered with verdure. In ſome places they are ſaid to have found a conſiderable quantity of ore, every hundred pounds of which yielded twenty-ſix ounces of ſilver. The ſame Admiral Lindenow made another voyage to the coaſt of Greenland in the year 1606, directing his courſe to the weſtward of Cape Farewell. He coaſted along the Straits of Davis; and having made ſome obſervations on the face of the country, the harbours and iſlands, returned to Denmark. Carſten Richards, being detached with two ſhips on the ſame diſcovery, deſcried the high land on the eaſtern ſide of Greenland; but was hindered by the ice from approaching the ſhore.

Other expeditions of the ſame nature have been planned and executed with the ſame bad ſucceſs, under the auſpices of a Daniſh company of merchants. Two ſhips

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* Nothing can be more inhuman and repugnant to the dictates of common juſtice, than this practice of tearing away poor creatures from their country, their familes, and connections: unleſs we ſuppoſe them altogether deſtitute of natural affection; and that this was not the caſe with thoſe poor Greenlanders, ſome of whom were brought alive to Copenhagen, appears from the whole tenor of their conduct, upon their firſt capture, and during their confinement in Denmark. When firſt captivated, they rent the air with their cries and lamentations: they even leaped into the ſea, and, when taken on board, for ſome time refuſed all ſuſtenance. Their eyes were continually turned towards their dear country, and their faces always bathed in tears. Even the countenance of his Daniſh majeſty, and the careſſes of the court and people, could not alleviate their grief. One of them was perceived to ſhed tears always when he ſaw an infant in the mother's arms; a circumſtance from whence it was naturally concluded, that he had left his wife with a young child in Greenland. Two of them went to ſea in their little canoes, in hope of reaching Greenland: but one of them was retaken. Other two made the ſame attempt: but were driven by a ſtorm on the coaſt of Schonen, where they were apprehended by the peaſants, and reconveyed to Copenhagen. One of them afterwards died of a fever, caught in fiſhing pearl, during the winter, for the governor of Kolding. The reſt lived ſome years in Denmark: but at length, ſeeing no proſpect of being able to reviſit their native country, they ſunk into a kind of melancholy diſorder, and expired.

ſhips returned from the weſtern part of Greenland loaded with a kind of yellow ſand, ſuppoſed to contain a large proportion of gold. This being aſſayed by the goldſmiths of Copenhagen, was condemned as uſeleſs, and thrown overboard: but from a ſmall quantity of this ſand, which was reſerved as a curioſity, an expert chemiſt afterwards extracted a quantity of pure gold. The captain, who brought home this adventure, was ſo chagrined at his diſappointment, that he died of grief, without having left any directions concerning the place where the ſand had been diſcovered. In the year 1654, Henry Muller, a rich Dane, equipped a veſſel under the command of David de Nelles, who ſailed to the weſt coaſt of Greenland, from which he carried off three women of the country. Other efforts have been made, under the encouragement of the Daniſh king, for the diſcovery and recovery of the old Iceland colony in Greenland: but all of them miſcarried, and people began to look upon ſuch expeditions as wild and chimerical. At length the Greenland company at Bergen in Norway, tranſported a colony to the weſtern coaſt, about the 64th degree of latitude; and theſe Norwegians ſailed in the year 1712, accompanied by the Reverend Hans Egede, to whoſe care, ability, and preciſion, we owe the beſt and moſt authentic account of modern Greenland. This gentleman endeavoured to reach the eaſtern diſtrict, by coaſting ſouthwards, and advanced as far as the States Promontory: but the ſeaſon of the year, and continual ſtorms, obliged him to return; and as he could not even find the Strait of Frobiſher, he concluded that no ſuch place ever exiſted. In the year 1724, a ſhip, being equipped by the company, ſailed on this diſcovery, with a view to land on the eaſt ſide oppoſite to Iceland; but the vaſt ſhoals of ice, which barricadoed that part of the coaſt, rendered this ſcheme impracticable. His Daniſh majeſty, in the year 1728, cauſed horſes to be tranſported to Greenland, in hope that the ſettlers might by their means travel over land to the eaſtern diſtrict; but the icy mountains were found impaſſable. Finally, lieutenant Richards, in a ſhip which had wintered near the new Daniſh colony, attempted, in his return to Denmark, to land on the eaſtern ſhore; but all his endeavours proved abortive.

Mr Egede is of opinion, that the only practicable method of reaching that part of the country, will be to coaſt north-about in ſmall veſſels, between the great flakes of ice and the ſhore; as the Greenlanders have declared, that the currents continually ruſhing from the bays and inlets, and running ſouth-weſtwards along the ſhore, hinder the ice from adhering to the land; ſo that there is always a channel open, through which veſſels of ſmall burden might paſs, eſpecially if lodges were built at convenient diſtances on the ſhore, for the convenience and direction of the adventurers.

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That part of the country which is now viſited and ſettled by the Danes and Norwegians, lies between the 64th and 68th degrees of north latitude; and thus far it is ſaid the climate is temperate. In the ſummer, which continues from the end of May to the middle of September, the weather is warm and comfortable, while the wind blows eaſterly; though even at this time ſtorms frequently happen, which rage with incredible violence; and the ſea-coaſts are infeſted with fogs that are equally diſagreeable and unhealthy. Near the ſhore, and in the bays and inlets, the low land is clothed with the moſt charming verdure; but the inland mountains are perpetually covered with ice and ſnow. To the northward of the 68th degree of latitude the cold is prodigiouſly intenſe; and towards the end of Auguſt all the coaſt is covered with ice, which never thaws till April or May, and ſometimes not till the latter end of June. Nothing can exhibit a more dreadful, and at the ſame time a more dazzling appearance, than thoſe prodigious maſſes of ice that ſurround the whole coaſt in various forms, reflecting a multitude of colours from the ſun-beams, and calling to mind the enchanted ſcenes of romance. Such proſpects they yield in calm weather; but when the wind begins to blow, and the waves to riſe in vaſt billows, the violent ſhocks of thoſe pieces of ice daſhing againſt one another, fill the mind with horror.—Greenland is ſeldom viſited with thunder and lightning, but the *Aurora Borealis* is very frequent and bright. At the time of new and full moon, the tide riſes and falls upon this coaſt about three fathoms; and it is remarkable, that the ſprings and fountains on ſhore riſe and fall with the flux and reflux of the ocean.

The ſoil of Greenland varies like that of all other mountainous countries. The hills are very barren, being indeed frozen throughout the whole year; but the valleys and low grounds, eſpecially near the ſea, are rich and fruitful. The ancient Norwegian chronicles inform us, that Greenland formerly produced a great number of cattle; and that conſiderable quantities of butter and cheeſe were exported to Norway; and, on account of their peculiar excellency, ſet apart for the king's uſe. The ſame hiſtories inform us, that ſome parts of the country yielded excellent wheat; and that large oaks were found here, which carried acorns as big as apples. Some of theſe oaks ſtill remain in the ſouthern parts, and in many places the marks of ploughed land are eaſily perceived. At preſent, however, the country is deſtitute of corn and cattle, though in many places it produces excellent paſture; and, if properly cultivated, would probably yield grain alſo. Mr Egede ſowed ſome barley in a bay adjoining to the Daniſh colony. It ſprang up ſo faſt, that, by the latter end of July it was in the full ear; but being nipped by a night-froſt, it never arrived at maturity. This ſeed was brought from Bergen, where the ſummer is of greater heat and duration than in Greenland; but in all probability the corn which grows in the northern parts of Norway would alſo thrive here. Turnips and coleworts of an excellent taſte and flavour are alſo produced here. The ſides of the mountains near the bays are clothed with wild thyme, which diffuſes its fragrance to a great diſtance. The herb tormentil is very common in this country, and likewiſe many others not deſcribed by the botaniſts. Among the fruits of Greenland we number juniper-berries, blue-berries, bil-berries, and bramble-berries.

Greenland is thought to contain many mines of metal, though none of them are wrought. To the ſouthward of the Daniſh colony are ſome appearances of a mine of copper. Mr Egede once received a lump of ore from one of the natives; and here he found calamine of a yellow colour. He once ſent a conſiderable quantity of ſand of a yellow colour, intermixed with ſtreaks of vermilion, to the Bergen company. They probably found their account in this preſent; for they deſired him by a letter to procure as much of that ſand as poſſible: but he was never able to find the place where he ſaw the firſt ſpecimen. It was one of the ſmalleſt among a great number of iſlands; and the mark he had ſet up was blown down by a violent ſtorm. Poſſibly this might be the ſame mineral of which Capt. Frobiſher brought ſo much to England. This country produces rock-cryſtals both red and white, and whole mountains of the aſbeſtos or incombuſtible flax. Around the colony, which is known by the name of *Good Hope*, they find a kind of baſtard marble of various colours, which the natives form into bowls, lamps, pots, &c. All that has been ſaid of the fertility of Greenland, however, muſt be underſtood only of that part which lies between the 60th and 65th degrees of latitude. The moſt northern parts are totally deſtitute of herbs and plants. The wretched inhabitants cannot find graſs in ſufficient quantities to ſtuff into their ſhoes to keep their feet warm, but are obliged to buy it from thoſe who inhabit the more ſouthern parts.

The animals which abound moſt in Greenland are rein-deer, foxes, hares, dogs, and white bears. The hares are of a white colour, and very fat; the foxes are of different colours, white, greyiſh, and bluiſh; and ſmaller than thoſe of Denmark and Norway. The natives keep a great number of dogs, which are large, white, or ſpeckled, and rough, with ears ſtanding upright, as is the caſe with all the dogs peculiar to cold climates. They are timorous and ſtupid; and neither bay nor bark, but ſometimes howl diſmally. In the northern parts the natives yoke them in ſledges; which, though heavy laden, they will draw on the ice at the rate of 70 miles in a ſhort winter's day. Theſe poor animals are very ill rewarded for their ſervice; being left to provide for themſelves, except when their maſters happen to catch a great number of ſeals. On theſe occaſions the dogs are regaled with the blood and entrails; at other times, they ſubſiſt, like wild beaſts, upon muſcles and berries. Here alſo are found great numbers of ravens, eagles of a prodigious ſize, faulcons, and other birds of prey; and likewiſe a kind of linnet, which warbles very melodiouſly. Whales, ſword-fiſh, porpoiſes, &c. abound on the coaſts; alſo holybut, turbot, cod, haddock, &c. The more dubious animals alſo, called *mermaids*, *ſea-ſerpents*, and *krakens*, ſaid to be found on the coaſt of Norway, are ſaid likewiſe to dwell in theſe ſeas. Mr Egede aſſures us, that, in the year 1734, the ſea-ſerpent was ſeen off the new Daniſh colony, and raiſed its head maſt-high above the ſurface of the water. See KRAKEN, MERMAID, and *Sea*-SERPENT.

9
Account of the inhabitants.

The people who now inhabit the weſtern coaſt of Greenland, and who, without doubt, are the deſcendants of the ancient *Schrellings*, who exterminated the firſt Iceland colony, bear a near reſemblance to the Samoiedes and Laplanders in their perſons, complexions, and way of life. They are ſhort, brawny, and inclined to corpulency; with broad faces, flat noſes, thick lips, black hair and eyes, and a yellowiſh tawney complexion. They are for the moſt part vigorous and healthy, but remarkably ſhort-lived; few of them reaching the grand climacteric; and many dying in their infancy, and in the prime of youth. They are ſubject to a weakneſs in the eyes, occaſioned by the piercing winds and the glare of the ſnow in the winter-time. The leproſy is known among them, but is not contagious. Thoſe that dwell in the northern parts are miſerably tormented with dyſenteries, rheums, and pulmonary diſorders, boils, and epilepſy. The ſmall-pox being imported among them from Copenhagen in the year 1734, made terrible havoc among theſe poor people, who are utterly deſtitute of any knowledge of the medicinal art, and depend entirely for aſſiſtance upon their *angekuts* or conjurers. In their diſpoſitions the Greenlanders are cold, phlegmatic, indolent, and ſlow of apprehenſion; but very quiet, orderly, and good-natured. They live peaceably together; and have every thing in common, without ſtrife, envying, or animoſity. They are civil and hoſpitable, but ſlovenly to a degree almoſt beyond the Hottentots themſelves. They never waſh themſelves with water; but lick their paws like the cat, and then rub their faces with them. They eat after their dogs without waſhing their diſhes; devour the lice which devour them; and even lick the ſweat, which they ſcrape off from their faces with their knives. The women waſh themſelves with their own urine, which they imagine makes the hair grow; and in the winter-time go out immediately after, to let the liquor freeze upon their ſkin. They will often eat their victuals off the dirty ground, without any veſſel to hold them in; and devour rotten fleſh with the greateſt avidity. In times of ſcarcity they will ſubſiſt on pieces of old ſkin, reeds, ſea-weed, and a root called *tugloronet*, dreſſed with train-oil and fat. The dung of rein-deer taken from the inteſtines, the entrails of partridges, and all ſorts of offals, are counted dainties among theſe ſavages; and of the ſcrapings of ſeals ſkins they make delicate pan-cakes. At firſt they could not taſte the Daniſh proviſions without abhorrence; but now they are become extremely fond of bread and butter, though they ſtill retain an averſion to tobacco and ſpirituous liquors, in which particular they differ from almoſt all ſavages on the face of the earth.

The Greenlanders commonly content themſelves with one wife; who is condemned, as among other ſavage nations, to do all the drudgery, and may be corrected, or even divorced, by the huſband at pleaſure. Heroes, however, and extraordinary perſonages, are indulged with a plurality of wives. Their young women are generally chaſte and baſhful; but at ſome of their feaſts, in the midſt of their jollity, a man retires with his neighbour's wife behind a curtain made of ſkins; and all the gueſts, thus coupled, retire in their turns. The women think themſelves happy if an angekut or prophet will thus honour them with his careſſes. Theſe people never marry within the prohibited degrees of conſanguinity, nor is it counted decent in a couple to marry who have been educated in the ſame family.—They have a number of ridiculous and ſuperſtitious cuſtoms, among which the two following are the moſt remarkable. While a woman is in labour, the goſſips hold a chamber-pot over her head, as a charm to haſten the delivery. When the child is a year old, the mother licks and ſlabbers it all over, to render it, as ſhe imagines, more ſtrong and hardy.

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10 nguage, gion,

All the Greenlanders hitherto known ſpeak the ſame language, though different dialects prevail in different parts of the country. It abounds with double conſonants; and is ſo guttural, that the pronunciation of many words is not to be learned except by thoſe who have been accuſtomed to it from their infancy. The letters C, D, F, Q, and X, are not known in their alphabet. Like the North Americans, and inhabitants of Kamſchatka, they have a great number of long polyſyllables. Their words, nouns as well as verbs, are inflected at the end by varying the terminations without the help of articles; but their language being found defective, they have adopted a good many words from the Norwegian dialect. Notwithſtanding the endeavours of the Daniſh miſſionaries, they have no great reaſon to boaſt of the proſelytes they have made of the natives of Greenland. Theſe ſavages pay great deference and reſpect to the Danes, whom indeeed they obey as their maſters, and hear the truths of the Chriſtian religion expounded without doubting the veracity of their teachers; but at the ſame time they liſten with the moſt mortifying indifference, without being in the leaſt influenced by what they have heard. They believe in the immortality of the ſoul, and the exiſtence of a ſpirit whom they call *Torngarſuk*; but of whom they have formed the moſt ridiculous notions. The Angekuts, who are ſuppoſed to be his immediate miniſters, differ concerning the principles of his exiſtence; ſome affirming that he is without form or ſhape; others, that he has the ſhape of a bear; others, that he has a large human body with only one arm; while others affirm that that he is no larger than a man's finger, with many other abſurdities of a ſimilar kind. They have alſo a peculiar kind of mythology, by which they believe all the elements to be full of ſpirits, from among which every one of their prophets is ſupplied with a familiar which they name *Torngack*, and who is always ready when ſummoned to his aſſiſtance.

The Greenlanders are employed all the year round either in fiſhing or hunting. At ſea they purſue whales, morſes, ſeals, fiſh for eating, and ſea-fowl. On ſhore they hunt the rein-deer in different parts of the country. They drive theſe animals, which feed in large herds, into a narrower circle or defile, where they are eaſily ſlain with arrows. Their bow is made of fir-tree, wound about with the twiſted ſinews of animals: the ſtring is compoſed of the ſame ſtuff, or of ſeal-ſkin: the arrow is a good fathom in length, pointed with a bearded iron, or a ſharp bone; but thoſe with which they kill birds are blunt, that they may not tear the fleſh. Sea-fowls they kill with lances, which they throw to a great diſtance with ſurpriſing dexterity. Their manner of catching whales is quite different from that practiſed by the Europeans. About 50 perſons, men and women, ſet out in one long boat, which is called a *kone-boat*, from *kone* a "woman," becauſe it is rowed by females only. When they find a whale, they ſtrike him with harpoons, to which are faſtened with long lines ſome ſeals ſkins blown up like bladders. Theſe, by floating on the ſurface, not only diſcover the back of the whale, but hinder him from diving under water for any length of time. They continue to purſue him until he loſes ſtrength, when they pierce him with ſpears and lances till he expires. On this occaſion they are clad in their ſpring-coats conſiſting of one piece, with gloves, boots, caps made of ſeal-ſkin ſo cloſely laced and ſewed that they keep out water. Thus accoutred, they leap into the ſea; and begin to ſlice off the fat, even under water, before the whale is dead.—They have many different ways of killing ſeals; namely, by ſtriking them with a ſmall harpoon equipped alſo with an air-bag; by watching them when they come to breathe at the air-holes in the ice, and ſtriking them with ſpears; by approaching them in the diſguiſe of their own ſpecies, that is, covered with a ſeal-ſkin, creeping upon the ice, and moving the head from ſide to ſide as the ſeals are accuſtomed to do. By this ſtratagem the Greenlander moves towards the unſuſpecting ſeal, and kills him with a ſpear. The Greenlanders angle with lines made of whale-bone cut very ſmall, by means of which they ſucceed wonderfully. The Greenland canoe, like that uſed in Nova-Zembla and Hudſon's bay, is about three fathoms in length, pointed at both ends, and three quarters of a yard in breadth. It is compoſed of thin rafts faſtened together with the ſinews of animals. It is covered with dreſſed ſeal-ſkins both below and above, in ſuch a manner, that only a circular hole is left in the middle, large enough to admit the body of one man. Into this the Greenlander thruſts himſelf up to the waiſt, and faſtens the ſkin ſo tight about him that no water can enter. Thus ſecured, and armed with a paddle broad at both ends, he will venture out to ſea in the moſt ſtormy weather to catch ſeals and ſea-fowl; and if he is overſet, he can eaſily raiſe himſelf by means of his paddle. A Greenlander in one of theſe canoes, which was brought with him to Copenhagen, outſtripped a pinnace of 16 oars, manned with choice mariners.—The kone-boat is made of the ſame materials, but more durable; and ſo large, that it will contain 50 perſons with all their tackle, baggage, and proviſions. She is fitted with a maſt, which carries a triangular ſail made of the membranes and entrails of ſeals, and is managed without the help of braces and bowlings. Theſe kones are flat-bottomed, and ſometimes 60 feet in length. The men think it beneath them to take charge of them; and therefore they are left to the conduct of the women, who indeed are obliged to do all the drudgery, including even the building and repairing their houſes, while the men employ themſelves wholly in preparing their hunting implements and fiſhing tackle.

This country is but thinly inhabited. In the winter time the people dwell in huts built of ſtone or turf: on the one ſide are the windows, covered with the ſkins of ſeals or rein-deer. Several families live in one of theſe houſes, poſſeſſing each a ſeparate apartment, before which is a hearth with a great lamp placed on a trevit, over which hangs their kettle: above is a rack or ſhelf on which their wet clothes are dried. They burn train-oil in their lamps; and inſtead of wick, they uſe a kind of moſs, which fully anſwers the purpoſe. Theſe fires are not only ſufficient to boil their victuals; but likewiſe produce ſuch a heat, that the whole houſe is like a bagnio. The door is very low, that as little cold air as poſſible may be admitted. The houſe within is lined with old ſkins, and ſurrounded with benches for the conveniency of ſtrangers. In the ſummer-time they dwell in tents made of long poles fixed in a conical form, covered in the inſide with deers ſkins, and on the outſide with ſeals ſkins, dreſſed ſo that the rain cannot pierce them.

11 Eaſt Greenland.

Eaſt Greenland was for a long time conſidered as a part of the continent of Weſt Greenland, but is now diſcovered to be an aſſemblage of iſlands lying between 76° 46′ and 80° 30′ of north latitude, and between 9° and 20° of eaſt longitude. It was diſcovered by Sir Hugh Willoughby in the 1553, who called it *Groenland;* ſuppoſing it to be a part of the weſtern continent. In 1595, it was again viſited by William Barentz and John Cornelius, two Dutchmen, who pretended to be the original diſcoverers, and called the country *Spitzbergen,* or Sharp Mountains, from the many ſharp-pointed and rocky mountains with which it abounds. They alleged that the coaſt diſcovered by Sir Hugh Willoughby was ſome other country; which accordingly the Hollanders delineated on their maps and charts by the name of *Willoughby Land;* whereas in fact no ſuch land ever exiſted; and long before the voyage of theſe Dutchmen, Stephen Barrows, an Engliſh ſhipmaſter, had coaſted along a deſolate country from N. Lat. 78° to 80° 11′, which was undoubtedly Spitzbergen. The ſea in the neighbourhood of the iſlands of Spitzbergen abounds very much with whales, and is the common reſort of the whale-fiſhing ſhips from different countries, and the country itſelf is frequently viſited by theſe ſhips; but till the late voyage of the Hon. Capt. Phipps, by order of his Majeſty, the ſituation of it was erroneouſly laid down. It was imagined that the land ſtretched to the northward as far as 82° of north latitude; but Capt. Phipps found the moſt northerly point of land, called *Seven Iſlands,* not to exceed 80° 30′ of latitude. Towards the eaſt he ſaw other lands lying at a diſtance, ſo that Spitzbergen plainly apppeared to be ſurrounded by water on that ſide, and not joined to the continent of Aſia, as former navigators had ſuppoſed. The north and weſt coaſts alſo he explored, but was prevented by the ice from ſailing ſo far to the northward as he wiſhed. The coaſt appeared neither habitable nor acceſſible. It is formed of high, barren, black rocks, without the leaſt marks of vegetation; in many places bare and pointed; in others covered with ſnow, appearing even above the clouds. The valleys between the high cliffs were filled with ſnow and ice. "This proſpect," ſays Capt. Phipps, "would have ſuggeſted the idea of perpetual winter, had not the mildneſs of the weather, the ſmooth water, bright ſun-ſhine, and conſtant day-light, given a cheerfulneſs and novelty to the whole of this romantic ſcene." The current ran along this coaſt half a knot an hour, north. The height of one mountain ſeen here was found by geometrical menſuration to be at one time $1503\frac{1}{2}$ feet, at another $1503\frac{8}{10}$ feet. By a barometer conſtructed after De Luc's method, the height was found to be $1588\frac{1}{2}$ feet. On this occaſion Capt. Phipps has the following remarks. "I cannot account for the great difference between the geometrical meaſure and the barometrical according to M. de Luc's calculation, which amounts to 84.7 feet. I have no reaſon to doubt the accuracy of Dr Irving's obſervations, which were made with great care. As to the geometrical meaſure, the agreement of ſo many triangles, each of which muſt have diſcovered even the ſmalleſt error, is the moſt ſatisfactory proof of its correctneſs. Since my return I have tried both the theodolite and barometer, to diſcover whether there was any fault in either; and find them, upon trial, as I had always done before, very accurate."

There is good anchorage in Schmeerenburg harbour, lying in N. Lat. 74° 44′ E. Long. 9° 50′ 45″, in 13 fathom, ſandy bottom, not far from the ſhore, and well ſheltered from all winds. Cloſe to this harbour is an iſland called *Amſterdam Iſland,* where the Dutch uſed formerly to boil their whale-oil; and the remains of ſome conveniency erected by them for that purpoſe are ſtill viſible. The Dutch ſhips ſtill reſort to this place for the latter ſeaſon of the whale-fiſhery. —The ſtone about this place is chiefly a kind of marble, which diſſolves eaſily in the marine acid. There were no appearances of minerals of any kind, nor any ſigns of ancient or modern volcanoes. No inſects, or any ſpecies of reptiles, were ſeen, not even the common earth-worm. There were no ſprings or rivers; but great plenty of water was produced from the ſnow which melted on the mountains.

The moſt remarkable views which theſe dreary regions preſent are thoſe called *Icebergs.* They are large bodies of ice filling the valleys between the high mountains. Their face towards the ſea is nearly perpendicular, and of a very lively light-green colour. One was about 300 foot high, with a caſcade of water iſſuing from it. The black mountains on each ſide, the white ſnow, and greeniſh coloured ice, compoſed a very beautiful and romantic picture. Large pieces frequently broke off from the icebergs, and fell with great noiſe into the water. One piece was obſerved to have floated out into the bay, and grounded in 24 fathom; it was 50 feet high above the ſurface of the water, and of the ſame beautiful colour with the iceberg from which it had ſeparated.

Theſe iſlands are totally uninhabited, though it doth not appear but that human creatures could ſubſiſt on them, notwithſtanding their vicinity to the pole. Eight Engliſh ſailors, who were accidentally left here by a whale-fiſhing ſhip, ſurvived the winter, and were brought home next ſeaſon. The Dutch then attempted to ſettle a colony on Amſterdam iſland above-mentioned; but all the people periſhed, not through the ſeverity of the climate, but of the ſcurvy, owing to the want of thoſe remedies which are now happily diſcovered, and which are found to be ſo effectual in preventing and curing that dreadful diſeaſe.—The late account alſo of ſix Ruſſian ſailors who ſtaid four years in this unhoſpitable country, affords a deciſive proof, that a colony might be ſettled on Eaſt Greenland, provided the doing ſo could anſwer any good purpoſe.

GREENOCK, a ſea-port town of Scotland, and one of the ports of the city of Glaſgow. It is ſituated 22 miles from that city; and was formerly called the *Bay of St Laurence.* The Frith of Clyde here expands into a fine baſon four miles wide, and is landlocked on all ſides.

GREENWICH, a town of the county of Kent, in England, pleaſantly ſituated on the bank of the

Thames, about five miles eaſt from London. Here was formerly a royal palace, built by Humphry Duke of Glouceſter, enlarged by Henry VII. and completed by Henry VIII. The latter often choſe this town for his place of reſidence; as did alſo the Queens Mary and Elizabeth, who were born in it. This palace, however, is now pulled down; and what goes by the name of *palace* at preſent, ſerves for apartments for the governor of the hoſpital, and the ranger of the park. This park was walled and planted by Charles II. and hath a hill in the middle, whence there is a noble proſpect of London, the Thames, and ſhipping; alſo a Royal Obſervatory, furniſhed with a complete ſet of aſtronomical obſervations. This obſervatory in the lateſt Engliſh maps is accounted the place of the firſt meridian; and the degrees of longitude, either eaſt or weſt, are accounted from it. But the moſt remarkable building about Greenwich, is the hoſpital for ſuperannuated and diſabled ſeamen, and likewiſe for their widows and children. It is a very noble ſtructure; the wing next London being part of the palace which King Charles II. intended to have erected for himſelf, and which coſt him 36,000 pounds; being finely adorned with all the decorations of painting, ſculpture, and architecture. About 2000 old diſabled ſeamen are maintained in it. The nurſes, who muſt be ſeamens widows, have ten pounds a-year, and ſuch as attend the infirmary, two ſhillings a-week more. Beſides private benefactions, to the amount of about L. 60,000, the parliament, in the year 1732, ſettled upon this hoſpital the earl of Derwentwater's eſtate, to the value of L. 6000 *per annum*. The hall of the hoſpital is finely painted by Sir James Thornhill. All ſtrangers who ſee it, pay twopence each; and this income is applied to the ſupport of the mathematical ſchool for the ſons of ſailors. For the better ſupport of this hoſpital, every ſeaman in the royal navy, and in the merchant ſervice, pays ſixpence a-month, ſtopped out of their pay, and delivered in at the ſix-penny receiver's office in Tower-hill.—On this account, a ſeaman, who can produce an authentic certificate of his being diſabled, and rendered unfit for ſervice, by defending any ſhip belonging to his Majeſty's Britiſh ſubjects, or in taking any ſhip from the enemy, may be admitted into this hoſpital, and receive the ſame benefit from it as if he had been in his Majeſty's immediate ſervice. Beſides the ſeamen and widows above-mentioned, about 100 boys, the ſons of ſeamen, are bred up for the ſervice of the royal navy; but there are no out-penſioners as at Chelſea. Each of the mariners has a weekly allowance of bread, beef, mutton, peaſe, cheeſe, butter, and beer, and one ſhilling a-week tobacco-money. The tobacco-money of the boatſwains is two ſhillings and ſixpence a-week each, that of their mates one ſhilling and ſixpence, and that of the other officers in proportion to their rank. Each common penſioner alſo, once in two years, has a ſuit of blue clothes, a hat, three pair of ſtockings, two pair of ſhoes, five neck-cloths, three ſhirts, and two night-caps. The principal officers of the houſe, are a governor, lieutenant-governor, treaſurer, three captains, ſix lieutenants, two chaplains, a phyſician, and ſurgeon, a clerk of the checque, and an auditor, who have handſome ſalaries. The profits of the market belong to this hoſpital, whoſe governors have the direction of it. The firſt hoſpital founded by an Engliſh Proteſtant, was at Greenwich, in 1560, by one Mr Lambard, (author of a book called the *Perambulation of Kent*), for twenty poor.

GREGARIOUS, among zoologiſts, a term applied to ſuch animals as do not live ſolitary, but aſſociate in herds or flocks.

GREGORIAN CALENDAR, that which ſhews the new and full moon, with the time of Eaſter, and the moveable feaſts depending thereon, by means of epacts diſpoſed through the ſeveral months of the Gregorian year. See ASTRONOMY, n° 295.

GREGORIAN *Year*. See ASTRONOMY, n° 295.

GREGORY the Great, was born at Rome, of a patrician family. He diſcovered ſuch abilities in the exerciſe of the ſenatorial employments, that the emperor Juſtin the younger appointed him prefect of Rome. Pope Pelaſgius II. ſent him nuncio to Conſtantinople, to demand ſuccours againſt the Lombards. When he thought of enjoying a ſolitary life, he was elected Pope by the clergy, the ſenate, and the people of Rome. Beſides his learning and diligence in inſtructing the church, both by writing and preaching, he had a very happy talent in winning over princes in favour of the temporal as well as ſpiritual intereſt of religion. He undertook the converſion of the Engliſh, and ſent over ſome monks of his order, under the direction of Auguſtin their abbot. His morality with reſpect to the chaſtity of churchmen was very rigid, aſſerting that a man who had ever known a woman ought not to be admitted to the prieſthood; and he always cauſed the candidates for it to be examined upon that point. He likewiſe vigorouſly exerted himſelf againſt ſuch as were found guilty of calumny. However, he flattered the emperor Phocas, while his hands were yet reeking with the blood of Mauritius, and of his three children, who had been butchered in his ſight. He likewiſe flattered Brunehaut, a very wicked queen of France. He is accuſed of deſtroying the noble monuments of ancient Roman magnificence, that thoſe who viſited the city might not attend more to the triumphal arches, than to holy things; and burnt a multitude of heathen books, Livy in particular. He died in 604.

GREGORY of Nazianzen, ſirnamed the *Divine*, was one of the moſt illuſtrious ornaments of the Greek church in the fourth age. He was made biſhop of Conſtantinople in 397; but finding his election conteſted by Timotheus, archbiſhop of Alexandria, he voluntarily reſigned his dignity about 382, in the general council of Conſtantinople. His works are extant, in two volumes, printed at Paris in 1609. His ſtyle is ſaid to be equal to that of the moſt celebrated orators of ancient Greece.

GREGORY (Theodorus), ſurnamed *Thaumaturgus* on account of his miracles, was the ſcholar of Origen; and was elected biſhop of Neocæſarea, the place of his birth, about the year 240, during his abſence. He aſſiſted at the council of Antioch, in 255, againſt Paulus Samoſetanus; and died in 270. He had the ſatisfaction of leaving only ſeventeen idolaters in his dioceſe, where there were but ſeventeen Chriſtians when he was ordained. There is ſtill extant of his, A gratulatory oration to Origen, A canonical epiſtle, and ſome other works.

GREGORY, biſhop of Nyſſa, one of the fathers of the church, and author of the Nicene creed, was born in Cappadocia, about the year 331. He was choſen biſhop of Nyſſa in 372, and baniſhed by the emperor Valens for adhering to the council of Nice. He was nevertheleſs afterwards employed by the biſhops in ſeveral important affairs, and died in 396. He wrote, Commentaries on the Scriptures; Sermons on the myſteries; Moral diſcourſes; Dogmatical treatiſes; Panegyrics on the ſaints; ſome letters on church-diſcipline; and other works. His ſtyle is very allegorical and affected.

GREGORY of Tours, or *Georgius Florentius Gregorius*, one of the moſt illuſtrious biſhops and celebrated writers of the ſixth century, was deſcended from a noble family in Auvergne. He was educated by his uncle Gallus, biſhop of Clermont; and diſtinguiſhed himſelf ſo much by his learning and virtue, that in 573 he was choſen biſhop of Tours. He afterwards went to Rome to viſit the tomb of the apoſtles, where he contracted a friendſhip with Gregory the Great, and died in 595. This author was extremely credulous with regard to miracles. He wrote, 1. The hiſtory of France. 2. The lives of the ſaints; and other works. The beſt edition is that publiſhed by Father Rumart, 1699.

GREGORY (James), an eminent mathematical genius of Scotland, was born at Aberdeen in 1639, and educated at that univerſity. He made a good progreſs in claſſical learning: but being more delighted with philoſophical reſearches, the works of Des Cartes and Kepler were his principal ſtudy; and he began early to make improvements on their diſcoveries in optics. The firſt of theſe improvements was the invention of the reflecting teleſcope, which ſtill bears his name; and which was ſo happy a thought, that that has given occaſion to the moſt conſiderable improvements made in optics ſince the invention of the teleſcope.

He publiſhed the conſtruction of this inſtrument in 1663, at the age of 24; and coming next year or the year after that to London, he became acquainted with Mr John Collins, who recommended him to the beſt optic glaſs-grinders there, in order to have it executed. But as this could not be done for want of ſkill in the artiſts to grind a plate of metal for the object ſpeculum into a true parabolic concave, which the deſign required, he was much diſcouraged thereby; and after a few imperfect trials made with an ill poliſhed ſpherical one, which did not ſucceed to his wiſh, he dropped the purſuit, and reſolved to make the tour of Italy, then the mart of mathematical learning, in the view of proſecuting his favourite ſtudy with greater advantage.

He had not been long abroad, when the ſame inventive genius which had before ſhewed itſelf in practical mathematics, carried him to ſome new improvements in the ſpeculative part. The ſublime geometry on the doctrine of curves was then hardly paſt its infant ſtate; and the famed problem of ſquaring the circle ſtill continued a reproach to it, when our author diſcovered a new analytical method of ſumming up an infinite converging ſeries, whereby the area of the hyperbola, as well as of the circle, may be computed to any degree of exactneſs. He was then at Padua; and getting a few copies of his invention printed there in 1667, he ſent one to his friend Mr Collins, who communicated it to the Royal Society, where it met with the commendations of lord Brounker and Dr Wallis. Our author printed it at Venice, and publiſhed it the following year 1668; together with another piece, wherein he firſt of any one entertained the public with an account of the transformation of curves. An account of this piece was alſo read by Mr Collins before the Royal Society, of which Mr Gregory, being returned from his travels, was choſen a member, and communicated to them an account of the controverſy in Italy about the motion of the earth, which was denied by the famous aſtronomer Riccioli and his followers.

The ſame year his quadrature of the circle being attacked by the celebrated Mr Huygens, a controverſy aroſe between theſe two eminent mathematicians, in which our author produced ſome improvements of his ſeries.

In 1672, Sir Iſaac Newton, in his wonderful diſcoveries on the nature of light, having contrived a new reflecting teleſcope, made ſeveral objections to Mr Gregory's. This gave occaſion to a controverſy betwixt theſe two philoſophers, which was carried on this and the following year in the moſt amicable manner on each ſide. Mr Gregory defended his own conſtruction, but gave his antagoniſt the whole honour of having made the catoptric teleſcopes preferable to the dioptric ones; ſhewing that the imperfections in theſe inſtruments were not ſo much owing to a defect in the object ſpeculum, as to the different refrangibility of the rays of light. In the courſe of this diſpute our author deſcribed a burning concave mirror, which was approved by Sir Iſaac, and is ſtill in good eſteem.

All this while he attended the proper buſineſs of his profeſſorſhip with great diligence; which, taking up the greateſt part of his time, eſpecially in the winter ſeaſon, hindered him in the purſuit of his proper ſtudies. Theſe, however, led him to farther improvements in the invention of infinite ſeries, which he occaſionally communicated to his friend and correſpondent Mr Collins, who might have had the pleaſure of receiving many more, had not our profeſſor's life been cut ſhort by a fever in December 1675, at the age of 36 years.

Beſides the inventions already mentioned, he was the firſt who gave a geometrical demonſtration of lord Brounker's ſeries for ſquaring the hyperbola, as it had been explained by Mercator in his Logarithmotechnia. He was likewiſe the firſt who demonſtrated the meridian line to be analogous to a ſcale of logarithmic tangents of the half complement of latitude. He alſo invented, and demonſtrated geometrically, by the help of the hyperbola, a very ſwift converging ſeries for making the logarithms, and therefore recommended by Dr Halley as very proper for practice. He alſo ſent to Mr Collins the ſolution of the famous Keplerian problem by an infinite ſeries. He found out a method of drawing tangents to curves geometrically, without any previous calculations. He gave a rule for the direct and inverſe method of tangents, which ſtands upon the ſame principle (of exhauſtions) with the fluxions, and differs not much from it in the method of application. He likewiſe gave a ſeries for the length of the area of a circle from the tangent, and *vice verſa*; as alſo for the ſecant and logarithmic tangent and ſecant, and *vice verſa*. Theſe, with others for certifying or meaſuring the length of the elliptic and hyperbolic curves, were ſent to Mr Collins in return for ſome received from him of Sir Iſaac Newton's; and their elegancy being admirable, above whatever he had produced before, and after the manner of Sir Iſaac Newton, gave room to think that he had improved himſelf greatly by that maſter, whoſe example he followed in giving his ſeries in ſimple terms, independent of each other. Theſe ſeveral inventions are contained, 1. In his *Optica promota*, &c. 4to. edit. 1663. 2. *Vera circuli & hyperbolæ quadratura*, Padua 1667. 3. *Geometriæ pars univerſalis*, &c. 1667, 4to. 4. Several letters and papers printed in the *Philoſophical Tranſactions*; the *Journal des Scavans*; the *Commerc. epiſtol. Jo. Collins & alior*, 1715, 8vo. and in the Appendix to the Engliſh edition of Dr David Gregory's *Elements of Optics*, 1735, 8vo. by Dr Deſaguliers.

Gregory (David), nephew of the preceding, was born June 24th, 1661, at the ſame place, where he alſo received the firſt grounds of his learning; but was afterwards removed to Edinburgh, and took the degree of maſter of arts in that univerſity. The great advantage of his uncle's papers induced his friends to recommend the mathematics to him; and he had a natural ſubtilty of genius, which particularly fitted him for that ſtudy, to which he applied with indefatigable induſtry; and ſucceeded ſo well, that he was advanced to the mathematical chair at Edinburgh, at the age of 25: and the ſame year he publiſhed a treatiſe entitled, *Exercitatio geometrica de dimenſione figurarum*, Edinb. 1684, 4to.

He had already ſeen ſome hints in his uncle's papers concerning Sir Iſaac Newton's method, of which he made the beſt uſe he could, and the advantage he found thereby raiſed an ardent deſire in him to ſee that method publiſhed. Under this impatient expectation, the *Principia* was no ſooner out in 1687, but our author took it in hand, and preſently made himſelf ſo much maſter of it as to be able to read his profeſſorial lectures upon the philoſophy contained in it; and cauſing his ſcholars to perform their exerciſes for their degrees upon ſeveral branches of it, became its firſt introducer into the ſchools.

He continued at Edinburgh till the year 1691; when hearing the news of Dr Bernard's intention to reſign the Savilian profeſſorſhip at Oxford, he left Scotland, and, coming to London, was admitted a member of the Royal Society. Proceeding to Oxford, he was elected aſtronomical profeſſor there, having been firſt admitted of Baliol-college, incorporated maſter of arts, and created doctor of phyſic. He had no reliſh for the technical part of his profeſſion, and was ſeldom ſeen in the obſervatory. His genius lay more to geometry, in which he diſtinguiſhed himſelf both by his *Elements of Optics*, and of *Phyſical and geometrical aſtronomy*. This laſt is reckoned his maſterpiece; and having finiſhed it in 1702, he immediately engaged in carrying on the noble deſign of his predeceſſor, Dr Bernard, to print all the works of the ancient mathematicians; the firſt fruits of which appeared in an edition of Euclid's works in Greek and Latin, in folio, the following year; and, in the ſame deſign, he afterwards joined with his colleague Dr Halley, in preparing an edition of *Apollonius's Conics*. Dr Bernard had the materials for the firſt four books, which our author undertook to complete, but was prevented by his death, which happened Oct. 16. 1710.

Gregory (Dr John), profeſſor of medicine in the univerſity of Edinburgh, was born in May 1725. His father was profeſſor of medicine in the King's-college, Aberdeen; and his grandfather was profeſſor of mathematics, firſt at St Andrews, and afterwards at Edinburgh. Thus Dr Gregory was the third profeſſor of his family in a lineal deſcent. But it deſerves to be remarked, that from his great-grandfather David Gregory, eſq; of Kinairdy in Aberdeenſhire, he was the 15th deſcendant who had held a profeſſorſhip in a Britiſh univerſity.

Dr Gregory began the ſtudy of medicine at Aberdeen; which he afterwards proſecuted, firſt at Edinburgh, next at Leyden, and then at Paris. In the 20th year of his age he was elected profeſſor of philoſophy in king's-college, Aberdeen; and had, at the ſame time, the degree of doctor of medicine conferred upon him. In the year 1756, upon the death of his brother Dr James Gregory, who had ſucceeded his father as profeſſor of medicine, he was elected to that chair. But about the beginning of the year 1765, he left Aberdeen, and came to Edinburgh. Soon after this he was appointed profeſſor of the practice of medicine in the univerſity there, in the room of Dr Rutherford, who reſigned in his favour. The year following, upon the death of Dr White, he was nominated firſt phyſician to his majeſty for Scotland. Thus, at the time of his death, beſides very extenſive practice, he enjoyed the higheſt and moſt important offices in the way of his profeſſion, which could be obtained in his native country.

Theſe diſtinguiſhing honours were univerſally allowed to be the juſt reward of ſingular merit. Of this the writings which he publiſhed will bear ample teſtimony to future ages. His firſt publication, which is entitled, *A comparative view of the faculties of man with thoſe of the animal world*, made its appearance in 1765. This production, while it demonſtrates the author to have been a philoſopher whoſe reflections were juſt and original, at the ſame time diſplays a liberality of ſentiment ſeldom to be equalled. Such was the avidity with which it was read, that in the ſpace of two years it went through four editions; and, while it was peruſed by all with peculiar pleaſure, it was honoured by thoſe diſtinguiſhed for taſte and literature with high approbation.

In the year 1770, a ſecond work of Dr Gregory's made its appearance; but without his conſent, and even contrary to his inclination. His preliminary lectures on the practice of phyſic were heard by his pupils with univerſal ſatisfaction. From a copy of theſe lectures taken down in ſhort-hand, there was publiſhed a book entitled, "Obſervations on the duties and office of a phyſician, and on the method of proſecuting inquiries in philoſophy." Although theſe lectures were not intended for the preſs, and did not paſs through the finiſhing hand of the author before they were preſented to the public; yet ſuch was the matter they contained, that, had they appeared in a much worſe dreſs, they could have done him no diſcredit. In theſe lectures, by the moſt forcible arguments, he laboured to convince his pupils, that a phyſician who ſtudies the principles of his profeſſion, who has an extenſive acquaintance with every branch of natural knowledge, and who properly applies his knowledge, muſt have an infinite advantage, as a practitioner, over one who is ignorant of the theory of medicine, and of every ſcience connected with it. He endeavoured to perſuade them, that genius and ſenſe, which indeed are the peculiar gifts of heaven, are yet capable of high improvement; and that, without improvement, they can be but of little account either to the public, or to an individual. In ſhort, no argument was ommitted which could prompt them to ſtudy medicine with attention and ardour, and afterwards to practiſe it with prudence and humanity.—Dr Gregory, however, was diſſatisfied with the dreſs in which this work appeared. Soon after, therefore, he publiſhed an edition of it himſelf, in which his former ſentiments are ſet off with all the advantages which can be derived from a correct and elegant ſtyle. His laſt publication, *Elements of the practice of phyſic*, was intended as a ſyllabus to his lectures; and in it he meant to have comprehended all the diſeaſes of which he uſually treated. But not having leiſure to finiſh the whole, he was obliged to ſtop at thoſe diſeaſes which are uſually reckoned febrile. Although this work appears with all thoſe diſadvantages, under which every text muſt labour; yet it ſufficiently ſhews how the author thought and acted in the exerciſe of his profeſſion. The world was deprived of this excellent perſon in February 1774. He left behind him a ſmall, but ineſtimable production, under the title of *A father's legacy to his daughters*, deſigned for their private inſtructions; but rendered a common bequeſt by the benevolence of his eldeſt ſon, who gave it to the public after his death. The maxims and advices it contains, which are claſſed under the general topics—of religion, of conduct and behaviour, of amuſements, of friendſhip, love, and marriage,—are as juſt as they are important; and appear to be the dictates of a mind which had long been inviolably attached to the intereſts of virtue; the reſults of an obſervation equally intereſting, extenſive, and mature. They are delivered in a ſtyle which is ſimple and unadorned; yet chaſtiſed with that elegance and correctneſs which reſult from the operations of a mind habitually governed by a refined taſte, and the cleareſt judgement.

Had Dr Gregory lived to a more advanced age, the world would probably have been favoured with other works no leſs honourable to the author than beneficial to mankind. But his extenſive practice, and his zeal in his duty as a profeſſor, occupied the greateſt part of his time.

To pretend to enumerate the many advantages which his pupils derived from him in the capacity of a teacher, would exceed our limits. Let it ſuffice to ſay, that, from the extent of his views, from the juſtice and importance of his obſervations, and from the force and accuracy of his reaſoning, every hearer obtained the moſt thorough conviction of his abilities, and retired from academical labours both pleaſed and inſtructed.

To conclude: Dr Gregory was not more eminent as a phyſician, than he was amiable and reſpectable as a man. With the mathematical genius of his family he united a correct taſte for the fine arts, and a high reliſh for every ſocial virtue. He poſſeſſed a clear and vigorous underſtanding; a chaſte and lively imagination; and an affectionate and feeling heart: and while he was diſtinguiſhed for paternal and conjugal attachment, he was a conſtant friend to poverty and diſtreſs, and an unwearied patron of ſcience and virtue.

GRE-HOUND. See CANIS.—Among a litter of gre-hound puppies, the beſt are always thoſe which are lighteſt. Theſe will make the nimbleſt dogs as they grow up. The gre-hound is beſt for open countries where there is little covert. In theſe places there will ſometimes be a courſe after a hare of two or three miles or more, and both the dogs and the game in ſight all the while. It is generally ſuppoſed that the gre-hound bitch will beat the dog in running: but this ſeems to be an error; for the dog is both longer-made, and conſiderably ſtronger, than the bitch of the ſame kind. In the breeding theſe dogs the bitch is principally to be regarded; for it is found by experience, that the beſt dog and a bad bitch will not get ſo good puppies as an indifferent dog with a good bitch. The dog and bitch ſhould be as nearly as may be of the ſame age; and for the breeding of fine and perfect dogs, they ſhould not be more than four years old. An old bitch may be uſed with a young dog, but the puppies of a young bitch and an old dog will never be good for any thing.

The general food for a gre-hound, ought to be chippings or raſpings of bread, with ſoft bones and griſtles; and thoſe chippings ought always to be ſoaked in beef or mutton broth.

The proper exerciſe for a gre-hound is courſing him three times a-week, and rewarding him with blood; which will animate him in the higheſt degree, and encourage him to proſecute his game. But the hare alſo ſhould ever have fair play. She ſhould have the law, as it is called; that is, have leave to run about twelve ſcore yards before the dog is ſlipped at her, that he may have ſome difficulty in the courſe, and not pick up the game too eaſily. If he kills the hare, he muſt never be ſuffered to tear her; but ſhe muſt be taken from him, his mouth cleaned of the wool, and the liver and lights given him by way of encouragement. Then he is to be led home, and his feet waſhed with butter and beer, and about an hour after he is to be fed.

When the dog is to be taken out to courſe, he ſhould have nothing in the morning but a toaſt and butter, and then he is to be kennelled till taken out to the field. The kennelling theſe dogs is of great uſe, always giving them ſpirit and nimbleneſs when they are let looſe: and the beſt way of managing a fine gre-hound is, never to let him ſtir out of the kennel, except at the times of feeding, walking, or courſing.

GRENADA, one of the Caribbee iſlands, lying in W. Long. 61. 40. N. Lat. 12. 0. It is the laſt of the Windward Caribbees; and lies 30 leagues north of New Andaluſia, on the continent. According to ſome, it is 24 leagues in compaſs; according to others, only 22; and it is ſaid to be 30 miles in length, and in ſome places 15 in breadth. The chief port is called *Lewis;* and ſtands on the weſt ſide of the iſland, in the middle of a large bay, with a ſandy bottom. It is pretended that 1000 barks, from 300 to 400 tons, may ride ſecure from ſtorms; and that 100 ſhips, of 1000 tons each, may be moored in the harbour. A large round baſon, which is parted from it by a bank of ſand, would contain a conſiderable number of ſhips, if the bank was cut through: but by reaſon of it, the large ſhips are obliged to paſs within 80 paces of one of the mountains lying at the mouth of the harbour; the other mountain lying about half a mile diſtant. The iſland abounds with wild game and fiſh; it produces alſo very fine timber, but the cocoa-tree is obſerved not to thrive here ſo well as in the other iſlands. A lake on a high mountain, about the middle of the iſland, ſupplies it with freſh-water ſtreams. Several bays and harbours lie round the iſland, ſome of which might be fortified to great advantage; ſo that it is very convenient for ſhipping, not being ſubject to hurricanes. The ſoil is capable of producing tobacco, ſugar, indigo, peaſe, and millet.

In 1638, M. Poincy, a Frenchman, attempted to make a ſettlement in Grenada; but was driven off by the Caribbeans, who reſorted to this iſland in greater numbers than to the neighbouring ones, probably on account of the game with which it abounded. In 1650, Monſ. Parquet, governor of Martinico, carried over from that iſland 200 men, furniſhed with preſents to reconcile the ſavages to them; but with arms to ſubdue them, in caſe they ſhould prove intractable. The ſavages are ſaid to have been frightened into ſubmiſſion by the number of the Frenchmen: but, according to ſome French writers, the chief not only welcomed the new-comers; but in conſideration of ſome knives, hatchets, ſciſſars, and other toys, yielded to Parquet the ſovereignty of the iſland, reſerving to themſelves their own habitations. The Abbe Raynal informs us, that theſe firſt French coloniſts, *imagining* they had purchaſed the iſland by theſe trifles, aſſumed the ſovereignty, and ſoon acted as tyrants. The Caribs, unable to contend with them by force, took their uſual method of murdering all thoſe whom they found in a defenceleſs ſtate. This produced a war; and the French ſettlers having received a reinforcement of 300 men from Martinico, forced the ſavages to retire to a mountain; from whence, after exhauſting all their arrows, they rolled down great logs of wood on their enemies. Here they were joined by other ſavages from the neighbouring iſlands, and again attacked the French, but were defeated anew; and were at laſt driven to ſuch deſperation, that 40 of them, who had eſcaped from the ſlaughter, jumped from a precipice into the ſea, where they all periſhed, rather than fall into the hands of their implacable enemies. From thence the rock was called *le morne des ſauteurs*, or "the hill of the leapers;" which name it ſtill retains. The French then deſtroyed the habitations and all the proviſions of the ſavages; but freſh ſupplies of Caribbeans arriving, the war was renewed with great vigour, and great numbers of the French were killed. Upon this they reſolved totally to exterminate the natives: and having accordingly attacked the ſavages unawares, they inhumanly put to death the women and children, as well as the men; burning alſo their boats and canoes, to cut off all communication between the few ſurvivors and the neighbouring iſlands. Notwithſtanding all theſe barbarous precautions, however, the Caribbees proved the irreconcileable enemies of the French, and their frequent inſurrections at laſt obliged Parquet to ſell all his property in the iſland to the Count de Cerillac in 1657. The new proprietor, who purchaſed Parquet's property for 30,000 crowns, ſent thither a perſon of brutal manners to govern the iſland. He behaved with ſuch inſupportable tyranny, that moſt of the coloniſts retired to Martinico; and the few who remained condemned him to death, after a formal trial. In the whole court of juſtice that tried this miſcreant, there was only one man (called *Archangeli*) who could write. A farrier was the perſon who impeached: and he, inſtead of the ſignatures, ſealed with a horſe-ſhoe; and Archangeli, who performed the office of clerk, wrote round it theſe words in French, "Mark of Mr de la Brie, council for the court."

It was apprehended that the court of France would not ratify a ſentence paſſed with ſuch unuſual formalities; and therefore moſt of the judges of the governor's crimes, and witneſſes of his execution, diſappeared. Only thoſe remained whoſe obſcurity ſcreened them from the purſuit of the laws. By an eſtimate, taken in 1700, there were at Grenada no more than 251 white people, 53 free ſavages or mulattoes, and 525 ſlaves. The uſeful animals were reduced to 64 horſes, and 569 head of horned cattle. The whole culture conſiſted of three plantations of ſugar, and 52 of indigo.——The iſland had been ſold in 1664 to the French Weſt India company for 100,000 livres.

This unfavourable ſtate of the affairs of Grenada was changed in 1714. The change was owing to the flouriſhing condition of Martinico. The richeſt of the ſhips from that iſland were ſent to the Spaniſh coaſts, and in their way touched at Grenada to take in refreſhments. The trading privateers, who undertook this navigation, taught the people of that iſland the value of their ſoil, which only required cultivation. Some traders furniſhed the inhabitants with ſtaves and utenſils to erect ſugar-plantations. An open account was eſtabliſhed between the two colonies. Grenada was clearing its debts gradually by its rich produce; and the balance was on the point of being cloſed, when the war, in 1744, interrupted the communication between the two iſlands, and at the ſame time ſtopped the progreſs of the ſugar-plantations. This loſs was ſupplied by the culture of coffee, which was purſued during the hoſtilities with all the activity and eagerneſs that induſtry ccould inſpire.—The peace of 1748 revived all the labours, and opened all the former ſources of wealth. In 1753 the population of Grenada conſiſted of 1262 white people, 175 free negroes, and 11,991 ſlaves. The cattle amounted to 2298 horſes or mules, 2456 head of horned cattle, 3278 ſheep, 902 goats, and 331 hogs. The cultivation roſe to 83 ſugar-plantations; 2,725,600, coffee-trees; 150,300 cocoa-trees, and 800 cotton-plants. The proviſions conſiſted of 5,740,450 trenches of caſſada; 933,596 banana trees; and 143 ſquares of potatoes and yams. The colony made a rapid progreſs, in proportion to the excellence of its ſoil; but in the courſe of laſt war, the iſland was taken by the Britiſh. At this time one of the mountains at the ſide of *Lewis* harbour was ſtrongly fortified, and might have made a good defence, but ſurrendered without firing a gun; and, by the treaty concluded in 1763, the iſland was ceded to Britain. On this ceſſion, and the management of the colony after that event, the Abbe Raynal has the following remarks.—"This long train of evils [the ambition and miſmanagement of his countrymen] has thrown Grenada into the hands of the Engliſh, who are in poſſeſſion of this conqueſt by the treaty of 1763. But how long will they keep this colony? Or, will it never again be reſtored to France?—England has not made a fortunate beginning. In the firſt enthuſiaſm raiſed by an acquiſition, of which the higheſt opinion had been previouſly formed, every one was eager to purchaſe eſtates there. They ſold for much more than their real value. This caprice, by expelling old coloniſts, who were inured to the climate, has ſent about L. 1,553,000 out of the mother-country. This imprudence has been followed by another. The new proprietors, miſled, no doubt, by national pride, have ſubſtituted new methods to thoſe of their predeceſſors. They have attempted to alter the mode of living among their ſlaves. The negroes, who from their very ignorance are more attached to their cuſtoms than other men, have revolted. It hath been found neceſſary to ſend out troops, and to ſhed blood. The whole colony was filled with ſuſpicions. The maſters who had laid themſelves under a neceſſity of uſing violent methods, were afraid of being burnt or maſſacred in their own plantations. The labours have declined, or been totally interrupted. Tranquillity has at length been reſtored. The number of ſlaves has been increaſed as far as 40,000, and the produce has been raiſed to the treble of what it was under the French government.

"The plantations will ſtill be improved by the neighbourhood of a dozen of iſlands, called the *Grenadines* or *Grenadilloes*, that are dependent on the colony. They are from three to eight leagues in circumference, but do not afford a ſingle ſpring of water. The air is wholeſome. The ground, covered only with thin buſhes, has not been ſcreened from the ſun. It exhales none of thoſe noxious vapours which are fatal to the huſbandman.

"Cariacou, the only one of the Grenadines which the French have occupied, was at firſt frequented by turtle fiſhermen; who, in the leiſure afforded them by ſo eaſy an occupation, employed themſelves in clearing the ground. In proceſs of time, their ſmall number was increaſed by the acceſſion of ſome of the inhabitants of Guadalupe; who, finding that their plantations were deſtroyed by a particular ſort of ants, removed to Cariacou. The iſland flouriſhed from the liberty that was enjoyed there. The inhabitants collected about 1200 ſlaves, by whoſe labours they made themſelves a revenue of near L. 20,000 a year in cotton.—The other Grenadines do not afford a proſpect of the ſame advantages, though the plantation of ſugar is begun there. It has ſucceeded remarkably well at Becouya, the largeſt and moſt fertile of theſe iſlands, which is no more than two leagues diſtant from St Vincent."

All theſe iſlands have lately been reduced again under the power of France, and the inhabitants treated with inhumanity and injuſtice.

GRENADINES, or **Grenadillos**. See the preceding article.

GRENOBLE, a large, populous, and ancient town of Dauphiny in France, with a biſhop's ſee. It contains a great number of handſome ſtructures, particularly the churches and convents. The leather and gloves that are made here are highly eſteemed. It is ſeated on the river Iſere, over which there are two bridges to paſs into that part called *Perriere*, a large ſtreet on the other ſide of the river. E. Lon. 5. 49. N. Lat. 45. 12.

GRESHAM (Sir Thomas), an opulent merchant of London, deſcended from an ancient and honourable family of Norfolk, was born in 1519. He was, as his father had been before him, appointed king's agent at Antwerp, for taking up money of the merchants; and, in 1551, he removed to that city with his family. This employment was ſuſpended on the acceſſion of queen Mary; but, on proper repreſentations, was reſtored to him again. Queen Elizabeth conferred the honour of knighthood upon him, and made him her agent in foreign parts. It was at this time he thought proper to provide himſelf with a manſion-houſe in the city, ſuitable to his ſtation and dignity; with which intention he built that large houſe on the weſt ſide of Biſhopſgate-ſtreet, afterwards known by the name of *Greſham-college*. His father had propoſed building a houſe or exchange for the merchants to meet in, inſtead of walking in the open ſtreet; but this deſign remained for the ſon to accompliſh. Sir Thomas went beyond his father: he offered, if the citizens would provide a proper piece of ground, to build a houſe at his own expence; which being accepted, he fulfilled his promiſe after the plan of the exchange at Antwerp. When the new edifice was opened, the queen (Jan. 29, 1570,) came and dined with the founder; and cauſed a herald with a trumpet to proclaim it by the name of the *Royal Exchange*. In purſuance alſo of a promiſe to endow a college for the profeſſion of the ſeven liberal ſciences, he made a teſtamentary diſpoſition of his houſe in London for that purpoſe; leaving one moiety of the royal exchange to the corporation of London, and the other to the mercer's company, for the ſalaries of ſeven lecturers in divinity, law, phyſic, aſtronomy, geometry, muſic, and rhetoric, at 50l. each *per ann.* He left ſeveral other conſiderable benefactions, and died in 1579.—Thoſe who have drawn Sir Thomas's character obſerve, that he had the happineſs of a mind every way ſuited to his fortune, generous and benign; ready to perform any good actions, and encourage them in others. He was a great friend and patron of our celebrated martyrologiſt John Fox. He was well acquainted with the ancient and ſeveral modern languages; he had a very comprehenſive knowledge of all affairs relating to commerce, whether foreign or domeſtic; and his ſucceſs was not leſs, being in his time eſteemed the higheſt commoner in England. He tranſacted queen Elizabeth's mercantile affairs ſo conſtantly, that he was called *the royal merchant*; and his houſe was ſometimes appointed for the reception of foreign princes upon their firſt arrival at London.

GREVILLE (Fulke) lord Brook, of Beauchamp's Court in Warwickſhire, a poet and miſcellaneous writer, was born in the year 1554, and deſcended from the noble families of Beauchamps of Powick and Willoughby de Brook. In company with his couſin Sir Philip Sidney, he began his education at a ſchool in Shrewſbury: thence he went to Oxford, where he remained for ſome time a gentleman commoner, and then removed to Trinity-college in Cambridge. Having left the univerſity; he viſited foreign courts, and thus added to his knowledge of the ancient languages a perfect knowledge of the modern. On his return to England he was introduced to queen Elizabeth by his uncle Robert Greville, at that time in her majeſty's ſervice; and by means of Sir Henry Sidney, lord preſident of Wales, was nominated to ſome lucrative employments in that principality.

In the year 1581, when the French commiſſioners who came to treat about the queen's marriage with the duke of Anjou were ſumptuouſly entertained with tilts and tournaments, Mr Greville, who was one of the challengers, ſo ſignalized himſelf, as to "win the reputation of a moſt valiant knight." He continued a conſtant attendant at court, and a favourite with the queen to the end of her reign, during which he obtained the office of treaſurer of marine cauſes, alſo a grant of the manor of Wedgnock, and likewiſe the honour of knighthood. In this reign he was ſeveral times elected member for the county of Warwick; and from the journals of the houſe ſeems to have been a man of buſineſs, as his name frequently appears in committees.

On the acceſſion of king James I. he was inſtalled knight of the Bath; and ſoon after obtained a grant of the ruinous caſtles of Warwick, which he repaired at a conſiderable expence, and where he probably reſided during the former part of this reign: but in the year 1614, the twelfth of James I. he was made under-treaſurer and chancellor of the exchequer, one of the privy-council, and gentleman of the bedchamber; and, in the 1620, was raiſed to the dignity of a baron, by the title of lord Brook of Beauchamp's Court. He was alſo privy-counſellor to king Charles I. in the beginning of whoſe reign he founded a hiſtory-lecture in Cambridge.

Having thus attained the age of 74, through a life of continued proſperity, univerſally admired as a gentleman and a ſcholar, he fell by the hand of an aſſaſſin, one of his own domeſtics, who immediately ſtabbed himſelf with the ſame weapon with which he had murdered his maſter. This fellow's name was Haywood; and the cauſe is ſaid to have been a ſevere reprimand for his preſumption in upbraiding his maſter for not providing for him after his death. It ſeems he had been witneſs to lord Brook's will, and knew the contents. Some ſay he ſtabbed him with a knife in the back; others, with a ſword. This affair happened at Brook-houſe in Holborn.—Lord Brook was buried with great pomp, in St Mary's church at Warwick, in his own vault, over which he had erected a monument of black and white marble, ordering at his death the following inſcription to be engraved upon the tomb. "Fulke Greville, ſervant to queen Elizabeth, counſellor to king James, and friend to Sir Philip Sidney. *Trophæum peccati.*" He wrote ſeveral works, both in verſe and proſe; among which are, 1. Two tragedies, Alaham and Muſtapha. 2. A treatiſe of human learning, &c. in verſe, folio. 3. The life of Sir Philip Sidney. 4. An inquiſition upon fame and honour, in 86 ſtanzas. 6. *Cælica*, a collection of 109 ſongs. 7. His remains, conſiſting of political and philoſophical poems.

GREW (Nehemiah), a learned Engliſh writer in the 17th century, had a conſiderable practice as a phyſician in London, and ſucceeded Mr Oldenburgh in the office of ſecretary to the royal ſociety. In this capacity, purſuant to an order of council, he drew up a catalogue of the natural and artificial rarities belonging to the ſociety, under the title of *Muſæum Regalis Societatis*, &c. 1681. He alſo wrote, beſides ſeveral pieces in the Philoſophical Tranſactions. 1. The comparative anatomy of the ſtomach and guts, folio. 2. The anatomy of plants, folio. 3. *Tractatus de ſalis cathartici natura et uſu.* 4. *Coſmologia ſacra*, or a diſcourſe of the univerſe as it is the creature and kingdom of God; folio. He die dſuddenly in 1721.

GREWIA, in botany; a genus of the polyandria order, belonging to the gynandria claſs of plants.

Species. 1. The occidentalis, with oval crenated leaves, has long been preſerved in many curious gardens both in England and Holland. It is a native of the Cape of Good Hope, and grows to the height of ten or twelve feet. The ſtem and branches greatly reſemble thoſe of the ſmall-leaved elm, the bark being ſmooth, and of the ſame colour with that when young. The leaves are alſo very like thoſe of the elm, and fall off in autumn. The flowers are produced ſingly along the young branches from the wings of the leaves, and are of a bright purple colour. 2. The Africana, with oval ſpear-ſhaped ſerrated leaves, is a native of Senegal in Africa, from whence its ſeeds were brought by Mr Adanſon. In this country it riſes with a ſhrubby ſtalk five or ſix feet high, ſending out many lateral branches, with a brown hairy bark, and garniſhed with ſpear-ſhaped, ſerrated leaves; but the plants have not flowered in Britain.

Culture and uſes. The firſt ſort, though a native of a warm climate, will bear the open air in this country; only requiring to be ſheltered in a green-houſe during the winter-time. It may be propagated by cuttings or layers planted in pots filled with ſoft loamy earth. The ſecond ſort is tender, and muſt be kept conſtantly in a warm bark-ſtove. In ſummer, they require a large ſhare of the free air to be admitted to them, and ſhould have water three or four times a-week in warm weather; but in the winter they muſt be ſparingly watered.—The negroes of Senegal highly value a decoction of the bark of this laſt ſpecies, and uſe it as a never-failing remedy againſt venereal complaints.

GREY or GRAY, a mixed colour, partaking of the two extremes black and white. See BLACK, n° 8, 9, 10.

GREY (Lady Jane), a moſt illuſtrious and unfortunate lady, deſcended of the blood-royal of England by both parents, was the eldeſt daughter of Henry Grey marquis of Dorſet and Francis the daughter of Charles Brandon lord Suffolk, by Mary the

Grey.

dowager of Lewis XII. king of France, who was the youngeſt daughter of Henry VII. king of England. She was born in the year 1537, at Broadgate, her father's ſeat in Leiceſterſhire. She diſcovered an early propenſity to all kinds of good literature; and having a fine genius, improved under the tuition of Mr Elmer, ſhe made a moſt ſurpriſing progreſs in the languages, arts, and ſciences. She underſtood perfectly both kinds of philoſophy, and could expreſs herſelf very properly at leaſt in the Latin and Greek tongues; and we are informed by Sir Thomas Chaloner (in Strype's memorials, vol. iii. p. 93.) that ſhe was well verſed in Hebrew, Chaldee, Arabic, French, and Italian; "and (he adds), ſhe played well on inſtrumental muſic, writ a curious hand, and was excellent at the needle." Chaloner alſo tells us, that ſhe accompanied her muſical inſtruments with a voice exquiſitely ſweet in itſelf, aſſiſted by all the graces that art could beſtow.

In the year 1553, the dukes of Suffolk and Northumberland, who were now, after the fall of Somerſet, arrived at the height of power, began, on the decline of the king's health, to think how to prevent that reverſe of fortune which, as things then ſtood, they foreſaw muſt happen upon Edward's death. To obtain this end, no other remedy was judged ſufficient but a change in the ſucceſſion of the crown, and tranſferring it into their own families, by rendering Lady Jane queen. Thoſe moſt excellent and amiable qualities which had rendered her dear to all who had the happineſs to know her, joined to her near affinity to the king, ſubjected her to become the chief tool of an ambition ſo notoriouſly not her own. Upon this very account ſhe was married to lord Guilford Dudley, fourth ſon of the duke of Northumberland, without diſcovering to her the real deſign of the match; which was celebrated with great pomp in the latter end of May, ſo much to the king's ſatisfaction, that he contributed bounteouſly to the expence of it from the royal wardrobe. The young king Edward VI. died in July following; and our fair ſcholar, with infinite reluctance, overpowered by the ſolicitations of her ambitious friends, allowed herſelf to be proclaimed queen of England, on the ſtrength of a deed of ſettlement extorted from that prince by her father-in-law the duke of Northumberland, which ſet aſide the ſucceſſion of queen Mary, queen Elizabeth, and Mary queen of Scots. Her regal pageantry continued but a few days. Queen Mary's undoubted right prevailed; and the unfortunate lady Jane Grey and her huſband were committed to the tower, and on the 13th of November arraigned and found guilty of high treaſon. On the 12th of February following they were both beheaded on Tower-hill. Her magnanimity in this dreadful cataſtrophe was aſtoniſhing. Immediately before her execution, ſhe addreſſed herſelf to the weeping multitude with amazing compoſure and coherency: ſhe acknowledged the juſtice of the law, and died in charity with that wretched world which ſhe had ſo much reaſon to execrate. Thus did the pious Mary begin her reign with the murder of an innocent young creature of 18; who for ſimplicity of manners, purity of heart, and extenſive learning, was hardly ever equalled in any age or country. But alas! Jane was an obſtinate heretic.—A few days before her execution, Fleckenham, the queen's chaplain, with a pious intention to reſcue her poor ſoul from eternal miſery, paid her frequent viſits in the tower, and uſed every argument in his power to convert her to the popiſh religion: but he found her ſo much his ſuperior in argument, that he gave up the conteſt; reſigning her body to the block, and her ſoul to the devil.

Grey,
Gribner.

Her writings are, 1. Four Latin epiſtles; three to Bullenger, and one to her ſiſter lady Catharine. The laſt was written, the night before her execution, in a blank leaf of a Greek Teſtament. Printed in a book entitled *Epiſtolæ Helveticæ Reformatoribus, vel ad eos ſcriptæ*, &c. Tiguri, 1742, 8vo. 2. Her conference with Fleckenham. (Ballard). 3. A letter to Dr Harding, her father's chaplain. Printed in the Phœnix, vol. ii. p. 28. 4. A prayer for her own uſe during her confinement. In Fox's acts and monuments. 5. Four Latin verſes; written in priſon with a pin. They are as follows.

Non aliena putes, homini, quæ obtingere poſſunt:
Sors hodierna mihi, tunc erit illa tibi.
Jane Dudley.

Deo juvante, nil nocet livor malus:
Et non juvante, nil juvat labor gravis.
Poſt tenebras ſpero lucem.

6. Her ſpeech on the ſcaffold. (Ballard). It began thus: "My Lords, and you good Chriſtian People who come to ſee me die; I am under a law, and by that law, as a never-erring judge, I am condemned to die: not for any thing I have offended the queen's majeſty; for I will waſh my hands guiltleſs thereof, and deliver to my God a ſoul as pure from ſuch treſpaſs as innocence from injuſtice; but only for that I conſented to the thing I was enforced unto, conſtraint making the law believe I did that which I never underſtood," &c.—Hollinſhed, Sir Richard Baker, Bale, and Fox, tell us that ſhe wrote ſeveral other things, but do not mention where they are to be found.

GREY-*Hound*. See GRE-*Hound*.

GRIBALDUS (Matthew), a learned civilian of Padua, left Italy in the 16th century, in order to make a public profeſſion of the Proteſtant religion. After having been for ſome time profeſſor of the civil law at Tubingen, he was obliged to make his eſcape to avoid the puniſhment he would have incurred had he been convicted of differing from Calvin with reſpect to the doctrine of the Trinity: but he was ſeized at Berne, where he would have met with very ſevere treatment had he not pretended to renounce his opinions; but as he relapſed again, he would certainly have been put to death, had he not died of the plague in 1664. He wrote *De methodo ac ratione ſtudendi in jure civili*; and ſeveral other works which are eſteemed.

GRIBNER (Michael Henry,) a learned civilian of Germany, was born at Leipſic in 1682. After writing ſome time in the journal of Leipſic, he was made profeſſor of law at Wittemberg; whence he paſſed to Dreſden, and was at laſt recalled to Leipſic to ſucceed M. Mencke. He died in 1734. Beſides ſeveral academical diſſertations, he wrote, 1. *Principia proceſſus judiciarii*; 2. *Principia juriſprudentiæ naturalis*, a ſmall work much eſteemed; 3. *Opuſcula ju-*

ris publici et privati.

GRIEF, or SORROW. The influence of this paſſion on the human mind is very great. It relaxes the ſolids, ſlackens the motion of the fluids, and deſtroys the health; it particularly weakens the ſtomach and inteſtines, deſtroying all appetite and deſire for food. Opiates, if not given in large doſes, are good cordials in this caſe.

GRIERSON (Conſtantia), born of poor parents in the county of Kilkenny in Ireland, was one of the moſt learned women on record, though ſhe died at the age of 27, in 1733. She was an excellent Greek and Latin ſcholar; and underſtood hiſtory, divinity, philoſophy, and mathematics. She proved her ſkill in Latin by her dedication of the Dublin edition of Tacitus to lord Carteret, and by that of Terence to his ſon; to whom ſhe alſo addreſſed a Greek epigram. She wrote many elegant Engliſh poems, ſeveral of which were inſerted by Mrs Barber among her own. When lord Carteret was lord lieutenant of Ireland, he obtained a patent for Mr Grierſon to be the king's printer; and to reward the uncommon merit of his wife, cauſed her life to be included in it.

GRIFFON, in heraldry, an imaginary animal, feigned by the ancients to be half eagle and half lion. By this form they intended to give an idea of ſtrength and ſwiftneſs joined, together with an extraordinary vigilance in guarding the things intruſted to its care. Thus the heathen naturaliſts perſuaded the ignorant, that gold mines were guarded by theſe creatures with incredible watchfulneſs and reſolution.

GRIMSBY, a large ſea-port town of Lincolnſhire in England, which had formerly a caſtle, and two pariſh-churches, with a commodious harbour, now almoſt choaked up. At preſent it has only one church, which is a large handſome ſtructure like a cathedral. The town conſiſts of ſeveral ſtreets, whoſe houſes are well built; and is a corporation, and ſends two members to parliament. E. Long. 0. 4. N. Lat. 53. 34.

GRINDING, the reducing hard ſubſtances to powder.

GRINDING *Optic Glaſſes*. See OPTICS, the *Mechanical Part*.

GRIPSWALD, a ſtrong and conſiderable town of Pomerania in Germany; formerly imperial, but now ſubject to the Swedes, with a good harbour and univerſity. E. long. 13. 53. N. lat. 54. 12.

GRISGRIS, a ſuperſtition greatly in vogue among the negroes in the interior parts of Africa. The griſgris, according to Le Maire, are certain Arabic characters mixed with magical figures drawn by the Marabuts or prieſts upon paper. Labat affirms, that they are nothing elſe than ſcraps of the alcoran in Arabic; but this is denied by Barbot, who brought over one of theſe griſgris to Europe, and ſhewed it to a number of perſons deeply ſkilled in oriental learning. None of theſe could find the leaſt trace of any character they underſtood. Yet, after all, this might be owing to the badneſs of the hand-writing; and the words are probably of the Mandingo language, though the characters are an attempt to imitate the Arabic. The pooreſt negro never goes to war without his Griſgris, as a charm againſt wounds; and if it proves ineffectual, the prieſt transfers the blame on the immorality of his conduct. Theſe prieſts invent griſgris againſt all kinds of dangers, and in favour of all deſires and appetites; by virtue of which the poſſeſſors may obtain or avoid whatever they like or diſlike. They defend them from ſtorms, enemies, diſeaſes, pains, and misfortunes; and preſerve health, long life, wealth, honour, and merit, according to the Marabuts. No clergy in the world are more honoured and revered by the people, than theſe impoſtors are by the negroes; nor are any people in the world more impoveriſhed by their prieſts than theſe negroes are, a griſgris being frequently ſold at three ſlaves and four or five oxen. The griſgris intended for the head is made in the form of a croſs, reaching from the forehead to the neck behind, and from ear to ear; nor are the arms and ſhoulders neglected. Sometimes they are planted in their bonnets in the form of horns; at other times, they are made like ſerpents, lizards, or ſome other animals, cut out of a kind of paſteboard, &c. There are not wanting Europeans, and otherwiſe intelligent ſeamen and merchants, who are in ſome degree infected with this weakneſs of the country, and believe that the negro ſorcerers have an actual communication with the devil, and that they are filled with the malignant influence of that evil ſpirit, when they ſee them diſtort their features and muſcles, make horrid grimaces, and at laſt imitate all the appearance of epileptics.

GRISONS, a people ſituated among the Alps, and allies of the Swiſs. Their country is bounded on the north by the counties of Surgans and Bludenz, the canton of Glaris, and the principality of Lichtenſtein; on the ſouth by the canton's Italian bailiwics, the county of Chavenne, and the Valteline; on the eaſt by the territories of Venice and Milan; and on the weſt by ſome of the Italian bailiwics, and the canton of Uri. It is divided into three leagues, viz. the *Griſon* or *grey league*, the *league of the houſe of God*, and that of the *ten juriſdictions*. The two firſt lie towards the ſouth, and the third towards the north. The length of the whole is above 70 miles, and the breadth about 60. The inhabitants are ſaid to have had the name of *Griſons* from the grey coats they wore in former times. This country, lying among the Alps, is very mountainous; but the mountains yield good paſture for cattle, ſheep, and goats, with ſome rye and barley: in the valleys there is plenty of grain, pulſe, fruits, and wine. This country alſo abounds with hogs and wild-fowl; but there is a ſcarcity of fiſh and ſalt, and their horſes are moſtly purchaſed of foreigners. The principal rivers are the Rhine, the Inn, and the Adda. Here are alſo ſeveral lakes, moſt of which lie on the tops of the hills. The language of the Griſons is either a corrupt Italian, or the German. About two-thirds of the inhabitants are Calviniſts, and the reſt Papiſts; the latter of whom, in ſpirituals, are under the biſhop of Coire, except a few that are in the dioceſe of Como. Each of the leagues is ſubdivided into ſeveral leſſer communities, which are ſo many democracies; every male above 16 having a ſhare in the government of the community, and a vote in the election of magiſtrates. Deputies from the ſeveral communities conſtitute the general diet of the Griſon leagues, which meets annually, and alternately at the capital of each league; but they can conclude nothing without the conſent of their conſtituents. This country was anciently a part of Rhetia. After the extinction of the Roman empire in the weſt, it was ſome time ſubject to its own dukes, or thoſe of Swabia. Then the biſhop of Coire, and other petty princes, dependent on the emperors of Germany, became maſters of great part of it: at laſt, by the extinction of ſome, purchaſe, voluntary grants, and force, it got rid of all its lords, and erected itſelf into three diſtinct republics, each of which, as we obſerved already, is ſubdivided into a certain number of communities, which are a ſort of republics, exerciſing every branch of ſovereignty, except that of making peace or war, ſending embaſſies, concluding alliances, and enacting laws relating to the whole country, which belong to the provincial diets of the ſeveral leagues. The communities may be compared to the cities of Holland, and the diets of the ſeveral leagues to the provincial ſtates. The particular diets are compoſed of a deputy from each community; and both in them and the communities every thing is determined by a majority of votes. In the communities, every male above 16 has a vote. Beſides the annual provincial diets for chooſing the chiefs and other officers, and deliberating on the affairs of the reſpective leagues, there are general diets for what concerns all the three leagues, or whole body. In both theſe, the repreſentatives can do nothing of themſelves, but are tied down to the inſtructions of their principals: however, as all reſolutions are decided by the plurality of votes, and as the Proteſtants are at leaſt two-thirds of the people, this republic may be deemed a Proteſtant ſtate. There is a general ſeal for all the three leagues; and each particular league has a ſeparate ſeal. Beſides the ſtated times of meeting, extraordinary diets are ſometimes ſummoned, when either the domeſtic affairs of the ſtate or any foreign miniſter require it. In the general diets, the Grey League has 28 votes; that of the Houſe of God, 23; and that of the Ten Juriſdictions, 15. Theſe leagues, at different times, have entered into cloſe alliances with the neighbouring cantons, and their aſſociates. The bailiwics belonging in common to the three leagues are thoſe of the Valteline, Chieavene, Bormio, Meyenfeld, Malans, and Jennins; the officers of which are nominated ſucceſſively by the ſeveral communities, every two years. The yearly revenue ariſing to the Griſons from their bailiwics is ſaid to amount to about 13,500 florins. The public revenues all together are but ſmall, though there are many private perſons in the country that are rich. However, in caſe of any extraordinary emergency, they tax themſelves in proportion to the neceſſity of the ſervice, and the people's abilities. They have no regular troops, but a well-diſciplined militia; and upon occaſion, it is ſaid, can bring a body of 30,000 fighting men into the field: but their chief ſecurity ariſes from the narrow paſſes and high mountains by which they are ſurrounded.

GRIST, in country affairs, denotes corn ground, or ready for grinding.

GROAT, an Engliſh money of account, equal to four pence. Other nations, as the Dutch, Polanders, Saxons, Bohemians, French, &c. have likewiſe their groats, groots, groches, gros, &c. In the Saxon times, no ſilver coin bigger than a penny was ſtruck in England, nor after the conqueſt, till Edward III. who, about the year 1351, coined groſſes, i. e. *groats*, or great pieces, which went for 4d. a-piece; and ſo the matter ſtood till the reign of Henry VIII. who, in 1504, firſt coined ſhillings.

Groats, in country affairs, oats after the hulls are off, or great oat-meal.

GROCERS, anciently were ſuch perſons as engroſſed all merchandize that was vendible; but now they are incorporated, and make one of the companies of the city of London, which deals in ſugar, foreign fruits, ſpices, &c.

GROENLAND, or Spitzbergen. See Greenland.

GROGRAM, a kind of ſtuff made of ſilk and mohair.

GROIN, that part of the belly next the thigh.—In the Philoſophical Tranſactions we have an account of a remarkable caſe, where a peg of wood was extracted from the groin of a young woman of 21, after it had remained 16 years in the ſtomach and inteſtines, having been accidentally ſwallowed when ſhe was about five years of age. *Vide* Vol. LXVII. p. 459.

GRONINGEN, the moſt northerly of the Seven United Provinces, is bounded on the north by the German ocean; on the ſouth, by the county of Drenthe; on the eaſt by the biſhopric of Munſter, and the principality of Eaſt-Frieſeland; and on the weſt by the province of Frieſeland, from which it is parted by the river Lawers. Its greateſt length from ſouth-eaſt to north-weſt is about 47 miles; but its breadth is very unequal, the greateſt being about 33 miles. Here alſo are rich paſtures, large herds of great and ſmall cattle, plenty of ſea and river fiſh, and of turf, with ſome foreſts and corn-land. There are ſeveral rivers in the province, of which the principal is the Hunſe; and a great number of canals and dykes. The ſtates conſiſt of the deputies of the town of Groningen, and the Ommeland, or circumjacent country; and hold their aſſemblies always in the town of Groningen. The province had anciently governors, under the title of *burgraves;* but their power being limited, the people enjoyed great privileges. Afterwards, it became ſubject to the biſhop of Utrecht; but ſhook off his yoke at laſt, and recovered its liberty. In 1536 it ſubmitted to Charles V. and in 1579 acceded to the union of Utrecht. The colleges are much the ſame here as in the other provinces, viz. the provincial ſtates, council of ſtate, provincial tribunal, and chamber of accounts. Six deputies are ſent from hence to the ſtates-general. Of the eſtabliſhed clergy there are 160 miniſters, which form ſeven claſſes, whoſe annual ſynod is held, by turns, at Groningen and Appingedam.

Groningen, the capital of the province of that name, is ſituated about 12 miles from the neareſt ſhore of the German ocean, at the conflux of ſeveral rivulets, which form the Hunſe and Fivel. Ships of conſiderable burthen can come up to the city, in conſequence of which it enjoys a pretty good trade. It was formerly very ſtrong, but its fortifications are now much neglected. The univerſity here was founded in 1615, and is well endowed out of the revenues of the ancient monaſteries. The town, which was formerly one of the Hanſe, and has ſtill great privileges, is large and populous, being the ſeat of the high colleges, and containing three ſpacious market-places, and 27 ſtreets, in which are many fine houſes, beſides churches and other public ſtructures. By the river Fivel, and the Eems, it has a communication with Weſtphalia. In 1672 it made ſuch a gallant reſiſtance againſt the biſhop of Munſter, that he is ſaid to have loſt ten thouſand men before it. Rodolphus Agricola and Veſelius, two of the moſt learned men of the age in which they lived, were born here. Under the juriſdiction of this city is a conſiderable diſtrict, called the *Gorecht*. E. Lon. 6. 25. N. Lat. 53. 10.

GRONOVIUS (John Frederic), a very learned critic, was born at Hamburgh in 1613; and having travelled through Germany, Italy, and France, was made profeſſor of polite learning at Deventer, and afterwards at Leyden, where he died in 1671. He publiſhed, 1. *Diatribe in Statii*, &c. 2. *De ſeſtertiis*. 3. Correct editions of Seneca, Statius, T. Livy, Pliny's Natural Hiſtory, Tacitus, Aulus Gellius, Phædrus's Fables, &c. with notes; and other works.

GRONOVIUS (James), ſon of the preceding, and a very learned man, was educated firſt at Leyden, then went over to England, where he viſited the univerſities, conſulted the curious MSS. and formed an acquaintance with ſeveral learned men. He was choſen by the grand duke to be profeſſor at Piſa, with a conſiderable ſtipend. He returned into Holland, after he had reſided two years in Tuſcany, and conſulted the MSS. in the Medicean library. In 1679, he was invited by the curators of the univerſity to a profeſſorſhip; and his inaugural diſſertation was ſo highly approved of, that the curators added 400 florins to his ſtipend, and this augmentation continued to his death in 1716. He refuſed ſeveral honourable and advantageous offers. His principal works are, *The treaſure of Greek antiquities*, in 13 vols. folio; and a great number of diſſertations, and editions of ancient authors. He was compared to Schioppus for the virulence of his ſtyle; and the ſeverity with which he treated other great men who differed from him, expoſed him to juſt cenſure.

GROOM, a name particularly applied to ſeveral ſuperior officers belonging to the king's houſehold, as groom of the chamber, groom of the ſtole. See STOLE, and WARDROBE.

GROOM is more particularly uſed for a ſervant appointed to attend on horſes in the ſtable.—The word is formed from the Flemiſh *grom*, a *boy*.

GROOVE, among miners, is the ſhaft or pit ſunk into the earth, ſometimes in the vein, and ſometimes not.

GROOVE, among joiners, the channel made by their plough in the edge of a moulding, ſtyle, or rail, to put their pannels in, in wainſcotting.

GROSS-BEAK, in ornithology; a ſpecies of LOXIA.

GROSSULARIA. See RIBES.

GROTESQUE, or GROTESK, in ſculpture and painting, ſomething whimſical, extravagant, and monſtrous; conſiſting either of things that are merely imaginary, and have no exiſtence in nature; or of things ſo diſtorted, as to raiſe ſurpriſe and ridicule.

GROTIUS (Hugo), or more properly HUGO DE GROOT, one of the greateſt men in Europe, was born at Delft in 1583. He made ſo rapid a progreſs in his ſtudies, that at the age of 15 he had attained a great knowledge in philoſophy, divinity, and civil law; and a yet greater proficiency in polite literature, as appeared by the commentary he had made at that age on Martianus Capella. In 1598, he accompanied the Dutch ambaſſador into France, and was honoured with ſeveral marks of eſteem by Henry IV. He took his degree of doctor of laws in that kingdom; and at his return to his native country, devoted himſelf to the bar, and pleaded before he was 17 years of age. He was not 24 when he was appointed attorney-general. In 1613 he ſettled in Rotterdam, and was nominated ſyndic of that city; but did not accept of the office, till a promiſe was made him, that he ſhould not be removed from it. This prudent precaution he took from his foreſeeing, that the quarrels of the divines on the doctrine of grace, which had already given riſe to many factions in the ſtate, would occaſion revolutions in the chief cities. The ſame year he was ſent into England, on account of the diviſions that reigned between the traders of the two nations, on the right of fiſhing in the northern ſeas; but he could obtain no satisfaction. He was afterwards ſent to England, as is it thought, to perſuade the king and the principal divines to favour the Arminians; and he had ſeveral conferences with king James on that ſubject. On his return to Holland, his attachment to Barnevelt involved him in great trouble; for he was ſeized, and ſentenced to perpetual impriſonment in 1619, and to forfeit all his goods and chattels. But after having been treated with great rigour for above a year and a half in his confinement, he was delivered by the advice and artifice of his wife, who having obſerved that his keepers had often fatigued themſelves with ſearching and examining a great trunk-full of foul linen which uſed to be waſhed at Gorkum, but now let it paſs without opening it, ſhe adviſed him to bore holes in it to prevent his being ſtifled, and then to get into it. He complied with this advice, and was carried to a friend's houſe in Gorkum; where dreſſing himſelf like a maſon, and taking a rule and trowel, he paſſed through the market-place, and ſtepping into a boat went to Valvec in Brabant. Here he made himſelf known to ſome Arminians, and hired a carriage to Antwerp. At firſt there was a deſign of proſecuting his wife, who ſtaid in the priſon; and ſome judges were of opinion that ſhe ought to be kept there in her huſband's ſtead: however, ſhe was releaſed by a plurality of voices, and univerſally applauded for her behaviour. He now retired into France, where he met with a gracious reception from that court, and Lewis XIII. ſettled a penſion upon him. Having reſided there eleven years, he returned to Holland, on his receiving a very kind letter from Frederic Henry, prince of Orange: but his enemies renewing their perſecution, he went to Hamburgh; where, in 1634, queen Chriſtina of Sweden made him her counſellor, and ſent him ambaſſor into France. After having diſcharged the duties of this office above eleven years, he returned, in order to give an account to queen Chriſtina of his embaſſy; when he took Holland in his way, and received many honours at Amſterdam. He was introduced to her Swediſh majeſty at Stockholm; and there begged that ſhe would grant his diſmiſſion, in order that he might return to Holland. This he obtained with difficulty; and the queen gave him many marks of her eſteem, though he had many enemies at this court. As he was returning, the ſhip in which he embarked was caſt away on the coaſt of Pomerania; and being now ſick, he continued his journey by land; but was forced to ſtop at Roſtock, where he died, on the 28th of Auguſt 1645. His body was carried to Delft, to be interred in the ſepulchre of his anceſtors, Notwithſtanding the embaſſies in which he was employed, he compoſed a great number of excellent works; the principal of which are, 1. A treatiſe *De jure belli et pacis*, which is eſteemed a maſter-piece. 2. A treatiſe on the truth of the Chriſtian religion. 3. Commentaries on the holy ſcriptures. 4. The hiſtory and annals of Holland. 5. A great number of letters. All which are written in Latin.

GROTSCAW, a town of Turky in Europe, in in the province of Servia, where a battle was fought between the Germans and Turks, in the year 1739, in which the Germans were forced to retreat with loſs. E. Lon. 21. 0. N. Lat. 45. 0.

GROTSKAW, a ſtrong town of Germany, capital of a province of the ſame name in Sileſia. It is very agreeably ſeated, in a fruitful plain. E. Lon. 17. 35. N. Lat. 50. 42.

GROTTO, a large deep cavern or den in a mountain or rock.

Of theſe there are ſeveral remarkable ones in different parts of the world †. The moſt celebrated one of our own country, is that called *Ookley-hole*, on the ſouth ſide of Mendip hills. Its length is about two hundred yards, and its height various; being in ſome places very low, and in others eight fathoms.

† See *Antiparos*.

Grotto is alſo uſed for a ſmall artificial edifice made in a garden, in imitation of a natural grotto.

The outſides of theſe grottos are uſually adorned with ruſtic architecture, and their inſide with ſhell-work, coral, &c. and alſo furniſhed with various fountains and other ornaments.

Grotta *del Cani*, a little cavern near Pozzuoli, four leagues from Naples, the ſteams whereof are of a mephitical or noxious quality; whence alſo it is called *bocca venenoſa*, the poiſonous mouth.

"Two miles from Naples, ſays Dr Mead, juſt by the Lago de Agnano, is a celebrated mofeta, commonly called *la Grotta del Cani*, equally deſtructive to all within the reach of its vapours.

"It is a ſmall *grotto* about eight feet high, twelve long, and ſix broad; from the ground ariſes a thin, ſubtile, warm fume, viſible enough to a diſcerning eye, which does not ſpring up in little parcels here and there, but in one continued ſtream, covering the whole ſurface of the bottom of the cave: having this remarkable difference from common vapours, that it does not, like ſmoke, diſperſe itſelf into the air, but quickly after its riſe falls back again, and returns to the earth, the colour of the ſides of the *grotto* being the meaſure of its aſcent; for ſo far it is of a darkiſh green, but higher only common earth. And as I myſelf found no inconveniency by ſtanding in it, ſo no animal, if its head be above this mark, is the leaſt injured. But when, as the manner is, a dog, or any other creature, is forcibly kept below it, or by reaſon of its ſmallneſs cannot hold its head above it, it preſently loſes all motion, falls down as dead or in a ſwoan, the limbs convulſed and trembling, till at laſt no more ſigns of life appear, than a very weak and almoſt inſenſible beating of the head and arteries; which, if the animal be left a little longer, quickly ceaſes too, and then the caſe is irrecoverable; but if ſnatched out, and laid in the open air, ſoon comes to life again, and ſooner if thrown into the adjacent lake."

"The fumes of the *grotto*, the ſame author argues, are no real poiſon, but act chiefly by their gravity; elſe the creatures could not recover ſo ſoon; or if they did, ſome ſymptoms, as faintneſs, &c. would be the conſequence of it. He adds, that in creatures killed therewith, when diſſected, no marks of infection appear; and that the attack proceeds from a want of air, by which the circulation tends to an entire ſtoppage, and this ſo much the more, as the animal inſpires a fluid of a quite different nature from the air, and ſo nowiſe fit to ſupply its place.

"Taking the animal out while alive, and throwing it into the neighbouring lake, it recovers. This is owing to the coldneſs of the water, which promotes the contraction of the fibres, and ſo aſſiſts the retarded circulation. The ſmall portion of the air which remains in the veſiculæ, after every exſpiration, may be ſufficient to drive out the noxious fluid. After the ſame manner, cold water acts in a deliquium animi: the lake of Agnano has no other virtue in it more than others."

The ſteam ariſing in this grotto was for a long time reckoned to be of a poiſonous nature, and thought to *ſuffocate* the animals which breathed it. Dr Hales imagined that it deſtroyed the elaſticity of the air, cauſed the veſicles of the lungs to collapſe, and thus occaſioned ſudden death.—It is now, however, found that this ſteam is nothing elſe than fixed air, which from time immemorial hath iſſued out of the earth in that place in very great quantity, the cauſes of which cannot yet be inveſtigated from any of the modern diſcoveries concerning that ſpecies of air. It proves pernicious when breathed in too great quantity, by rarefying the blood too much; and hence the beſt method of recovering perſons apparently killed by fixed air, is to apply a great degree of cold all over their bodies, in order to condenſe the blood as much as poſſible. This is the reaſon why the dogs recover when thrown into the lake Agnano, as above-mentioned. See the articles Blood, Damps, and (the *Index* ſubjoined to) Medicine.

Grotta *del Serpi*, is a ſubterraneous cavern near the village of Saſſa, eight miles from the city of Braccano in Italy, deſcribed by Kircher thus:

"The *grotta del ſerpi* is big enough to hold two perſons. It is perforated with ſeveral fiſtular apertures, ſomewhat in manner of a ſieve; out of which, at the beginning of the ſpring ſeaſon, iſſues a numerous brood of young ſnakes of divers colours, but all free from any particular poiſonous quality.

"In this cave they expoſe their lepers, paralytics, arthritics, and elephantiac patients, quite naked; where, the warmth of the ſubterraneous ſteams reſolving them into a ſweat, and the ſerpents clinging variouſly all around, licking and ſucking them, they become ſo thoroughly freed of all their vitious humours, that, upon repeating the operation for ſome time, they become perfectly reſtored."

This cave Kircher viſited himſelf; and found it warm, and every way agreeable to the deſcription given of it. He ſaw the holes, and heard a murmuring hiſſing noiſe in them. Though he miſſed ſeeing the ſerpents, it not being the ſeaſon of their creeping out; yet he ſaw a great number of their exuviæ, or ſloughs, and an elm growing hard by laden with them.

Muſeum Worm.

The diſcovery of this cave, was by the cure of a leper going from Rome to ſome baths near this place. Loſing his way, and being benighted, he happened upon this cave. Finding it very warm, he pulled off his clothes; and being weary and ſleepy, had the good fortune not to feel the ſerpents about him till they had wrought his cure.

GROVE, in gardening, a ſmall wood impervious to the rays of the ſun.

Groves are not only great ornaments to gardens; but are alſo the greateſt relief againſt the violent heats of the ſun, affording ſhade to walk under in the hotteſt parts of the day, when the other parts of the garden are uſeleſs; ſo that every garden is defective which has not ſhade.

Groves are of two ſorts, viz. either open or cloſe. Open groves are ſuch as have large ſhady trees, which ſtand at ſuch diſtances, as that their branches approach ſo near to each other as to prevent the rays of the ſun from penetrating through them.

Cloſe groves have frequently large trees ſtanding in them; but the ground under theſe are filled with ſhrubs or underwood: ſo that the walks which are in them are private, and ſcreened from winds; by which means they are rendered agreeable for walking, at thoſe times when the air is either too hot or too cold in the more expoſed parts of the garden. Theſe are often contrived ſo as to bound the open groves, and frequently to hide the walls or other incloſures of the garden: and when they are properly laid out, with dry walks winding through them, and on the ſides of theſe ſweet-ſmelling ſhrubs and flowers irregularly planted, they have a charming effect.

Grove (Henry), a learned and ingenious Preſbyterian divine, was born at Taunton in Somerſetſhire, in 1683. Having obtained a ſufficient ſtock of claſſical literature, he went through a courſe of academical learning, under the reverend Mr Warren of Taunton, who had a flouriſhing academy. He then removed to London, and ſtudied ſome time under the Reverend Mr Rowe, to whom he was nearly related. Here he contracted a friendſhip with ſeveral perſons of merit, and particularly with Dr Watts, which continued till his death, though they were of different opinions in ſeveral points warmly controverted among divines. After two years ſpent under Mr Rowe, he returned into the country, and began to preach with great reputation; when an exact judgment, a lively imagination, and a rational and amiable repreſentation of Chriſtianity, delivered in a ſweet and well-governed voice, rendered him generally admired; and the ſpirit of devotion, which prevailed in his ſermons, procured him the eſteem and friendſhip of Mrs Singer, afterwards Mrs Rowe, which ſhe expreſſed in a fine ode on death, addreſſed to Mr Grove. Soon after his beginning to preach, he married; and on the death of Mr Warren, was choſen to ſucceed him in the academy at Taunton. This obliging him to reſide there, he preached for eighteen years to two ſmall congregations in the neighbourhood; and though his ſalary from both was leſs than twenty pounds a-year, and he had a growing family, he went through it cheerfully. In 1708, he publiſhed a piece, intitled *The regulation of diverſions*, drawn up for the uſe of his pupils. About the ſame time, he entered into a private diſpute by letter with Dr Samuel Clarke: but they not being able to convince each other, the debate was dropped with expreſſions of great mutual eſteem. He next wrote ſeveral papers printed in the Spectator, viz. Numb. 588. 601. 626. 635. The laſt was republiſhed, by the direction of Dr Gibſon biſhop of London, in the Evidences of the Chriſtian Religion, by Joſeph Addiſon, Eſq. In 1725, Mr James, his partner in the academy, dying, he ſucceeded him in his paſtoral charge at Fulwood, near Taunton, and engaged his nephew to undertake the other parts of Mr James's work as tutor; and in this ſituation Mr Grove conntinued till his death, which happened in 1738. His great concern with his pupils, was to inſpire and cheriſh in them a prevailing love of truth, virtue, liberty, and genuine religion, without violent attachments or prejudices in favour of any party of Chriſtians. He repreſented truth and virtue in a moſt engaging light; and though his income, both as a tutor and a miniſter, was inſufficient to ſupport his family, without breaking into his paternal eſtate, he knew not how to refuſe the call of charity. Beſides the above pieces, he wrote, 1. An eſſay towards a demonſtration of the ſoul's immortality. 2. An eſſay on the terms of Chriſtian communion. 3. The evidence of our Saviour's reſurrection conſidered. 4. Some thoughts concerning the proof of a future ſtate from reaſon. 5. A diſcourſe concerning the nature and deſign of the Lord's ſupper. 6. Wiſdom the firſt ſpring of action in the Deity. 7. A diſcourſe on ſaving faith. 8. Miſcellanies in proſe and verſe. 9. Many ſermons, &c. After his deceaſe, his poſthumous works were publiſhed by ſubſcription, in four volumes octavo, with the names of near 700 ſubſcribers, among whom were ſome of the beſt judges of merit in the eſtabliſhed church.

GROUND, in painting, the ſurface upon which the figures and other objects are repreſented.

The ground is properly underſtood of ſuch parts of the piece, as have nothing painted on them, but retain the original colour upon which the other colours are applied to make the repreſentations.

A building is ſaid to ſerve as a ground to a figure, when the figure is painted on the building.

The ground behind a picture in miniature, is commonly blue or crimſon, imitating a curtain of ſattin or velvet.

Ground, in etching, denotes a gummous compoſition ſmeared over the ſurface of the metal to be etched, to prevent the aquafortis from eating, except in ſuch places where this ground is cut through with the point of a needle. See the article Etching.

Ground-*Angling*, fiſhing under water without a float, only with a plumb of lead, or a bullet, placed about nine inches from the hook; which is better, becauſe it will roll on the ground. This method of fiſhing

ing is moſt proper in cold weather, when the fiſh ſwim very low.

The morning and evening are the chief ſeaſons for the ground-line in fiſhing for trout; but if the day prove cloudy, or the water muddy, you may fiſh at ground all day.

GROUND-*Tackle*, a ſhip's anchors, cables, &c. and in general whatever is neceſſary to make her ride ſafe at anchor.

GROUND-*Ivy*, in botany. See GLECHOMA.

GROUND-*Pine*, in botany. See TEUCRIUM.

GROUNDSEL. See SENECIO.

GROUP, in painting and ſculpture, is an aſſemblage of two or more figures of men, beaſts, fruits, or the like, which have ſome apparent relation to each other. See PAINTING.—The word is formed of the Italian *groppo*, a *knot*.

The GROUPS, a cluſter of iſlands lately diſcovered in the ſouth ſea. They lie in about S. Lat. 18. 12. and W. Lon. 142. 42. They are long narrow ſlips of land, ranging in all directions, ſome of them ten miles or upwards in length, but not more than a quarter of a mile broad. They abound in trees, particularly thoſe of the cocoa-nut. They are inhabited by well-made people, of a brown complexion. Moſt of them carried in their hands a ſlender pole about 14 feet in length, pointed like a ſpear; they had likewiſe ſomething ſhaped like a paddle, about four feet long. Their canoes were of different ſizes, carrying from three to ſix or ſeven people, and ſome of them hoiſted a ſail.

GROUSE, or GROWSE. See TETRAO.

GROWTH, the gradual increaſe of bulk and ſtature that takes place, in animals or vegetables, to a certain period.—The increaſe of bulk in ſuch bodies as have no life, owing to fermentations excited in their ſubſtance, or to other cauſes, is called EXPANSION, SWELLING, &c.

The growth of animals, nay even of the human ſpecies, is ſubject to great variations. A remarkable inſtance in the laſt was obſerved in France in the year 1729. At this time the Academy of Sciences examined a boy who was then only ſeven years old, and who meaſured four feet eight inches and four lines high, without his ſhoes. His mother obſerved the ſigns of puberty on him at two years old, which continued to increaſe very quick, and ſoon arrived at the uſual ſtandard. At four years old he was able to lift and toſs the common bundles of hay in ſtables into the horſes racks; and at ſix years old could lift as much as a ſturdy fellow of twenty. But though he thus increaſed in bodily ſtrength, his underſtanding was no greater than is uſual with children of his age, and their playthings were alſo his favourite amuſements.

Another boy, a native of the hamlet of Bouzanquet, in the dioceſe of Alais, though of a ſtrong conſtitution, appeared to be knit and ſtiff in his joints till he was about four years and a half old. During this time nothing farther was remarkable of him than an extraordinary appetite, which was ſatisfied no otherwiſe than by giving him plenty of the common aliments of the inhabitants of the country, conſiſting of rye-bread, cheſnuts, bacon, and water; but his limbs ſoon becoming ſupple and pliable, and his body beginning to expand itſelf, he grew up in ſo extraordinary a manner, that at the age of five years he meaſured four feet three inches; ſome months after, he was four feet eleven inches; and at ſix, five feet, and bulky in proportion. His growth was ſo rapid, that one might fancy he ſaw him grow: every month his cloaths required to be made longer and wider; and what was ſtill very extraordinary in his growth, it was not preceded by any ſickneſs, nor accompanied with any pain in the groin or elſewhere. At the age of five years his voice changed, his beard began to appear, and at ſix he had as much as a man of thirty; in ſhort, all the unqueſtionable marks of puberty were viſible in him. It was not doubted in the country but this child was, at five years old, or five and a half, in a condition of begetting other children; which induced the rector of the pariſh to recommend to his mother that ſhe would keep him from too familiar a converſation with children of the other ſex. Tho' his wit was riper than is commonly obſervable at the age of five or ſix years, yet its progreſs was not in proportion to that of his body. His air and manner ſtill retained ſomething childiſh, though by his bulk and ſtature he reſembled a complete man, which at firſt ſight produced a very ſingular contraſt. His voice was ſtrong and manly, and his grent ſtrength rendered him already fit for the labours of the country. At the age of five years, he could carry to a good diſtance, three meaſures of rye, weighing eighty-four pounds; when turned of ſix, he could lift up eaſily on his ſhoulders and carry loads of a hundred and fifty pounds weight a good way off; and theſe exerciſes were exhibited by him as often as the curious engaged him thereto by ſome liberality. Such beginnings made people think that he would ſoon ſhoot up into a giant. A mountebank was already ſoliciting his parents for him, and flattering them with hopes of putting him in a way of making a great fortune. But all theſe hopes ſuddenly vaniſhed. His legs became crooked, his body ſhrunk, his ſtrength diminiſhed, his voice grew ſenſibly weaker, and he at laſt ſunk into a total imbecillity.

In the Paris Memoirs alſo there is an account of a girl who had her menſes at three months of age. When four years old, ſhe was four feet ſix inches in height, and had her limbs well proportioned to that height, her breaſts large and plump, and the parts of generation like thoſe of a girl of eighteen; ſo that there is no doubt but that ſhe was marriageable at that time, and capable of being a mother of children. Theſe things are more ſingular and marvellous in the northern than in the ſouthern climates, where the females come ſooner to maturity. In ſome places of the Eaſt Indies, the girls have children at nine years of age.

Many other inſtances of extraordinary growth might be brought, but the particulars are not remarkably different from thoſe already related.—It is at firſt ſight aſtoniſhing that children of ſuch early and prodigious growth do not become giants: but when we conſider that the ſigns of puberty appear ſo much ſooner than they ought, it ſeems evident that the whole is only a more than uſually rapid expanſion of the parts, as in hot climates; and accordingly it is obſerved that ſuch children, inſtead of becoming giants, always decay and die apparently of old age, long before the natural term of human life.

GRUB, in zoology, the Engliſh name of the hexapode worms, produced from the eggs of beetles, and which at length are transformed into winged inſects of the ſame ſpecies with their parents.

GRUBBING, in agriculture, the digging or pulling up of the ſtubs and roots of trees.

When the roots are large, this is a very troubleſome and laborious taſk; but Mr Mortimer hath ſhewn how it may be accompliſhed in ſuch a manner as to ſave great expence by a very ſimple and eaſy method. He propoſes a ſtrong iron hook to be made about two feet four inches long, with a large iron-ring faſtened to the upper part of it. This hook muſt be put into a hole in the ſide of the root, to which it muſt be faſtened; and a lever being put into the ring, three men, by means of this lever, may wring out the root, and twiſt the ſap-roots aſunder. Stubs of trees may alſo be taken up with the ſame hook, in which work it will ſave a great deal of labour, though not ſo much as in the other; becauſe the ſtubs muſt be firſt cleft with wedges, before the hook can enter the ſides of them, to wrench them out by pieces.

GRUBENHAGEN, a town and caſtle of the duchy of Brunſwic, in Lower Saxony, remarkable for its mines of ſilver, copper, iron, and lead. E. Lon. 9. 36. N. Lat. 51. 45.

GRUBS, in medicine, certain unctuous pimples ariſing in different parts of the face, but chiefly in the alæ of the noſe. The cure of theſe ought only to be attempted by evacuations and cleanſers of the blood.

GRUINALES, (from *grus*, a crane); the name of the fourteenth order in Linnæus's fragments of a natural method, conſiſting of geranium, and a few other genera which the author conſiders as allied to it in their habit and external ſtructure.

GRUME, in medicine, denotes a concreted clot of blood, milk, or other ſubſtance. Hence grumous blood is that which approaches to the nature of grume, and by its viſcidity and ſtagnating in the capillary veſſels produces ſeveral diſorders.

GRUPPO, or *Turned* SHAKE, a muſical grace, defined by Playford to conſiſt in the alternate prolation of two tones in juxtapoſition to each other, with a cloſe on the note immediately beneath the lower of them. See SHAKE.

GRUS, in ornithology. See ARDEA.

GRUTER (James), a learned philologer, and one of the moſt laborious writers of his time, was born at Antwerp in 1560. He was but a child, when his father and mother, being perſecuted for the Proteſtant religion by the ducheſs Parma governeſs of the Netherlands, carried him into England. He imbibed the elements of learning from his mother, who was one of the moſt learned women of the age, and beſides French, Italian, and Engliſh, was a complete miſtreſs of Latin, and well ſkilled in Greek. He ſpent ſome years in the univerſity of Cambridge; after which he went to that of Leyden, to ſtudy the civil law; but at laſt applied himſelf wholly to polite literature. After travelling much, he became profeſſor in the univerſity of Heidelburgh; near which city he died, in 1627. He wrote many works; the moſt conſiderable of which are, 1. A large collection of ancient inſcriptions. 2. *Theſaurus criticus*. 3. *Deliciæ poetarum Gallorum, Italorum, et Belgarum, &c.*

GRUYERS, a town of Swiſſerland, in the canton of Friburgh, with a pretty good caſtle. It is famous for its cheeſe, which are all its riches. E. Lon. 7. 23. N. Lat. 46. 35.

GRYLLUS, in zoology, the name of the cricket and locuſt kind; which, together with the graſshoppers, make only one genus of inſects, belonging to the order of hemiptera. The characters are theſe: The antennæ are ſetaceous and filiform; the exterior wings are membranaceous, narrow, and have much of the appearance of the wings of ſome of the fly-kind; the thorax is compreſſed and angulated; and the legs are formed for leaping, See Plate CXV. CXL. and the articles GRASSHOPPER, GRYLLOTALPA, LOCUST, (and CRICKET in *Appendix*.)

GRYLLOTALPA, the MOLE-CRICKET; an inſect very deſtructive to gardens. Like the cricket, it makes a noiſe in the evening; and like the mole, is perpetually employed in digging below ground. It is an inſect of a very unpleaſant form. It is of the length and thickneſs of a man's little finger; and is of a brown colour, which is darker in the male than in the female. There are on each ſide of the anus two hairy proceſſes, reſembling the tails of mice; its belly is compoſed of eight joints, and is covered with as many ſcales, which are of a pale fleſh-colour, and are covered with ſhort hair. The back is covered by a pair of pointed wings, along each of which there runs a black ſtreak or line. Theſe wings fold any way at the creature's pleaſure, and when fully expanded are very large. Over theſe lie the antennæ; which are variegated alſo with black, and reach about half the length of the wings. It has only four legs: the hinder pair are long and fit for hopping; the anterior pair are ſhort, and furniſhed with a ſort of hands for digging in the manner of the mole. The breaſt is covered with a cruſtaceous ſubſtance, which is blackiſh and hairy on the outſide, and ſmooth and pale within. The eyes are very bright and black, and are very hard; and the mouth is wide, and has two tonſils, and teeth in both jaws. This creature lives under ground, and is principally found in damp and boggy places. They come out in the duſk of the evening, and make a very loud noiſe of the nature of that of the cricket.

The mole-cricket moves very ſlowly: and Goedartius is of opinion, that its wings were given it rather as an ornament, than as a thing of uſe; or if they have any real uſe, that it is the covering and defending the tender body of the creature, which is very ſoft, and eaſily liable to accidents; and Mouffett ſays, that its flights are no more than long leaps. But we have a very different account of the uſe this creature makes of its wings, in the German Ephemerides. Mentzelius, in a paper there, declares this to be one of the moſt miſchievous inſects of the creation. He ſays it is a kind of amphibious creature; and that it lives equally well under ground, in the air, or under water: that while it is under ground, it does infinite miſchief, by burrowing under the beds of a garden, and eating the roots of flowers; and that in the night it comes out, and taking wing, ſettles upon the fruit-trees, where it does no little emiſchief: and all this the author affirms from his own experience, in the gardens which he obſerved.

This creature is very nice in the conſtruction of its neſt. This is always under ground, and it chooſes a ſolid clay for the purpoſe. All its precautions ſeem to be neceſſary to ſecure its eggs from becoming a prey to a kind of black fly, which conceals itſelf under ground. The noiſe of this animal is variouſly accounted for by naturaliſts; but it is moſt probably effected by the play of organs in their belly, of a ſingular conſtruction. This is certain, that if the head of the animal be taken off, or if it be ſevered in the middle, it continues to live, and even to chirp, for ſome conſiderable time.

It is remarkable of this creature, that it can move backward as faſt as forward, and often does ſo when frightened.

GRYNÆUS (Simon), ſon to a peaſant of Suabia, born in 1493, was Greek profeſſor at Heidelberg, in 1523. He took a tour into England, and received great civility from the lord chancellor Sir Thomas More, to whom Eraſmus had recommended him. He was a learned and laborious man, and did great ſervice to the commonwealth of letters. He was the firſt who publiſhed the Almageſt of Ptolemy in Greek. He alſo publiſhed a Greek Euclid, and Plato's works, with ſome commentaries of Proclus.

GRYPHIUS (Sebaſtian), an eminent Swiſs printer, and accurate corrector; on which account his Hebrew and Latin Bibles are eſteemed. He died in 1556.

GRYPHITES, in natural hiſtory, in Engliſh CROW'S STONE, an oblong foſſile ſhell, very narrow at the head, and becoming gradually wider to the extremity, where it ends in a circular limb; the head or beak of this is very hooked or bent inward.

They are frequently found in our gravel or clay-pits, in many counties. There are three or four diſtinct ſpecies of them; ſome are extremely rounded and convex on the back, others leſs ſo; and the plates of which they are compoſed, are in ſome ſmaller and thinner, in others thicker and larger, in ſpecimens of the ſame bigneſs.

GUADALAJARA, or GUADALAXARA, a town of Spain, in New Caſtile, and diſtrict of Alcala, ſeated on the river Herares, W. Lon. 2. 45. N. Lat. 40. 36.

GUADALAJARA, a conſiderable town of North America, and capital of a rich and fertile province of the ſame name, with a biſhop's ſee. W. Lon. 114.59. N. Lat. 20. 20.

GUADALAVIAR, a river of Spain, which riſes on the confines of Arragon and New Caſtile, and, running by Turvel in Arragon, croſſes the kingdom of Valencia, paſſes by the town of the ſame name, and ſoon after falls into the Mediterranean ſea, a little below Valencia.

GUADALUPE, a handſome town in Spain, in Eſtramadura, with a celebrated convent, whoſe ſtructure is magnificent, and is immenſely rich. It is ſeated on a rivulet of the ſame name. E. Lon. 3. 50. N. Lat. 39. 15.

GUADALQUIVER, one of the moſt famous rivers of Spain, riſes in Andaluſia, near the confines of Granada, and running quite through Andaluſia, by the towns of Baiza, Andaxar, Cordova, Seville, and St Lucar, falls at laſt into the Bay of Cadiz.

GUADALUPE, one of the Caribbee iſlands, belonging to the French, the middle of which is ſeated in about 16. 30. N. Lat. and 61. 20. W. Lon.

This iſland, which is of an irregular figure, may be about 80 leagues in circumference. It is divided into two parts by a ſmall arm of the ſea, which is not above two leagues long, and from 15 to 40 fathom broad. This canal, known by the name of the Salt River, is navigable, but will only carry veſſels of 50 tons burthen.

That part of the iſland which gives its name to the whole colony, is, towards the centre, full of craggy rocks, where the cold is ſo intenſe, that nothing will grow upon them but fern, and ſome uſeleſs ſhrubs covered with moſs. On the top of theſe rocks, a mountain called *la Souphriere*, or the *Brimſtone Mountain*, riſes to an immenſe height. It exhales, through various openings, a thick black ſmoke, intermixed with ſparks that are viſible by night. From all theſe hills flow numberleſs ſprings, which fertilize the plains below, and moderate the burning heat of the climate by a refreſhing ſtream, ſo celebrated, that the galleons which formerly uſed to touch at the Windward Iſlands, had orders to renew their proviſion with this pure and ſalubrious water. Such is that part of the iſland properly called *Guadalupe*. That which is commonly called *Grand Terre*, has not been ſo much favoured by nature. It is indeed leſs rugged; but it wants ſprings and rivers. The ſoil is not ſo fertile, or the climate ſo wholeſome or ſo pleaſant.

No European nation had yet taken poſſeſſion of this iſland, when 550 Frenchmen, led on by two gentlemen named *Loline* and *Dupleſſis*, arrived there from Dieppe on the 28th of June 1635. They had been very imprudent in their preparations. Their proviſions were ſo ill choſen, that they were ſpoilt in the paſſage; and they had ſhipped ſo few, that they were exhauſted in two months. They were ſupplied with none from the mother-country. St Chriſtopher's, whether from ſcarcity or deſign, refuſed to ſpare them any; and the firſt attempts in huſbandry they made in the country, could not as yet afford any thing. No reſource was left for the colony but from the ſavages; but the ſuperfluities of a people, who cultivate but little, and therefore had never laid up any ſtores, could not be very conſiderable. The new comers, not content with what the ſavages might freely and voluntarily bring, came to a reſolution to plunder them; and hoſtilities commenced on the 16th of January 1636.

The Caribs, not thinking themſelves in a condition openly to reſiſt an enemy who had ſo much the advantage from the ſuperiority of their arms, deſtroyed their own proviſions and plantations, and retired to Grand Terre, or to the neighbouring iſlands. From thence the moſt deſperate came over to the iſland from which they had been driven, and concealed themſelves in the thickeſt parts of the foreſts. In the day-time, they ſhot with their poiſoned arrows, or knocked down with their clubs, all the Frenchmen who were ſcattered about for hunting or fiſhing. In the night, they burned the houſes and deſtroyed the plantations of their unjuſt ſpoilers.

A dreadful famine was the conſequence of this kind of war. The coloniſts were reduced to graze in the fields, Plate CXL.

Fig. 1. GLASS MAKERS at Work

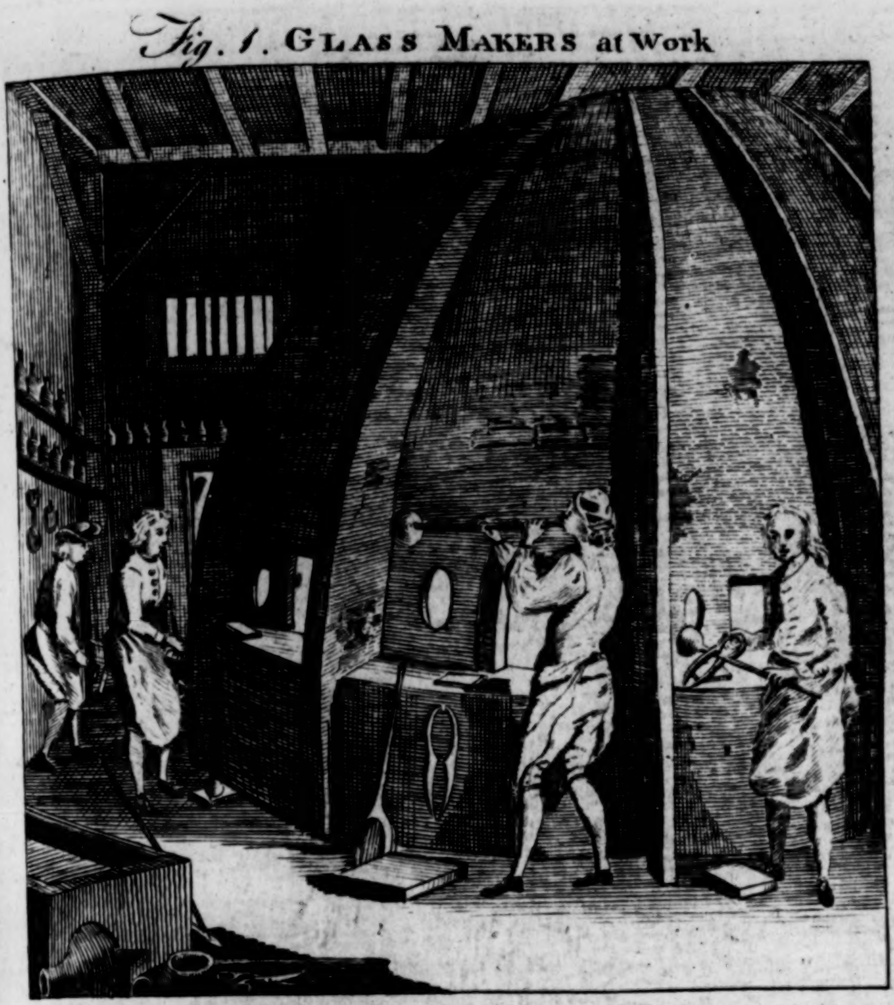


Fig. 2. Caſting and Running of PLATE GLASS

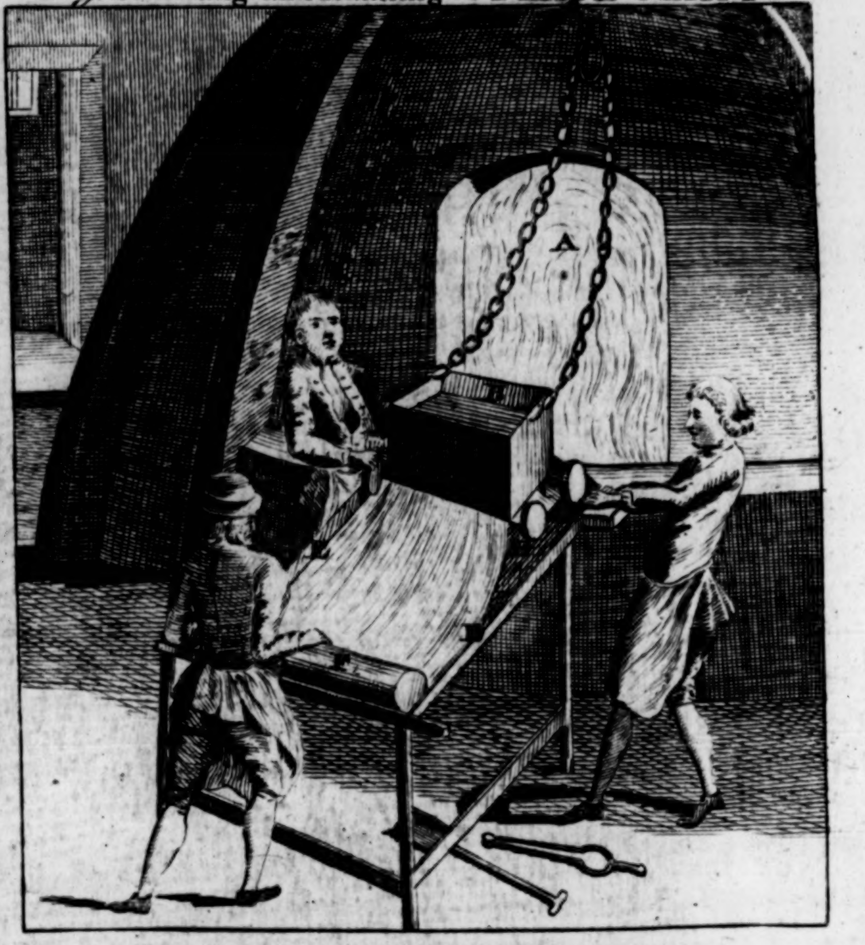
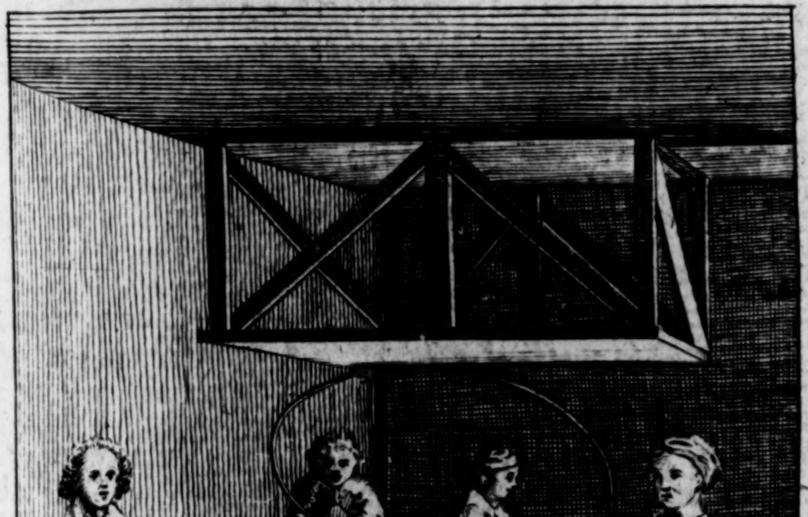


Fig. 3.

Grinding and Poliſhing of PLATE GLASS.



GRYLUS or LOCUST

Fig. 4. Criſtatus.
½ the Scale.

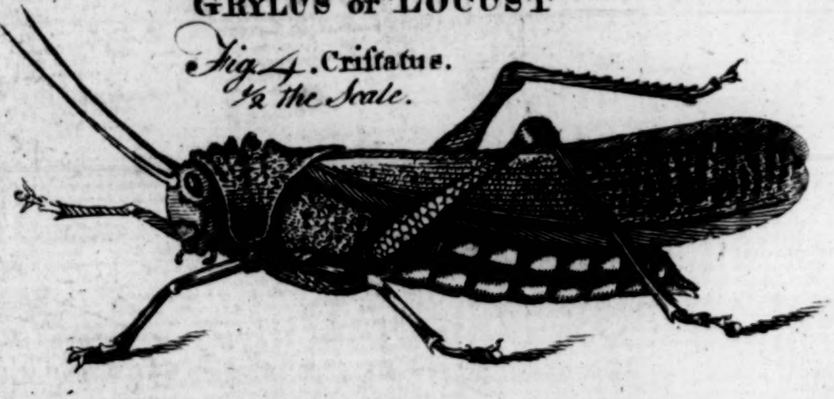


Fig. 5.
Migratorius.

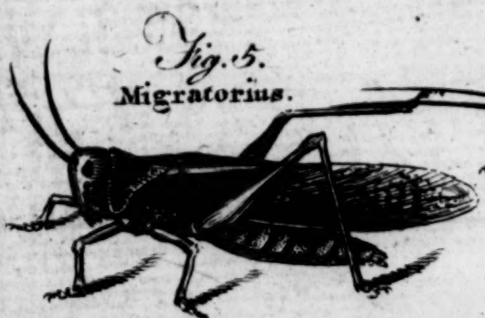


Fig. 6.
Common Locuſt.

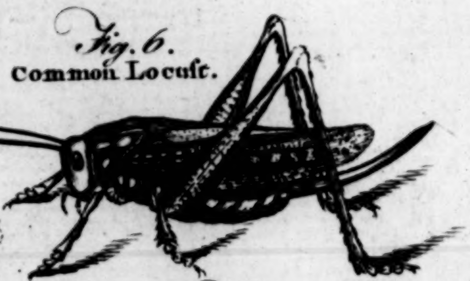


Fig. 7.
Carolinus.

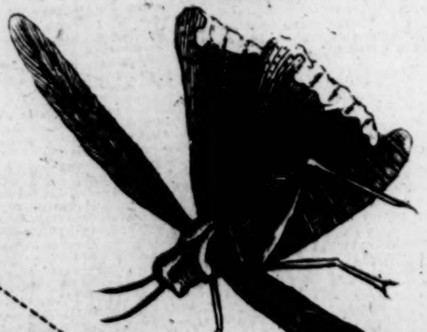
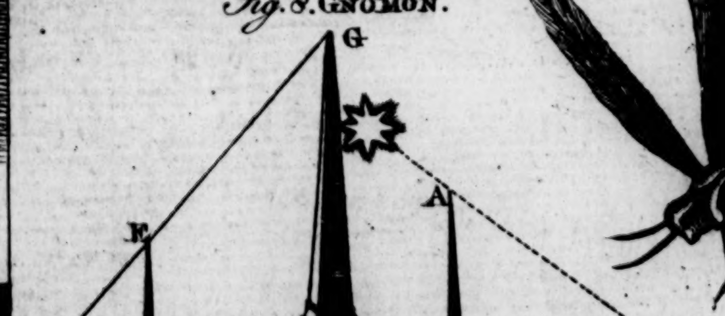


Fig. 8. GNOMON.



A. Bell Sculp!

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fields, to eat their own excrements, and to dig up dead bodies for their ſubſiſtence. Many who had been ſlaves at Algiers, held in abhorrence the hands that had broken their fetters; and all of them curſed their exiſtence. It was in this manner that they atoned for the crime of their invaſion, till the government of Aubert brought a peace with the ſavages at the end of the year 1640. The remembrance, however, of hardſhips endured in an invaded iſland, proved a powerful incitement to the cultivation of all articles of immediate neceſſity; which afterwards induced an attention to thoſe of luxury conſumed in the mother-country. The few inhabitants who had eſcaped the calamities they had drawn upon themſelves, were ſoon joined by ſome diſcontented coloniſts from St Chriſtopher's, by Europeans fond of novelty, by ſailors tired of navigation, and by ſome ſea-captains, who prudently choſe to commit to the care of a grateful ſoil the treaſures they had ſaved from the dangers of the ſea. But ſtill the proſperity of Guadalupe was ſtopped or impeded by obſtacles ariſing from its ſituation.

The facility with which the pirates from the neighbouring iſlands could carry off their cattle, their ſlaves, their very crops, frequently brought them into a deſperate ſituation. Inteſtine broils, ariſing from jealouſies of authority, often diſturbed the quiet of the planters. The adventurers who went over to the windward iſlands, diſdaining a land that was fitter for agriculture than for naval expeditions, were eaſily drawn to Martinico, by the convenient roads it abounds with. The protection of thoſe intrepid pirates, brought to that iſland all the traders who flattered themſelves that they might buy up the ſpoils of the enemy at a low price, and all the planters who thought they might ſafely give themſelves up to peaceful labours. This quick population could not fail of introducing the civil and military government of the Caribbee iſlands into Martinico. From that time, the French miniſtry attended more ſeriouſly to this than to the other colonies, which were not ſo immediately under their direction; and, hearing chiefly of this iſland, they turned all their encouragements that way.

It was in conſequence of this preference, that in 1700 the number of inhabitants in Guadalupe amounted only to 3825 white people, 325 ſavages, free negroes, mulattoes, and 6725 ſlaves, many of whom were Caribs. Her cultures were reduced to 60 ſmall plantations of ſugar, 66 of indigo, a little cocoa, and a conſiderable quantity of cotton. The cattle amounted to 1620 horſes and mules, and 3699 head of horned cattle. This was the fruit of ſixty years labour. But her future progreſs was as rapid as her firſt attempts had been ſlow.

At the end of the year 1755, the colony was peopled with 9,643 whites, 41,140 ſlaves of all ages and of both ſexes. Her ſaleable commodities were the produce of 334 ſugar-plantations, 15 plots of indigo, 46840 ſtems of cocoa, 11700 of tobacco, 2,257,725 of coffee, 12,748,447 of cotton. For her proviſions ſhe had 29 ſquares of rice or maize, and 1219 of potatoes or yams, 2,028,520 banana trees, and 32,577,950 trenches of caſſava. The cattle of Guadalupe conſiſted of 4946 horſes, 2924 mules, 125 aſſes, 13,716 head of horned cattle, 11,162 ſheep or goats, 2444 hogs. Such was the ſtate of Guadalupe when it was conquered by the Britiſh in the month of April 1759.

France lamented this loſs; but the colony had reaſon to comfort themſelves for this diſgrace. During a ſiege of three months, they had ſeen their plantations deſtroyed, the buildings that ſerved to carry on their works burnt down, and ſome of their ſlaves carried off. Had the enemy been forced to retreat after all theſe devaſtations, the iſland was ruined. Deprived of all aſſiſtance from the mother-country, which was not able to ſend her any ſuccours; and expecting nothing from the Dutch, (who, on account of their neutrality, came into her roads), becauſe ſhe had nothing to offer them in exchange; ſhe could never have ſubſiſted till the enſuing harveſt.

The conquerors delivered them from theſe apprehenſions. The Britiſh, indeed, are no merchants in their colonies. The proprietors of lands, who moſtly reſide in Europe, ſend to their repreſentatives whatever they want, and draw the whole produce of the eſtate by the return of their ſhip. An agent ſettled in ſome ſea-port of Great Britain, is intruſted with the furniſhing the plantation, and receiving the produce. This was impracticable at Guadalupe; and the conquerors in this reſpect were obliged to adopt the cuſtom of the conquered. The Britiſh, informed of the advantage the French made of their trade with the colonies, haſtened, in imitation of them, to ſend their ſhips to the conquered iſland; and ſo multiplied their expeditions, that they overſtocked the market, and ſunk the price of all European commodities. The coloniſts bought them at a very low price, and, in conſequence of this plenty, obtained long delays for the payment.

To this credit, which was neceſſary, was ſoon added another ariſing from ſpeculation, which enabled the colony to fulfil its engagements. A great number of negroes were carried thither, to haſten the growth and enhance the value of the plantations. It has been ſaid in various memorials, all copied from each other, that the Engliſh had ſtocked Guadalupe with 30,000, during the four years and three months that they remained maſters of the iſland. The regiſters of the cuſtomhouſes, which may be depended on, as there could be no inducement for an impoſition, atteſt that the number was no more than 18,721. This was ſufficient to give the nation well-grounded hopes of reaping great advantages from their new conqueſt. But their hopes were fruſtrated; and the colony, with its dependencies, was reſtored to its former poſſeſſors, by the treaty of peace in July 1763.

By the ſurvey taken in 1767, this iſland, including the ſmaller iſlands, Deſeada, St Bartholomew, Marigalante, and the Saints, dependent upon it, contains 11,863 white people of all ages, and of both ſexes; 752 free blacks and mulattos; 72,761 ſlaves; which makes in all a population of 85,376 ſouls. The cattle conſiſts of 5060 horſes, 4854 mules, 111 aſſes, 17,378 head of horned cattle, 14,895 ſheep or goats, and 2669 hogs. The proviſion is 30,476,218 trenches of caſſava, 2,819,262 banana tres, 2118 ſquares of land planted with yams and potatoes. The plantations contain 72 arnotto trees, 327 of caſſia, 13,292 of cocoa, 5,881,176 of coffee, 12,156,769 of cotton, 21,474 ſquares of land planted with ſugar-canes.

The woods occupy 22,097 ſquares of land. There are 20,247 in meadows, and 6405 are uncultivated or forſaken, Only 1582 plantations grow cotton, coffee, and proviſions. Sugar is made but in 401. Theſe ſugar-works employ 140 water-mills, 263 turned by oxen, and 11 wind-wills.

The produce of Guadalupe, including what is poured in from the ſmall iſlands under her dominion, ought to be very conſiderable. But in 1768, it yielded to the mother-country no more than 140,418 quintals of fine ſugar, 23,603 quintals of raw ſugar, 34,205 quintals of coffee, 11,955 quintals of cotton, 456 quintals of cocoa, 1884 quintals of ginger, 2529 quintals of logwood, 24 cheſts of ſweetmeats, 165 cheſts of liquors, 34 caſks of rum, and 1202 undreſſed ſkins. All theſe commodities were ſold in the colony only for 310,792 l. 18 s. 3 d. and the merchandiſe it has received from France has coſt but 197,919 l. 18 s. 6 d.

GUADIANA, a large river of Spain, having its ſource in New Caſtile, and, paſſing croſs the high mountains, falls down to the lakes called *Ojos of Guadiana;* from whence it runs to Calatrava, Medelin, Merida, and Badajox in Eſtremadura of Spain; and after having run for ſome time in Alentejo in Portugal, it paſſes on to ſeparate the kingdom of Algarve from Andaluſia, and falls into the bay or gulph of Cadiz between Caſtro Marino and Agramonte.

GUADIX, a town of Spain, in the kingdom of Garnada, with a biſhop's ſee. It was taken from the Moors in 1253, who afterwards retook it, but the Spaniards again got poſſeſſion of it in 1489. It is ſeated in a fertile country, in W. Long. 2. 12. N. Lat. 37. 5.

GUAJACUM, Lignum Vitæ, or *Pockwood;* a genus of the monogynia order, belonging to the decandria claſs of plants.

Species. 1. The officinale, or common lignum vitæ uſed in medicine, is a native of the Weſt India iſlands. There it becomes a large tree, having a hard, brittle, browniſh bark, not very thick. The wood is firm, ſolid, ponderous, very reſinous, of a blackiſh yellow colour in the middle, and of a hot aromatic taſte. The ſmaller branches have an aſh-coloured bark, and are garniſhed with leaves divided by pairs of a bright green colour. The flowers are produced in cluſters at the end of the branches, and are compoſed of oval concave petals of a fine blue colour. 2. The ſanctum, with many pairs of obtuſe lobes, hath many ſmall lobes placed along the mid-rib by pairs of a darker green colour than thoſe of the foregoing ſort. The flowers are produced in looſe bunches towards the end of the branches, and are of a fine blue colour, with petals fringed on the edges. This ſpecies is alſo a native of the Weſt India iſlands, where it is called baſtard lignum vitæ. 3. The Alpum with many blunt-pointed leaves, is a native of the Cape of Good Hope. The plants retain their leaves all the year, but have never yet flowered in this country.

Culture. The firſt ſpecies can only be propagated by ſeeds, which muſt be procured from the countries where it naturally grows. They muſt be ſown freſh in pots, and plunged into a good hot-bed, where they will come up in ſix or eight weeks. While young, they may be kept in a hot-bed of tan-bark under a frame during the ſummer; but in autumn, they muſt be removed into the bark-ſtove, where they ſhould conſtantly remain. The ſecond ſort may be propogated the ſame way; but the third is to be propogated by layers, and will live all the winter in a good greenhouſe.

Uſes. The wood of the firſt ſpecies is of very conſiderable uſe both in medicine and in the mechanical arts. Ulric Hutten ſays this wood was introduced into Europe in 1517; but Braſſavolus ſays, not until 1525. It is brought from the Weſt Indies, in large pieces, each weighing from four to five hundred weight: it is hard, compact, and ſo heavy as to ſink in water: the outer part is often of a pale yellowiſh colour; but the heart is blacker, or of a deep brown. Sometimes it is marbled with different colours. It has little or no ſmell, except when heated, and then a ſlight aromatic one is perceived. When chewed, it impreſſes a mild acrimony, biting the palate and fauces. Its pungency reſides in its reſinous matter, which it gives it out in ſome degree to water by boiling, but ſpirit extracts it wholly.

Of the bark of guaiac, there are two kinds, one ſmooth, the other unequal on the ſurface; they are both of them weaker than the wood.

The gum, or rather reſin, exſudes from the tree; and is of a brown colour, partly reddiſh, and often greeniſh, brittle, having a gloſſy ſurface when broke, of a pungent taſte, affecting the tongue and palate in the ſame manner as is ſaid of the wood. The chief of what is brought to us is in irregular maſſes, of a duſky green colour. There is a ſort in drops, which is the beſt, but is very rarely met with.

In the choice of the wood, that which is the freſheſt, moſt ponderous, and of the darkeſt colour, is the beſt; the largeſt pieces are to be preferred too; and the beſt method is to raſp them as wanted, for the finer parts are apt to exhale when the raſpings or chips are kept a while. In chooſing the gum, prefer thoſe pieces which have ſlips of the bark adhering to them, and that eaſily ſeparate therefrom by a quick blow.

Neumann aſſures us, that a compoſition of colophony and balſam of ſulphur is impoſed on the unwary for true gum guaiacum; but the cheat is eaſily detected by expoſing it to a due degree of heat, by which the odour of the falſe is perceived to be quite different from that of the true.

The guaiac wood was firſt introduced into Europe as a remedy for the venereal diſeaſe. It is a good aſſiſtant to mercury, as it warms and ſtimulates, and ſo promotes perſpiration and urine; it alſo proves gently purgative in a ſomewhat increaſed doſe: and theſe ſeem to be its primary virtues. When the excretory glands are obſtructed, the veſſels lax and flaccid, the habite replete with ſerous humours, in many cutaneous and catarrhous diſorders, ſome female weakneſſes, in gouty complaints, and rheumatic diſorders, it produces good effects. The hectic fever which ſometimes follows a ſalivation, gives way to a decoction of the woods.

A long uſe of this medicine hath been obſerved to produce a yellowneſs in the ſkin. In thin emaciated habits and an acrimonious ſtate of the fluids, it often does harm. It is alſo improper in hot bilious habits, and where the fibres are very tenſe.

Three ounces of the wood, or four ounces of the bark, may be boiled in 4℔. of water to 2℔. and if a little liquorice is added at the latter end of the boiling, or when the decoction is taken from the fire, it will abate the diſagreeable pungency of this medicine, which affects the throat very much in ſwallowing it. Of this decoction, at leaſt half a pint ſhould be taken in a day. Of the gum, or extract, the doſe may be from gr. v. to ℈ ii. which laſt purges pretty much. These ſhould be diſſolved by the mediation of egg, or the mucilage of gum arabic; for otherwiſe they do not eaſily mix the juices in the ſtomach.

A pound of guaiacum wood, diſtilled over an open fire, gave ℥ iiiſs of acid, which is called ſpirit, and ℥ iſs. of empyreumatic oil.—An hard extract of guaiacum is accounted an excellent errhine.

The wood of this tree is ſo hard, that it breaks the tools which are employed in felling it; and is therefore ſeldom uſed as firewood, but is of great uſe to the ſugar-planters for making wheels and cogs to the ſugar-mill. It is alſo frequently wrought into bowls, mortars, and other utenſils.

GUALEOR, a large town of Indoſtan in Aſia, and capital of a province of the ſame name, with a ſtrong fort. E. Long. 69. 5. N. Lat. 25. 45.

GUAM, the largeſt of the Ladrone iſlands in the South Sea, being about 100 miles in circumference. The inhabitants are almoſt all natives, but the Spaniards have a garriſon which keeps them in awe. The iſland abounds with excellent fruits, and the air is wholeſome; notwithſtanding which, the people are ſubject to the leproſy. E. Long. 139. 25. N. Lat. 13. 25.

GUAMANGA. a conſiderable town of South America, and capital of a province of the ſame name in Peru, and in the audience of Lima, with a biſhop's ſee. It is remarkable for its ſweetmeats, manufactures, and mines of gold, ſilver, loadſtone, and quickſilver. W. Long. 7. 50. S. Lat. 13 0.

GUANUCO, a rich and handſome town of S. America, and capital of a diſtinct of the ſame name in the audience of Lima. W. Long. 72. 55. S. Lat. 9. 55.

GUANZAVELCA, a town of South America, in Peru, and in the audience of Lima. It abounds in mines of quickſilver. W. Lon. 71. 59. S. Lat. 12. 40.

GUARANTY, in matters of polity, the engagement of mediatorial or neutral ſtates, whereby they plight their faith that certain treaties ſhall be inviolably obſerved, or that they will make war againſt the aggreſſor.

GUARD, in a general ſenſe, ſignifies the defence or preſervation of any thing; the act of obſerving what paſſes, in order to prevent ſurprize; or, the care, precaution, and attention, we make uſe of to prevent any thing from happening contrary to our intention or inclinations.

GUARD, in the military art, is a duty performed by a body of men, to ſecure an army or place from being ſurpriſed by an enemy. In garriſon the guards are relieved every day; hence it comes that every ſoldier mounts guard once every three or four days in time of peace, and much oftener in time of war. See HONOURS.

Advanced GUARD, is a party of either horſe or foot, that marches before a more conſiderable body, to give notice of any approaching danger. Theſe guards are either made ſtronger or weaker, according to ſituation, the danger to be apprehended from the enemy, or the nature of the country.

Van GUARD. See *Advanced* GUARD.

Artillery GUARD, is a detachment from the army to ſecure the artillery when in the field. Their *corps de garde* is in the front of the artillery park, and their centries diſperſed round the ſame. This is generally a 48-hours guard; and upon a march, this guard marches in the front and rear of the artillery, and muſt be ſure to leave nothing behind: if a gun or or waggon breaks down, the officer that commands the guard is to leave a ſufficient number of men to aſſiſt the gunners and matroſſes in getting it up again.

Artillery Quarter-GUARD, is frequently a non-commiſſioned officer's guard from the royal regiment of artillery, whoſe *corps de garde* is always in the front of their incampment.

Artillery Rear-GUARD, conſiſts in a corporal and ſix men, poſted in the rear of the park.

Corps de GARDE, are ſoldiers entruſted with the guard of a poſt, under the command of one or more officers. This word alſo ſignifies the place where the guard mounts.

Grand GUARD; three or four ſquadrons of horſe, commanded by a field-officer, poſted at about a mile or a mile and a half from the camp, on the right and left wings, towards the enemy, for the better ſecurity of the camp.

Forage GUARD, a detachment ſent out to ſecure the foragers, and who are poſted at all places, where either the enemy's party may come to diſturb the foragers, or where they may be ſpread too near the enemy, ſo as to be in danger of being taken. This guard conſiſts both of horſe and foot, and muſt remain on their poſts till the foragers are all come off the ground.

Main GUARD, is that from which all other guards are detached. Thoſe who are for mounting guard aſſemble at their reſpective captain's quarters, and march from thence to the parade in good order; where, after the whole guard is drawn up, the ſmall guards are detached to their reſpective poſts: then the ſubalterns throw lots for their guards, who are all under the command of the captain of the main guard. This guard mounts in garriſon at different hours, according as the governor pleaſes.

Piquet GUARD, a good number of horſe and foot, always in readineſs in caſe of an alarm: the horſes are generally ſaddled all the time, and the riders booted.

The foot draw up at the head of the battalion, frequently at the beating of the tat-too; but afterwards return to their tents, where they hold themſelves in readineſs to march upon any ſudden alarm. This guard is to make reſiſtance in caſe of an attack, until the army can get ready.

Baggage GUARD, is always an officer's guard, who has the care of the baggage on a march. The waggons ſhould be numbered by companies, and follow one another regularly: vigilance and attention in the paſſage of hollow ways, woods, and thickets, muſt be ſtrictly obſerved by this guard.

Quarter GUARD, is a ſmall guard commanded by a ſubaltern officer, poſted in the front of each battalion, at 222 feet before the front of the regiment.

Rear GUARD, that part of the army which brings up the rear on a march, generally compoſed of all the old grand guards of the camp. The rear-guard of a party is frequently eight or ten horſe, about 500 paces behind the party. Hence the advance-guard going out upon a party, form the rear-guard in their retreat.

Rear GUARD, is alſo a corporal's guard placed in the rear of a regiment, to keep good order in that part of the camp.

Standard GUARD, a ſmall guard under a corporal, out of each regiment of horſe, who mount on foot in the front of each regiment, at the diſtance of 20 feet from the ſtreets, oppoſite the main ſtreet.

Trench GUARD, only mounts in the time of a ſiege, and ſometimes conſiſts of three, four, or ſix battalions, according to the importance of the ſiege. This guard muſt oppoſe the beſieged when they ſally out, protect the workmen, &c.

Provoſt GUARD, is always an officer's guard that attends the provoſt in his rounds, either to prevent deſertion, maroding, rioting, &c. See PROVOST.

GUARD, in fencing, implies a poſture proper to defend the body from the ſword of the antagoniſt.

Ordinary GUARDS, ſuch as are fixed during the campaign, and relieved daily.

Extraordinary GUARDS, or detachments, which are only commanded on particular occaſions; either for the further ſecurity of the camp, to cover the foragers, or for convoys, eſcorts, or expeditions.

GUARDS, alſo imply the troops kept to guard the king's perſon, and conſiſt both of horſe and foot.

Horſe GUARDS, in England, are gentlemen choſen for their bravery, to be entruſted with the guard of the king's perſon; and are divided into four troops, called *the 1ſt, 2d, 3d, and 4th troop of horſe-guards.* The firſt troop was raiſed in the year 1660, and the command given to lord Gerard; the ſecond in 1659, and the command given to Sir Philip Howard; the third in 1665, and the command given to earl Feverſham; the fourth in 1660, and the command given to earl Newburgh. Each troop has one colonel, two lieutenant-colonels, one cornet and major, one guidon and major, four exempts and captains, four brigadiers and lieutenants, one adjutant, four ſub-brigadiers and cornets, and 60 private men.

Horſe-Grenadier GUARDS, are divided into two troops, called *the 1ſt and 2d troops of horſe-grenadier guards.* The firſt troop was raiſed in 1693, and the command given to lieutenant-general Cholmondeley; the ſecond in 1702, and the command given to lord Forbes. Each troop has one colonel, lieutenant-colonel, one guidon or major, three exempts and captains, three lieutenants, one adjutant, three cornets, and 60 private men.

Yeomen of the GUARD, firſt raiſed by Henry VII. in the year 1485. They are a kind of pompous foot-guards to the king's perſon; and are generally called by a nickname, the *beef-eaters.* They were anciently 250 men of the firſt rank under gentry; and of larger ſtature than ordinary, each being required to be ſix feet high. At preſent there are but 100 in conſtant duty, and 70 more not on duty; and when any one of the 100 dies, his place is ſupplied out of the 70. They go dreſſed after the manner of king Henry VIII's time. Their firſt commander or captain was the earl of Oxford, and their pay is 2s. 6d. per day.

Foot-GUARDS, are regiments of foot appointed for the guard of his majeſty, and his palace. There are three regiments of them, called *the 1ſt, 2d, and 3d regiments of foot-guards.* They were raiſed in the year 1660; and the command of the firſt given to colonel Ruſſel, that of the ſecond to general Monk, and the third to the earl of Linlithgow. The firſt regiment is at preſent commanded by one colonel, one lieutenant-colonel, three majors, 23 captains, one captain-lieutenant, 31 lieutenants, and 24 enſigns; and contains three battalions. The ſecond regiment has one colonel, one lieutenant-colonel, two majors, 14 captains, one captain-lieutenant, 18 lieutenants, 16 enſigns; and contains only two battalions. The third regiment is the ſame as the ſecond.

The French GUARDS are divided into thoſe within, and thoſe without, the palace.—The firſt are the *gardes du corps*, or body-guards; which conſiſt of four companies, the firſt of which companies was anciently Scots. See *Scots* GUARDS, *infra.*

The guards without are the *Gens d'Armes*, light horſe, muſqueteers, and two other regiments, the one of which is French, and the other Swiſs.

Scots GUARDS; a celebrated band, which formed the firſt company of the ancient *gardes du corps* of France.

It happened from the ancient intercourſe between France and Scotland, that the natives of the latter kingdom had often diſtinguiſhed themſelves in the ſervice of the former. On this foundation the company of *Scots guards*, and the company of *Scots gendarmes*, were inſtituted.—Both of them owed their inſtitution to Charles VII. of France, by whom the firſt ſtanding army in Europe was formed, *anno* 1454; and their fates cannot but be intereſting to Scotſmen. See GENDARMES.

Valour, honour, and fidelity, muſt have been very conſpicuous features of the national character of the Scots, when ſo great and civilized a people as the French could be induced to chooſe a body of them, foreigners as they were, for guarding the perſons of their ſovereigns.—Of the particular occaſion and reaſons of this predilection, we have a recital by Lewis XII. a ſucceeding monarch. After ſetting forth the ſervices which the Scots had performed for Charles VII. in expelling the Engliſh out of France, and reducing the kingdom to his obedience, he adds—"Since which "reduction, and for the ſervice of the Scots upon that "occaſion, and for the great loyalty and virtue which "he found in them, he ſelected 200 of them for the "guard of his perſon, of whom he made an hundred "*men at arms*, and an hundred *life-guards*: And "hundred men at arms are the hundred lances of our "the ancient ordinances; and the life-guard men are "thoſe of our guard, who ſtill are near and about "our perſon."—As to their fidelity in this honourable ſtation; the hiſtorian, ſpeaking of Scotland, ſays, "The French have ſo ancient a friendſhip and

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and alliance with the Scots, that of 400 men appointed for the king's life-guard, there are an hundred of the ſaid nation who are the neareſt to his perſon, and in the night keep the keys of the apartment where he ſleeps. There are, moreover, an hundred complete lances and two hundred yeomen of the ſaid nation, beſides ſeveral that are diſperſed through the companies: And for ſo long a time as they have ſerved in France, never hath there been one of them found, that hath committed or done any fault againſt the kings or their ſtate; and they make uſe of them as of their own ſubjects."

The ancient rights and privileges of the Scottiſh life-guards were very honourable; eſpecially of the twenty-four firſt. The author of the *Ancient Alliance* ſays, "On high holidays, at the ceremony of the *royal touch*, the erection of knights of the king's order, the reception of extraordinary ambaſſadors, and the public entries of cities, there muſt be ſix of their number next to the king's perſon, three on each ſide; and the body of the king muſt be carried by theſe only, whereſoever ceremony requires. They have the keeping of the keys of the king's lodging at night, the keeping of the choir of the chapel, the keeping the boats where the king paſſes the rivers; and they have the honour of bearing the *white ſilk fringe* in their arms, which in France is the *coron colour*. The keys of all the cities where the king makes his entry are given to their captain in waiting or out of waiting. He has the privilege, in waiting or out of waiting, at ceremonies, ſuch as coronations, marriages, and funerals of the kings, and at the baptiſm and marriage of their children, to take duty upon him. The coronation-robe belongs to him: and this company, by the death or change of a captain, never changes its rank, as do the three others."

This company's firſt commander, who is recorded as a perſon of great valour and military accompliſhments, was Robert Patillock, a native of Dundee; and the band, ever ardent to diſtinguiſh itſelf, continued in great reputation till the year 1578. From that period, the Scots guards were leſs attended to, and their privileges came to be invaded. In the year 1612, they remonſtrated to Lewis XIII. on the ſubject of the injuſtice they had ſuffered, and ſet before him the ſervices they had rendered to the crown of France. Attempts were made to re-eſtabliſh them on their ancient foundation; but no negociation for this purpoſe was effectual. The troops of France grew jealous of the honours paid them: the death of Francis II. and the return of Mary to Scotland, at a time when they had much to hope, were unfortunate circumſtances to them: the change of religion in Scotland, was an additional blow: and the acceſſion of James VI. to the throne of England, diſunited altogether the intereſts of France and Scotland. The Scots guards of France have now, therefore, no connection with Scotland but the name.

Guard-*Boat*, a boat appointed to row the rounds amongſt the ſhips of war which are laid up in any harbour, &c. to obſerve that their officers keep a good look-out, calling to the guard-boat as ſhe paſſes, and not ſuffering her crew to come on board, without having previouſly communicated the watch-word of the night.

Guard-*Ship*, a veſſel of war appointed to ſuperintend the marine affairs in a harbour or river, and to ſee that the ſhips which are not commiſſioned have their proper watchward kept duly, by ſending her guard-boats around them every night. She is alſo to receive ſeamen who are impreſſed in the time of war.

GUARDIAN, in law, a perſon who has the charge of any thing; but more commonly it ſignifies one who has the cuſtody and education of ſuch perſons as have not ſufficient diſcretion to take care of themſelves and their own affairs, as children and ideots.

Their buſineſs is to take the profits of the minor's lands to his uſe, and to account for the ſame: they ought to ſell all moveables within a reaſonable time, and to convert them into land or money, except the minor is near of age, and may want ſuch things himſelf; and they are to pay intereſt for the money in their hands, that might have been ſo placed out; in which caſe it will be preſumed that the guardians made uſe of it themſelves. They are to ſuſtain the lands of the heir, without making deſtruction of any thing thereon, and to keep it ſafely for him: if they commit waſte on the lands, it is a forfeiture of the guardianſhip, 3 Edw. I. And where perſons, as guardians, hold over any land, without the conſent of the perſon who is next intitled, they ſhall be adjudged treſpaſſers, and ſhall be accountable; 6 Ann. cap. xviii.

Guardian, or *Warden, of the Cinque-ports*, is an officer who has the juriſdiction of the Cinque-ports, with all the power which the admiral of England has in other places.

Guardian *of the Spiritualities*, the perſon to whom the ſpiritual juriſdiction of any dioceſe is committed, during the time the ſee is vacant. A guardian of the ſpiritualities may likewiſe be either ſuch in law, as the archbiſhop is of any dioceſe within his province; or by delegation, as he whom the archbiſhop or vicar-general for the time appoints. Any ſuch guardian has power to hold courts, grant licences, diſpenſations, probates of wills, &c.

GUARINI (Battiſta), a celebrated Italian poet, born at Ferrara, in 1538. He was great-grandſon to Guarino of Verona and was ſecretary to Alphonſo; Duke of Ferrara, who entruſted him with ſeveral important commiſſions. After the death of that prince, he was ſucceſſively ſecretary to Vincenzio de Gonzaga, to Ferdinand de Medicis grand duke of Tuſcany, and to Francis Maria de Feltri duke of Urbino. But the only advantages he reaped under theſe various maſters, were great encomiums on his wit and compoſitions. He was well acquainted with polite literature; and acquired immortal reputation by his Italian poems, eſpecially by his *Paſtor Fido*, the moſt known and admired of all his works, and of which there have been innumerable editions and tranſlations. He died in 1612.

GUARDIA, or **Guarda**, a town of Portugal, in the province of Beira, with a biſhop's ſee. It contains about 2300 inhabitants, is fortified both by art and nature, and has a ſtately cathedral. W. Lon. 5. 17. N. Lat. 40. 20.

Guardia-*Alferez*, a town of Italy, in the kingdom of Naples, and in the Contado-di-Moliſe, with a biſhop's ſee. E. Lon. 15. 53. N. Lat. 51. 50.

GUARGALA, or **Guerguela**, a town of Africa,

rica, and capital of a ſmall kingdom of the ſame name, in Biledulgerid, to the S. of Mount Atlas. E. Lon. 9. 55. N. Lat. 28. 0.

GUASTALLA, a ſtrong town of Italy, in the duchy of Mantua, with the title of a duchy, remarkable for a battle between the French and Imperialiſts in 1734. It was ceded to the duke of Parma in 1748, by the treaty of Aix-la-Chapelle. It is ſeated near the river Po, in E. Lon. 10. 33. N. Lat 44. 55.

GUATIMALA, *the* AUDIENCE *of*, in North America, and in New Spain, is above 750 miles in length, and 450 in breadth. It abounds in chocolate, which they make uſe of inſtead of money. It has 12 provinces under it: and the native Americans, under the dominions of Spain, profeſs Chriſtianity; but it is mixed with great many of their own ſuperſtitions. There is a great chain of high mountains, which run acroſs it from E. to W. and it is ſubject to earthquakes and ſtorms. It is however very fertile; and produces, beſides chocolate, great quantities of cochineal and cotton.

GUATIMALA, a province of North America, in New Spain, and in the Audience of the ſame name; bounded on the W. by Soconjuſco, on the N. by Verapaz and Honduras, on the E. by Nicaragua, and on the S. by the ſouth ſea. St Jago de Guatimala is the capital of the whole audience.

GUATIMALA, a large and rich town of North America, in New Spain; and capital of a government of the ſame name, with a biſhop's ſee, and an univerſity. It carries on a great trade, eſpecially in chocolate. W. Lon. 91. 30. N. Lat. 14. 0.

GUATIMALA (the Volcano of), is a mountain, which throws out fire and ſmoke. St Jago de Guatimala was almoſt ruined by it in 1541. It was afterwards rebuilt at a good diſtance from this dreadful mountain. A few years ago, however, it was again deſtroyed, with circumſtances more terrible perhaps than any mentioned in hiſtory.

GUAXACA, a province of North America, in New Spain, which is very fertile in wheat, Indian corn, cochineal, and caſſia. It is bounded by the gulph of Mexico on the N. and by the ſouth ſea on S. It contains mines of gold, ſilver, and cryſtal. Guaxaca is the capital town.

GUAXACA, a town of North America, in the Audience of Mexico, and capital of a province of the ſame name, with a biſhop's ſee. It is without walls, and does not contain above 2000 inhabitants; but it is rich, and they make very fine ſweet-meats and chocolate. It has ſeveral rich convents, both for men and women. W. Lon. 100. 0. N. Lat. 17. 45.

GUAYRA, a diſtrict of the province of La Plata, in South America, having Braſil on the E. and Paraguay on the W.

GUBEN, a handſome town of Germany, in Lower Luſatia, ſeated on the river Nieſſe, and belonging to the houſe of Sax-Merſenburg. E. 14. 59. N. Lat. 51. 55.

GUBER, a kingdom of Africa, in Negroland. It is ſurrounded with high mountains; and the villages, which are many, are inhabited by people who are employed in taking care of their cattle ſheep. There are alſo abundance of artificers, and linen-weavers, who ſend their commodities to Tombuto. The whole country is overflowed every year by the inundations of the Niger, and at that time the inhabitants ſow their rice. There is one town, which contains almoſt 6000 families, among whom are many merchants.

GUBIO, a town of Italy, in the territory of the church, and in the duchy of Urbino, with a biſhop's ſee. E. Lon. 12. 41. N. Lat. 43. 18.

GUDGEON, in ichthyology; a ſpecies of cyprinus. See CYPRINUS.

This fiſh, though ſmall, is of ſo pleaſant a taſte, that it is very little inferior to ſmelt. They ſpawn twice in the ſummer-ſeaſon; and their feeding is much like the barbels in ſtreams and on gravel, ſlighting all manner of flies: but they are eaſily taken with a ſmall red worm, fiſhing near the ground; and being a leather-mouthed fiſh, will not eaſily get off the hook when ſtruck.—The gudgeon may be fiſhed for with float, the hook being on the ground; or by hand, with a running line on the ground, without cork or float. But although the ſmall red worm above-mentioned is the beſt bait for this fiſh, yet waſps, gentles, and cad-baits will do very well. You may alſo fiſh for gudgeons with two or three hooks at once, and find very pleaſant ſport, where they riſe any thing large. When you angle for them, ſtir up the ſand or gravel with a long pole; this will make them gather to that place, bite faſter, and with more eagerneſs.

Sea-GUDGEON, *Rock-fiſh*, or *Black Goby*. See GOBIUS.

GUELPHS, or GUELFS, a celebrated faction in Italy, antagoniſts of the Gibelins. See GIBELIN.

The Guelphs and Gibelins filled Italy with blood and carnage for many years. The Guelphs ſtood for the Pope, againſt the emperor. Their riſe is referred by ſome to the time of Conrad III. in the twelfth century; by others, to that of Frederic I.; and by others, to that of his ſucceſſor Frederic II. in the thirteenth century.

The name of *Guelf* is commonly ſaid to have been formed from *Welfe*, or *Welfo*, on the following occaſion: the emperor Conrad III. having taken the duchy of Bavaria from Welfe VI. brother of Henry duke of Bavaria, Welfe, aſſiſted by the forces of Roger king of Sicily, made war on Conrad, and thus gave birth to the faction of the Guelfs.

Others derive the name *Guelfs* from the German *Wolff*, on account of the grievous evils committed by that cruel faction: others deduce the denomination from that of a German called *Guelfe*, who lived at Piſtoye; adding, that his brother, named *Gibel*, gave his name to the Gibelins. See (Hiſtory of) ITALY.

GUELDERLAND, one of the united provinces, bounded on the W. by Utrecht and Holland, on the E. by the biſhoprick of Munſter and the duchy of Cleves, on the N. by the Zuyder ſea and Overyſſel, and on the S. it is ſeparated from Brabant by the Maes. Its greateſt extent from N. to S. is about 47 miles, and from W. to E. near as much; but its figure is very irregular. The air here is much healthier and clearer than in the maritime provinces, the land lying higher. Excepting ſome part of what is called the *Veluwe*, the ſoil is fruitful. It it watered by the Rhine, and its three branches, the Wahal, the Yſſel, and the Leck, beſides leſſer ſtreams. In 1079, it was raiſed to a county by the emperor Henry IV. and in 1339 to a duchy by the emperor Lewis of Bavaria. It had dukes of its own till 1528, when it was yielded up to the emperor Charles V. In 1579, it acceded to the union of Utrecht. It is divided into three diſtricts, each of which has its ſtates and diets. Thoſe for the whole province are held twice a-year at the capital towns. The province ſends 19 deputies to the ſtates-general. Here are computed 285 Calviniſt miniſters, 14 Roman-Catholic congregations, 4 of the Lutheran perſuaſion, beſides 3 others of Remonſtrants and Anabaptiſts. The places of moſt note are Nimeguen, Zutphen, Arnheim, Harderwyk, Loo, &c.

GUELDRES, a ſtrong town of the Netherlands, in the duchy of the ſame name. It was ceded to the king of Pruſſia by the peace of Utrecht, and is ſeated among marſhes. E. Lon. 6. 21. N. Lat. 51. 30.

GUERICKE, or GUERICHE, (Otho), the moſt celebrated mathematician of his time, was born in 1602. He was the inventor of the air-pump; and author of ſeveral works in natural philoſophy, the chief of which is *Experimenta Magdeburgica*. He died in 1686.

GUERNSEY, an iſland in the Engliſh channel, on the coaſt of Normandy, ſubject to Britain; but, (as well as the adjacent iſlands,) governed by its own laws. See JERSEY.—Of this iſland, Dr Campbell gives the following account. "It lies 20 leagues ſouth-weſt from Weymouth in Dorſetſhire, between eight and nine leagues weſt from the coaſt of Normandy, 13 ſouth of Bretagne, ſeven north-weſt from Jerſey, five ſouth-weſt from Alderney, and two weſt from Sarke. In length from north-eaſt to ſouth-weſt, about twelve miles; in breadth, from ſouth to north, about nine; in circumference, upwards of 30; containing 50 ſquare miles, or 32,000 acres. The climate is mild and temperate; not ſubject to exceſſive heats, much leſs to ſevere cold; ſomewhat windy; but, taking all things together, equally healthy and pleaſant. The ſoil is, generally ſpeaking, rich and fertile; the country, though ſufficiently incloſed with ſtone fences, yet more open than in Jerſey, and as capable of cultivation of every kind. On the north ſide, the coaſt is commonly low and flat, riſing gradually, ſo that on the ſouth ſide the cliffs are of a prodigious height. The face of the country is variegated with hills and little eminences, and tolerably well watered with ſprings and ſharp gravelly ſtreams. There was formerly a fine lake, about half a league in extent, now filled up, and turned into a meadow; but many gentlemen have ſtill very beautiful and convenient fiſh-ponds.

"There are very few countries in the world more capable of improvement. Moſt of the riſing grounds afford a ſhort thick graſs, equally beautiful to the eye, and ſucculent as paſture. Roots and herbs it produces of all kinds, eſculent, medicinal, and aromatic; with a profuſion of flowers that grow wild, and are exquiſitely fragrant. All ſorts of ſhrubs and fruit-trees flouriſh here: and there is ſome, though but little timber; not through any defect of ſoil or climate, but becauſe they cannot conveniently afford it room. Grain they have of every ſpecies we cultivate in Britain, but more eſpecially wheat; and though they have not either lime, chalk, or marle, yet the ſea-wreck anſwers all the intention of manure, ſo well as to keep their ground in conſtant heart. They have large quantities of ſheep, but ſmall in ſize; and had formerly a very ſingular breed, of which the ewes had four horns, and the rams ſix; but theſe are now become very ſcarce. Their black cattle are in ſuch abundance, as not only to ſupport their own uſes, but to furniſh alſo a conſiderable exportation; and their horſes, though but little, are equally ſtrong and hardy. The ſea alſo furniſhes a prodigious variety as well as plenty of fiſh, more eſpecially red and grey mullet, excellent mackrel, and, above all, conger-eels. To theſe advantages we may add, the ſingular privilege of being free from all venomous creatures.

"There are in this iſland ten pariſhes, each of which is divided into ſeveral vintons, for the more eaſy management of affairs, civil, eccleſiaſtical, and military, and the choice of their reſpective officers and magiſtrates. Though the country is very fully peopled, yet the houſes are ſcattered up and down, according to the humour or the conveniency of the inhabitants: ſo that there is, properly ſpeaking, but one town in the iſland, which is likewiſe the only haven of any reſort; though there are ſome creeks on the north and weſt ſides of the iſland, ſuch as Bazon, L'Aucreſſe, Ferminer, St Sampſon, and the Weſt Paſſage. All theſe ports are in a ſtate of nature; but might be certainly improved and fortified, which would be productive of many advantages to the iſland; as was long ago obſerved and propoſed to government by captain Yarranton. In the reign of king Charles II. when the French formed an inſidious deſign of making themſelves maſters of this iſle by treachery, it left ſuch an impreſſion on his majeſty's mind, that ſome years after he ſent over the lord Dartmouth, accompanied by certain engineers, who diſcovered on the north-weſt ſide of the iſle, a deep bay, which, by the help of a mole, might cover a numerous ſquadron, even of ſhips of the line, under the protection of what was alſo intended to be built, a ſtrong caſtle: but his exchequer being exhauſted, this neceſſary work was never carried into execution. As this port would look full into the channel, it deſerves conſideration, how far it might be uſeful to us in the time of a French war, and of what infinite detriment it might prove if this iſland ſhould ever fall into the hands of our enemies.

"The inhabitants are very induſtrious in their reſpective employments; naturally ſober, frugal in their manner of living, honeſt in their dealings, ſincere in their religion, which is that of the church of England, and loyal to their princes, as well as ſteady to the Britiſh intereſt. They are, however, reſerved to a degree that makes them ſometimes thought moroſe; they are ſomewhat ſuſpicious; and, which is their greateſt error, they are, or at leaſt were, very litigious. They are good huſbandmen in their own way, and manage the ſea-wreck (which firſt ſerves the poor people for fuel, and then its aſhes are employed by thoſe in better circumſtances for manure) with great ſkill, and under very prudent regulations. The wreck is cut in ſummer, and about the vernal equinox, by the proclamation of the magiſtrates, and when dried, diſtributed by their order. As for the winter-wreck, which after ſtorms is thrown in large quantities on the coaſt; this is alſo eqnitably divided, and being ſtrewed wet, and ſo ploughed into the ground, renders it continually fertile. They have a ſtronger turn, however, to grazing, than to agriculture; and though they bring in annually ſome corn, yet in the ſame ſpace they ſend out a few hundred cattle, Guernſey.

cattle. They are ſtill more inclined to orchards, which enables them to make many thouſand hogſheads of cyder every year; of which, it being the common drink of the people, they export but little. The woollen is their principal manufacture, for the carrying on of which they are allowed to import 2000 tons from England, which they work up chiefly in ſtockings, waiſtcoats, and breeches. They might certainly make their fiſhery turn to profit, more eſpecially as of late years they have ſet up ſalt-works; and yet, except lobſters, I never heard that any of their fiſh went to a foreign market. Our French and Portugal merchants have large ſtocks of wine here, which they import as they have occaſion. As they are enabled, by this method, to keep it to a proper age before they are obliged to pay the duty, it ſeems to be a benefit to the mother-country, by putting it in their power both to buy and ſell cheaper: as on the other hand, from the rent of warehouſes, the ſubſiſting factors and their ſervants, the reſort of ſhips employed in this trade, it muſt be very advantageous to the inhabitants of this iſland. It is a point of juſtice to obſerve, that this manner of depoſiting wines, has nothing at all to do with ſmuggling; a practice equally injurious to the intereſts of this country and to the people of Guernſey, as it breeds few ſeamen, is carried on in very ſmall veſſels, and upon the whole is not only an infamous, but a very unprofitable kind of traffic. Heretofore, merchants of this iſle traded to moſt parts of Europe, and had ſeveral ſtout ſhips of their own; and if this vile practice was aboliſhed, as it might eaſily be, without any violation of the liberties of the people, they would ſoon find their account in it, by the revival of many lucrative branches of commerce. As they take from England ſome of the neceſſaries, and almoſt all the conveniencies, of life, ſuch as corn, malt-liquor, ſugars, ſpices, coals, houſehold-furniture, many ſpecies of the iron and leather manufactures, grocery, haberdaſhery, and hard-wares, the balance is greatly in our favour; and muſt continually increaſe, in proportion as they augment in number, and grow eaſier in circumſtances. At preſent, upon a very moderate computation, there are in Guernſey upwards of 15,000 ſouls.

" The ſeveral iſlets and vaſt chains of rocks that ſurround this country on every ſide, and cauſe ſuch a variety of tides and currents, add much to the ſecurity of the place, by rendering it equally difficult and dangerous for ſhips to approach it, unleſs they have pilots aboard extremely well acquainted with the coaſt. On the ſouth ſide, the cliffs are prodigiouſly high; ſo that the old writers ſay, it looks like a park in the ſea, impaled with rocks. On the weſt ſide lie the Hanoys, or, as the French write them, *Hanovaux*, which cover that coaſt ſo effectually, that a deſcent there is little to be feared. At the north-weſt extremity lies a little iſland called *the Howe;* which would be a very convenient place for a ſalt-work, glaſs-houſe, or manufactory of ſoap. At the north-eaſt extremity we meet with St Michael in the vale, a peninſula ſome miles in extent, connected with Guernſey by a very narrow iſthmus, with bays that might be rendered uſeful on both ſides. This peninſula is likewiſe guarded by rocks and iſlets, the moſt conſiderable of which are the Bryants, the Hummet, and the Hays. South-eaſt from the vale, lies the iſland of Harnet, or Arne, about a league in compaſs, formerly deſart, but now cultivated. At a league ſouth from thence lies Brichoe, of leſs extent; and between both, the little iſland of Gythau, or Jethau, wich ſerves the governor for a kind of park, or rather paddock.

Guiana.

GUIANA, a large country of South America, is bounded on the eaſt and north by the Atlantic ocean, and the river Oroonoko; on the ſouth, by the river of the Amazons; and on the weſt, by the provinces of Grenada and New-Andaluſia, in Terra-Firma, from which it is ſeparated both on the weſt and north by the river Oroonoko. It extends above 1200 miles from the north-eaſt to the ſouth-weſt, that is, from the mouth of the river Oroonoko to the mouth of the river of Amazons, and near 600 in the contrary direction.

Moſt geographers divide it into two parts, calling the country along the coaſt *Caribbeana Proper*, and the interior country *Guiana Proper:* the laſt is alſo ſtyled *El Dorado* by the Spainards, on account of the immenſe quantity of gold it is ſuppoſed to contain.

The Portugueſe, French, and Dutch, have all ſettlements along the coaſt. What lies ſouth of Cape North belongs to the firſt of theſe nations; the coaſt between Cape North and Cape Orange is poſſeſſed by the natives; French Guiana, Old Cayenne, or Equinoctial France, extends from Cape Orange, about 240 miles along the coaſt, to the river Marani; where the Dutch territory begins, and extends to the mouth of the Oroonoko.

Along the coaſt, the land is low, marſhy, and ſubject to inundations in the rainy ſeaſon, from a multitude of rivers which deſcend from the inland mountains. Hence it is, that the atmoſphere is ſuffocating hot, moiſt, and unhealthful, eſpecially where the woods have not been cleared away. Indeed, the Europeans are forced to live in the moſt diſagreeable ſituations, and fix their colonies at the mouths of the rivers, amidſt ſtinking marſhes, and the putrid ooze of ſalt moraſſes, for the conveniency of exportation and importation.

" Dutch Guiana (according to an account lately publiſhed by a gentleman who reſided ſeveral years at Surinam as a phyſician) was firſt diſcovered by Columbus in 1498. It lies between the 7° of north, and the 5° of ſouth latitude, and between the 53° and 60° of longitude weſt from London. It is bounded on the north and eaſt, by the Atlantic; on the weſt, by the rivers Oroonoko and Negroe; and on the ſouth, by the river of Amazons.

" It is now divided between the Spaniards, Dutch, French, and Portugueſe; but except its ſea-coaſt, and lands adjacent to its rivers, it has hitherto remained unknown to all but its original natives; and even of theſe, it is only the Dutch territories that foreigners have any knowledge of; for thoſe of the Spaniards, French, and Portugueſe, are inacceſſible them.

" This country, on account of the diverſity and fertility of its ſoil, and of its vicinity to the equator, which paſſes through it, affords almoſt all the productions of the different American countries between the tropics, beſides a variety peculiar to itſelf.

" Dutch Guiana was formerly the property of the Engliſh, who made ſettlements at Surinam, where a kind of corrupt Engliſh is ſtill ſpoken by the negroes. The Dutch took it in the reign of Charles the Second; and it was ceded to them by a treaty in 1674, in exchange for what they had poſſeſſed in the province now called *New York*.

The land for 50 miles up the country from the ſea-coaſt is flat; and, during the rainy ſeaſons, covered two feet high with water. This renders it inconceivably fertile, the earth, for 12 inches deep, being a ſtratum of perfect manure: an attempt was once made to carry ſome of it to Barbadoes; but the wood-ants ſo much injured the veſſel, that it was never repeated The exceſſive richneſs of the ſoil is a diſadvantage, for the canes are too luxuriant to make good ſugar; and, therefore, during the firſt and ſecond crop, are converted into rum.

There are ſome trees on this part; but they are ſmall and low, conſiſting chiefly of a ſmall ſpecies of palm, intermixed with a leaf near 30 feet long and three feet wide, which grows in cluſters, called a *Troælie;* and, at the edges of running-water, with mangroves.

Farther inward the country riſes; and the ſoil, though ſtill fertile, is leſs durable. It is covered with foreſts of valuable timber, that are always green; and there are ſome ſandy hills, though no mountains; in the French territories, however, there are mountains, according to the report of the Indians, for they have never been viſited by any other people.

In this country the heat is ſeldom diſagreeable: the trade-winds by day, the land breezes in the evening, and the invariable length of the nights, with gentle dews, refreſh the air, and render it temperate and ſalubrious. There are two wet ſeaſons, and two dry, of three months each, in every year; and, during more than a month in each wet ſeaſon, the rain is inceſſant. The dry ſeaſons commence ſix weeks before the equinoxes, and continue ſix weeks after. The wet ſeaſons are more wholeſome than the dry, becauſe the rains keep the waters that cover the low lands, next the ſea, freſh and in motion; but during the dry ſeaſon it ſtagnates, and, as it waſtes, becomes putrid, ſending up very unwholeſome exhalations. Bloſſoms, green and ripe fruit, are to be found upon the ſame tree in every part of the year. There are ſome fine white and red agates in Guiana, which remain untouched; and mines of gold and ſilver, which the Dutch will not ſuffer to be wrought.

The inhabitants of Guiana are either natives, who are of a reddiſh brown; or negroes and Europeans; or a mixed progeny of theſe in various combinations. The natives are divided into different tribes, more or leſs enlightened, and poliſhed, as they are more or leſs remote from the ſettlements of the Europeans. They allow polygamy, and have no diviſion of lands. The men go to war, hunt, and fiſh; and the women look after domeſtic concerns, ſpin, weave, in their faſhion, and manage the planting of caſſava and manive, the only things which in this country are cultivated by the natives. Their arms are bows and arrows; ſhort poiſoned arrows, blown through a reed, which they uſe in hunting; and clubs made of a heavy wood called *iron-wood*. They eat the dead bodies of thoſe that are ſlain in war, and ſell for ſlaves thoſe they take priſoners; their wars being chiefly undertaken to furniſh the European plantations. All the different tribes go naked. On particular occaſions they wear caps of feathers; but, as cold is wholly unknown, they cover no part but that which diſtinguiſhes the ſex. They are chearful, humane, and friendly; but timid, except when heated by liquor, and drunkenneſs is a very common vice among them.

Their houſes conſiſt of four ſtakes ſet up in a quadrangular form, with croſs poles, bound together by ſlit nibbees, and covered with the large leaves called *troælies*. Their life is ambulatory; and their houſe, which is put up and taken down in a few hours, is all they have to carry with them. When they remove from place to place, which, as they inhabit the banks of rivers, they do by water in ſmall canoes, a few veſſels of clay made by the women, a flat ſtone on which they bake their bread, and a rough ſtone on which they grate the roots of the caſſava, a hammock and a hatchet, are all their furniture and utenſils; moſt of them, however, have a bit of looking-glaſs framed in paper, and a comb.

Their poiſoned arrows are made of ſplinters of a hard heavy wood, called *cacario:* they are about 12 inches long, and ſomewhat thicker than a coarſe knitting needle: one end is formed into a ſharp point; round the other is wound ſome cotton, to make it fit the bore of the reed through which it is to be blown. They will blow theſe arrows 40 yards with abſolute certainty of hitting the mark, and with force enough to draw blood, which is certain and immediate death. Againſt this poiſon no antidote is known. The Indians never uſe theſe poiſoned arrows in war, but in hunting only, and chiefly againſt the monkies; the fleſh of an animal thus killed may be ſafely eaten, and even the poiſon itſelf ſwallowed with impunity.

GUIAQUIL, a town, bay, and harbour of South America, in Peru, and capital of an audience of the ſame name. W. Long. 76. 55. S. Lat. 2. 0.

GUIARA, a ſea-port town of South America, and on the Caracca coaſt. The Engliſh attempted to take it in 1749 and 1743; but they were repulſed both times. W. Long. 66. 5. N. Lat. 10. 35.

GUICCIARDINI (Franciſco), a celebrated hiſtorian, born at Florence in 1482. He profeſſed the civil law with reputation, and was employed in ſeveral embaſſies. Leo X. gave him the government of Modena and Reggio, and Clement VII. that of Romagna and Bologna. Guicciardini was alſo lieutenant-general of the pope's army, and diſtinguiſhed himſelf by his bravery on ſeveral occaſions; but Paul III. having taken from him the government of Bologna, he retired to Florence, where he was made counſellor of ſtate, and was of great ſervice to the houſe of Medicis. He at length retired into the country to write his Hiſtory of Italy, which he compoſed in Italian, and which comprehends what paſſed from the year 1494 to 1532. This hiſtory is greatly eſteemed; and was continued by John Baptiſt Adriani, his friend. He died in 1540.

Guicciardini (Lewis), his nephew, compoſed a hiſtory of the Low Countries, and memoirs of the affairs of Europe, from 1530 to 1560. He wrote with great ſpirit, againſt the perſecution of the duke d'Alva, for which he impriſoned him. Died in 1583.

GUIDI (Alexander), an eminent Italian poet, born at Pavia in 1650. Having a deſire to ſee Rome, he there attracted the notice of queen Chriſtina of Sweden, who retained him at her court; he beſide obtained a conſiderable benefice from pope Innocent XI. and a penſion from the duke of Parma. For a good office he did the ſtate of Milan with prince Eugene, he was enrolled among the nobles and decurions of that town; and died in 1712. Nature had been kinder to his intellects than to his exterior form; his body was ſmall and crooked, his head was large, and he was blind of his right eye. A collection of his works was publiſhed at Verona in 1726.

GUIDO (Reni), an illuſtrious Italian painter, born at Bologna in 1575. In his early age he was the diſciple of Denis Calvert, a Flemiſh maſter of good reputation; but afterwards entered himſelf in the ſchool of the Caracci. He firſt imitated Ludovico Caracci; but fixed at laſt in a peculiar ſtile of his own, that ſecured him the applauſe of his own time and the admiration of poſterity. He was much honoured, and lived in ſplendor: but an unhappy attachment to gaming ruined his circumſtances; the reflection on which brought on a languiſhing diſorder, that put an end to his life in 1642. There are ſeveral deſigns of this great maſter in print, etched by himſelf.

GUIENNE, the largeſt province of France, bounded on the north by Saintogne, Angoumois, and Limoſin; on the eaſt by Limoſin, Auvergne, and Languedoc; on the ſouth by the Pyrenees, Lower Navarre, and Bearn; and on the weſt by the ocean. It is about 225 miles in length, and 200 in breadth. It is divided into the Upper and Lower. The Upper comprehends Querci, Rouergue, Armagnac, the territory of Comminges, and the county of Bigorre. The Lower contains Bourdelois, Perigord, Agenois, Condomois, Bazadois, the Lander, Proper Gaſcony, and the diſtrict of Labour. The principal rivers are, the Garonne, the Adour, the Tarn, the Aveirou, and the Lot. Bourdeaux is the capital town.

GUILANDINA, the NICKAR TREE; a genus of the monogynia order, belonging to the decandria claſs of plants.

Species. 1. The bonduc, or yellow nickar. 2. The bonducella, or gray nickar. Theſe are climbing plants, natives of the Weſt Indies, where they riſe to the height of twelve or fourteen feet: the flowers come out at the wings of the ſtalks; and are compoſed of five concave yellow petals. They are ſucceeded by pods about three inches long and two broad, cloſely armed with ſlender ſpines, opening with two valves, each incloſing two hard ſeeds about the ſize of children's marbles, of a yellowiſh colour. 3. The moringa, or morunga nickar, is a native of the iſland of Ceylon, and ſome places on the Malabar coaſt. It riſes to the height of 25 or 30 feet, having flowers produced in looſe bunches from the ſide of the branches, and compoſed of an unequal number of petals.

Culture and Uſes. Theſe plants being natives of warm climates, require to be kept through the winter in a ſtove in this country. They are propagated by ſeeds; but thoſe of the firſt ſort are ſo hard, that unleſs they are ſoaked two or three days in water before they are put into the ground, or placed under the pots in the tan-bed to ſoften their covers, they will remain for years without vegetating.—The roots of the third ſort are ſcraped when young, and uſed by the inhabitants of Ceylon and Malabar as thoſe of horſe-radiſh are in Europe. The wood dyes a beautiful blue colour.

GUILD, (from the Saxon *guildan*, to "pay"), ſignifies a fraternity or company, becauſe every one was *gildare, i. e.* to pay ſomething towards the charge and ſupport of the company. As to the original of theſe guilds or companies, it was a law among the Saxons, that every freeman of fourteen years of age ſhould find ſureties to keep the peace, or be committed; upon which the neighbours entered into an aſſociation, and became bound for each other, either to produce him who committed any offence, or to make ſatisfaction to the injured party: in order to this, they raiſed a ſum among themſelves, which they put into a common ſtock; out of which they, upon occaſion, made a pecuniary compenſation according to the quality of the offence committed. Theſe guilds are now companies joined together, with laws and orders made by themſelves, by the licence of the prince.

Guild, in the royal boroughs of Scotland, is ſtill uſed for a company of merchants, who are freemen of the borough. See BOROUGH.

Every royal borough has a dean of *guild*, who is the next magiſtrate below the bailiff. He judges of controverſies among men concerning trade; diſputes between inhabitants touching buildings, lights, water-courſes, and other nuiſances; calls courts, at which his brethren of the *guild* are bound to attend; manages the common ſtock of the *guild*; and amerces and collects fines.

Guild, *Gild*, or *Geld*, is alſo uſed among our ancient writers, for a compenſation, or mulct, for a fault committed.

Guild-*Hall*, the chief hall of the city of London, for holding of courts, and for the meeting of the lord-mayor and commonalty, in order to make laws and ordinances for the welfare and regulation of the city.

Dean of Guild, in Scots law, a magiſtrate of a royal borough, who is head of the merchant-company. See LAW, Nº clviii. 11.

GUILDFORD, or GULDEFORD, a borough-town of Surry, ſituated on the river Wye, thirty-miles ſouth-weſt of London. It ſends two members to parliament. Long. 0. 40. N. Lat. 51. 16.

GUILLEMOT, in ornithology. See COLYMBUS.

GUILLIM, (John), of Welſh extraction, was born in Herefordſhire, about the year 1565. Having completed his education at Brazen-noſe college, Oxford, he became a member of the college of arms in London; and was made rouge croix purſuivant, in which poſt he died in 1621. He publiſhed, in 1610, a celebrated work, intitled *the Diſplay of Heraldry*, folio, which has gone through many editions. To the fifth, which came out in 1679, was added *A treatiſe of honour civil and military*, by captain John Loggan.

GUINEA, a large tract of country lying along the weſt ſide of the continent of Africa. It is divided into the upper and lower, the latter of which is alſo called *Congo*. See CONGO.—Theſe two together, reckoning from Cape Togrin, near the mouth of the river Sierra Leoni in N. Lat. 9° 18′, to Cape Ne-

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gro in S. Lat. 16° 45′, extend about 2500 miles along the ſea-coaſt, and many more, if we reckon all the turnings, windings, and bays. As for its inland extent, it is not eaſy to aſcertain it.

As all this country lies between the tropics, the air is exceſſively hot, eſpecially from the beginning of September to the end of March, which, with the coolneſs of the nights, the frequent thick, ſtinking, ſulphureous miſts, and the periodical rains, when the flat country is overflowed, makes it very unhealthy, eſpecially to Europeans, to whom it is generally fatal. The winds on the coaſt of Guinea Proper ſet from weſt to eaſt, directly contrary to the trade-winds, except in the rainy ſeaſon, between the vernal and autumnal equinox, when they have violent ſtorms of wind, with terrible thunder and lightning: and theſe winds blowing from the ſouth, the ſhipping on the coaſt at this time are in great danger of being wrecked; and, even in the calmeſt weather, there is always ſuch a ſurf beating upon the ſhore, that it is very difficult and dangerous landing. As to the face of the country, a variey of hills, valleys, woods, and plains, are ſeen all along the coaſt, intermixed with bogs and moraſſes.

The animals of Guinea are the ſame as thoſe of Caffraria; but their grain is different. Here is no wheat; but plenty of Guinea grain, rice, maiz, or Indian corn. There are no grapes here; but the palm-tree affords them wine, and their cocoa-nuts a pleaſant drink. Here are alſo oranges and lemons, plantains, pomegranates, tamarinds, pine-apples, and other tropical fruits.

Of foreſt-trees they have a great variety, which grow to a prodigious height and bulk; ſome of them being excellent timber, and having a very beautiful grain.

Their metals are gold, copper, and iron. The gold is found by the natives in the ſands of their rivulets in duſt; ſometimes they meet with large pieces, but there are no gold mines open, and poſſibly there may be no mines of that metal. As it is found waſhed down into the brooks and rivulets in every place our people bring it from, it ſeems probable that it lies pretty near the ſurface. There is plenty of ſalt on the Guinea coaſt; which they make by letting the ſalt-water into ſhallow pans in the dry ſeaſons, and the ſun exhaling the water, the ſalt is left at bottom.

Beſides gold, ivory, and ſlaves, this country affords indigo, wax, gum-ſenega, gum-tragacanth, and a variety of other gums and drugs. Theſe articles may be had in moſt parts of this extenſive coaſt, but chiefly in Proper Guinea.

Of mountains in Guinea, the moſt remarkable are thoſe of Sierra Leoni. The principal capes are thoſe of Cape Blanco, Cape Verd, Cape Leon, Cape St. Ann's, Cape Palmas, and Cape Three-Points, Cape Formoſa, Cape Monte, Cape St. John, Cape Lopas, Cape Lede, and Cape Negro. The chief bays are the Cyprian or Cintra Bay, and the Bite of Guinea. Of the rivers, the moſt conſiderable are thoſe of Coanzo and Ambriſi, the Zaara, the Lunde, the Cameron, the Formoſa, the Volta, the Sierra Leon, and the Sherbro. All theſe run from eaſt to weſt, (except the Volta, which runs from north to ſouth), and fall into the Atlantic.

The natives of Guinea, deſcended from the original inhabitants, are all negroes, well known by their flat noſes, thick lips, and ſhort woolly hair; though there are among them many camps or villages of Arabs, who are of a tawny complexion; and there is a mixed breed of Mulattoes, proceeding from the commerce of the Portugueſe and natives, who are almoſt as dark as the negroes.

As to their habits, the common people have generally only a cloth about their middle; but people of condition have another over their ſhoulders, and are adorned with abundance of rings, and bracelets of gold, ivory, or copper: the arms, legs, and a great part of the bodies of the men are naked; but the women are veiled, when they go abroad.

The Eurropeans tell us, that the natives have generally more wit than honeſty, frequently mixing their gold with baſe metal: but there is reaſon to ſuſpect, that the little tricks and cheats they uſe in trade have been taught them by the Chriſtians with whom they traffic; and if the women are lewd, they are not worſe than thoſe that accuſe them, who firſt tempt them to incontinence, and then reproach them for it.

Every family almoſt in Guinea make their own tools and utenſils: they are all ſmiths, carpenters, and maſons; building their own houſes or huts, which are, indeed, of very ſlight materials; and, till the Europeans brought them hammers, &c. one ſtone ſerved them for an anvil, and another for a hammer. The women manage all the huſbandry, as well as their domeſtic affairs: they dig, ſow, plant, and bring in the harveſt, while the huſband looks on: ſo that the more wives a man has, the richer he is ſaid to be in this country; and ſome negroes on the coaſt make money by letting out their wives; and, indeed, they make little difference between their wives and their ſlaves.

The ſmall-pox is as fatal to the negroes as the plague, and worms are an epidemical diſtemper; not thoſe in the ſtomach and bowels; but a ſpecies that are found between the ſkin and the fleſh, and give the patient extreme pain, till they are drawn out: which is an operation that ſometimes takes a month to perform; for, if they attempt to draw it out too haſtily, the worm breaks, and rots in the fleſh, or breaks out in another place. Some negroes have nine or ten of theſe worms in their ſkin at once, and the Europeans are not entirely free from them. A greedy ravenous appetite is alſo reckoned among the diſeaſes of the Guinea negroes; and the venereal diſeaſe is often fatal to them, having no effectual methods of cure of their own: nor are the wounds they receive in the field of Mars leſs dangerous than the other, eſpecially if the bones are ſhattered; for they can cure only ordinary fleſh-wounds, which they do by applying poultices of herbs. The negroes are ſeldom long-lived, though they are generally healthful while they live.

The diſtempers the Europeans are ſubject to on this coaſt are fevers, fluxes, and colics, which are occaſioned by indifferent water and bad air; their ſettlements lying near the coaſt, where the fogs and ſteams ariſing from the ooze and ſalt-marſhes, and

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the ſtinking fiſh the natives dry on the beach, corrupt the air, and render it fatal to the foreigners. The moſt temperate men find it difficult to preſerve their health; but a great many haſten their death by their intemperance, or negligence, expoſing themſelves to the cold air in the evening, after a very hot day. This ſudden change, from one extreme to the other, has often very bad effects in hot climates.

As to religion, the natives generally acknowledge one Supreme Being, that created the univerſe; and yet pay him no manner of worſhip or adoration, never praying to him, or giving him thanks for any thing they enjoy. They believe he is too far exalted above poor mortals to take notice of them; and therefore pray to a multitude of inferior deities, of which there are ſome common to whole nations, and yet every man has a god of his own chooſing beſides.

In Guinea there are ſome ſovereign princes, whoſe dominions are very extenſive, rich, powerful, and themſelves arbitrary, limited by no laws, or any other reſtraint; and there are many others, to whom the Dutch and other Europeans have given the name of kings, whoſe dominions do not exceed the bounds of an ordinary pariſh, and whoſe power and revenues are proportionably mean.

The country of Guinea-Proper extends from Cape Palmas to the river Volta, about an hundred and fifty leagues along the ſea-coaſt, which bounds it to the ſouth. The Europeans divide it into two parts, the Tooth and the Gold Coaſt; the former extending from Cape Palmas to the river Sueira da Caſta, 18 miles weſt of the river Mancha, by ſome called *Rio Cobre*, and Aukeber; and the latter from thence to the river Volta.

The Tooth, Ivory, or Quaqua Coaſt, is ſo called from the great plenty of elephants teeth found there. According to Dapper, the inhabitants of this coaſt, though they ſeem the moſt barbarous and ſavage people of all Guinea, are really the moſt civilized and the moſt reaſonable, and paſs for ſuch among their neighbours. When they come to trade with any ſhip, they take ſome water into their hands, and let a few drops of it fall into their eyes; which is a kind of oath, by which they intimate, that they would rather loſe their eye-ſight than cheat thoſe they trade with. They are no leſs averſe to drunkenneſs than to fraud; and though their country produces numbers of palm-trees, yet they drink no palm-wine, but only a certain liquor, called *bordon*, or *tombo-wine*, which they mix with water. Their chief manufactures and trade conſiſt in cotton habits, which are called *Quaqua gowns*, and are made of five or ſix breadths ſewed together. One of the fundamental laws of this country is, that every one is obliged to continue all his life-time in the condition in which he was born; ſo that one whoſe father was a fiſherman, for inſtance, can never become any thing elſe but a fiſherman, and ſo of all other trades and profeſſions.

The Gold-coaſt had its name given it by the Portugueſe, from the immenſe quantity of that precious metal it produces: the ſame reaſon has made all the other nations of Europe retain the ſame appellation. According to the beſt charts, the ſituation of the Gold-coaſt is between 4° 30′ and 8° north latitude, and 16° and 8° 4′ of longitude, beginning at the river Ankobar, and extending to the Rio Volta, that is, about 130 leagues from weſt to eaſt. The beginning of the Gold-coaſt, however, is placed by many at Rio de Suiero da Coſta, near Iſnui, that being the firſt place where gold is found; and the end at Lay, in the country of Lampi, three or four leagues from Akra, becauſe there the gold is procured but accidentally, from a people called *Amaho*, inhabiting the more diſtant interior country.

This coaſt contains a variety of different kingdoms and ſtates, viz. Adomir, called likewiſe *Saku*, and *Avina*: Axim, Ankobar, Adom, likewiſe called *Little Inkaſſan*, or *Warſhes*; Jabi, or Jabs; Commendo, or Guaſſo: Fetu, Sabo, Fantin, Ackron, Agonna, or Anguirra; Amra, or Aquambus, Lubbade, and Ningo, or Lampi. Each of the above diviſions, provinces, or kingdoms, have one, two, or more towns or villages on the ſea-coaſt, between or under the European forts and ſettlements. Eight of them are real monarchies, having their own proper kings, who, before the arrival of the Europeans, were called *captains*; the reſt are republics, governed by magiſtrates, who are ſubject to the laws, and periodical changes. Upon the river Cobre or Ankbobar, and in the country of that name, which is properly the firſt country of the Gold-coaſt, there are a number of towns, in the three provinces of Ankobar, Aborrel or Abocro, and Eguira. The firſt is a monarchy; the two latter republics. For a number of years the Dutch had a fort at Eguira; and their gold trade, beſides what they drew from the neighbouring countries, was very conſiderable, this canton having its own proper mines; but loſt all their footing in the country by a quarrel with the negroes.

New **GUINEA**, a long and narrow iſland of the Eaſt Indies, very imperfectly known. It was ſuppoſed to be connected with New-Holland, until Captain Cook diſcovered the ſtrait which ſeparates them. New Guinea, including Papua, its north-weſtern part, (which according to Bougainville's conjecture is ſeparated from it by a ſtrait) reaches from the equator to the twelfth degree of ſouth latitude, and from 131 to 150 deg. eaſt longitude; in one part it does not apper to be above fifty miles broad. It was firſt viſited by an European ſhip in 1529. Saavedra, a Portugueſe, who made the diſcovery of the north-weſt part of this country, called it *Terra de Papuas* or *Papos*. Van Schouten, a Dutch diſcoverer, afterwards gave the name of *New-Guinea* to its ſouth-weſtern part. Admiral Roggewain alſo touched here; and before him Dampier, 1ſt January 1700. Captain Cook made the coaſt of New-Guinea, in latitude 6 deg. 15. min. longitude 138. eaſt, on the 3d of September, and landed in the pinnace, accompanied by Mr Banks, Doctor Solander, nine of the ſhip's crew, and ſervants well armed, and leaving two ſeamen to take care of the boat advanced ſome little way up the country; but coming to the ſkirts of a thick wood, they judged it prudent to proceed no further, leſt they ſhould fall into an ambuſcade of the natives, and their retreat to the boat be cut off. Having advanced about a quarter of a mile from the boat, three Indians ruſhed out of the wood with a hideous ſhout; they threw their darts, and ſhowed ſuch a hoſtile diſpoſition, that the party, to prevent the deſtruction of theſe people, returned to the boat, as they had no intention forcibly to invade their country, either to gratify their appetites or curioſity, and it was evident nothing could be done upon friendly terms. When they got on board the boat, they rowed along the ſhore, and the number of Indians aſſembled ſeemed to be between ſixty and a hundred. They made much the ſame appearance as the New-Hollanders, being ſtark naked, and their hair cropped ſhort. All the while they were ſhouting defiance, and throwing ſomething out of their hand which burnt exactly like gun-powder, but made no report; what theſe fires were, or for what purpoſe intended, could not be gueſſed at; thoſe who diſcharged them had in their hands a ſhort piece of ſtick, poſſibly a hollow cane, which they ſwung ſidewiſe from them, and immediately fire and ſmoke iſſued, exactly reſembling the diſcharge of a muſket, and of no longer duration. This wonderful phænomenon was obſerved from the ſhip; and the deception was ſo great, that the people on board thought they had fire-arms, and event in the boat, if they had not been ſo near as that, they muſt have heard the report, if there had been any, they ſhould have thought they had been firing volleys. After looking at them attentively ſome time, without making any notice of their flaſhing and vociferation, the ſailors fired ſome muſkets over their heads. Upon hearing the balls rattle among the trees, they walked leiſurely away, and the boat returned to the ſhip. Upon examining ſome weapons which the natives had thrown, they were found to be light darts, about four feet long, very ill made, of a reed or bamboo cane, and pointed with hard wood, in which there were many barbs. They were diſcharged with great force, for at ſixty yards diſtance they went beyond the party; but in what manner they were thrown could not be exactly ſeen. But the general opinion was, that they were thrown with a ſtick in the manner practiſed by the New-Hollanders.

The land here is very low, as is every other part of the coaſt; but it is covered with a luxuriance of wood and herbage that can ſcarcely be conceived. Here the cocoa-nut, plantain, and bread-fruit, flouriſh in the higheſt perfection.

Guinea is alſo the name of a Britiſh gold coin, value 1 l. 1 ſh. Sterling.

Guinea *Hen*, in ornithology. See Numidia.

Guinea-*Pig*, in zoology. See Mus.

GUIPUSCOA, the north-eaſt diviſion of the province of Biſcay in Spain, ſituated on the confines of Navarre.

GUISE, ſmall town of France, in Picardy, and in Tierache, with a very ſtrong caſtle, and the title of a duchy. It is ſeated on the river Ouſe, in E. Lon. 3. 42. N. Lat. 49. 54.

GUISE (Henry) of Lorrain, duke of Guiſe, (eldeſt ſon of Francois of Lorrain duke of Guiſe) memorable in the hiſtory of France as a gallant officer; but an imperious, turbulent, ſeditious ſubject, who placed himſelf at the head of an armed force, and called his rebel band, The League. The plan was formed by the cardinal, his younger brother; and under the pretext of defending the Roman Catholic religion, the king Henry III. and the freedom of the ſtate, againſt the deſign of the Huguenots, or French Proteſtants, they carried on a civil war, maſſacred the Hugenots, and governed the king, who forbid his appearance at Paris: but Guiſe now became an open rebel, entered the city againſt the king's expreſs order, and put to the ſword all who oppoſed him; the ſtreets being barricadoed to prevent his progreſs, this fatal day is called in the French hiſtory, The day of the barricades. Maſters of Paris, the policy of the Guiſes failed them: for they ſuffered the king to eſcape to Blois, though he was deſerted in his palace at Paris by his very guards. At Blois, Henry convened an aſſembly of the ſtates of France; the duke of Guiſe had the boldneſs to appear to a ſummons ſent him for that purpoſe; a forced reconciliation took place between him and the king, by the advice of this aſſembly; but it being accidentally diſcovered, that Guiſe had formed a plan to dethrone the king, that weak monarch, inſtead of reſolutely bringing him to juſtice, had him privately aſſaſſinated, December 23, 1558, in the 38th year of his age. His brother the cardinal ſhared the ſame fate the next day.

GUITTAR, Guitarra, a muſical inſtrument of the ſtringed kind, with five double rows of ſtrings; of which thoſe that are baſs are in the middle, except it be for the burthen, an octave lower than the fourth.—This inſtrument was firſt uſed in Spain, and by the Italians. In the former country it is ſtill greatly in vogue. There are few of that nation who cannot play on the guittar; and with this inſtrument they ſerenade their miſtreſſes at night. At Madrid, and other cities in that country, it is common to meet in the ſtreets young men equipped with a guittar and a dark lanthorn, who, taking their ſtation under the windows, ſing, and accompany their voices with this inſtrument; and there is ſcarce an artificer or day-labourer in any of the cities or principal towns, who does not entertain himſelf with his guittar.

GULES, in heraldry, a corruption of the French word *geules*, which in this ſcience ſignifies *red*, and is repreſented in engraving by perpendicular lines. It may ſerve of itſelf to denote martial proweſs, boldneſs, and hardineſs: for the ancients uſed this colour to make themſelves terrible to their enemies, to ſtir up magnanimity, and to prevent the ſeeing of blood, by the likeneſs of the colours; for which reaſon perhaps it is uſed by the Engliſh. But, according to G. Leigh, if this tincture is compounded with

Or.	it ſignifies	Deſire.
Arg.		Envy.
Azu.		Ardour.
Ver.		Streugth.
Pur.		Juſtice.
Sab.		Wearineſs.

This colour is by the generality of the Engliſh heralds ranked before azure; but French heralds, N. Upton and his followers, prefer azure to it.

GULL, in ichthyology. See Larus.

GULF, a broad and capacious bay comprehended between two promontories, and ſometimes taking the name of a *ſea* when it is very extenſive; but particularly when it only communicates with the ſea by means of a ſtreight. Such are the Euxine or Black Sea, otherwiſe called *the Gulf of Conſtantinople;* the Adriatic Sea, called alſo *the Gulf of Venice;* the gulf of Sidra near Barbary; and the gulf of Lions near France. All theſe gulfs are in the Mediterranean. There are, beſides the gulf of Mexico, the gulf of St Lawrence, and the gulf of California, which are in North America. There are alſo the gulf of Perſia, otherwiſe called *the Red Sea*, between Perſia and Arabia; the gulf of Bengal in India; and the gulfs of Cochinchina and Kamtſchatka, near the countries of the ſame name. See 2d Plate CXVI.

The word comes from the French *golfe*, and that from the Italian *golfo*, which ſignify the ſame. Some deduce theſe further from the Greek γολπος; which Guiſhart again derives from the Hebrew כאב, *gob*. Du Cange derives them from the barbarous Latin *gulfum*, or *gulfus*, which ſignify the ſame thing.

GUM *(Gumma)*, in medicine, is a tumour ariſing out of the ſubſtance of a bone; it is ſo ſoft as to yield to the finger. When theſe tumours are harder they are called *tophs*; when harder ſtill, they receive the name of *nodes*: but the hardeſt tumours in bones are *exoſtoſes*. In venereal patients ſuch tumours often happen on the head, and even in the middle of the moſt ſolid bones. They ſeem to be produced when the veſſels running between the bony laminæ, being either obſtructed or inflamed, are dilated, and ſo raiſe the incumbent laminæ. Perhaps the bone degenerates too into a morbid ſoftneſs. A ſoftneſs of the bones ſometimes ſucceeds abſceſſes of the adjacent parts; and ſometimes the origin of the diſorder is lodged in the ſubſtance of the bone, eſpecially in the lues venerea; gummata have, however, been diſcovered, when no ſuch adequate cauſe could be obſerved.

Gum *(Gummi)*, is a concrete vegetable juice, of no particular ſmell or taſte, becoming viſcous and tenacious when moiſtened with water; totally diſſolving in water into a liquid, more or leſs glutinous in proportion to the quantity of the gum; not diſſolving in vinous ſpirits or in oils; burning in the fire to a black coal, without melting or catching flame; ſuffering no diſſipation in the heat of boiling water.

The true gums are gum arabic, gum tragacanth, gum ſenega, the gum of cherry and plum trees, and ſuch like. All elſe have more or leſs of reſin in them.

The virtues of gums are ſimilar to all mucilaginous ſubſtances in general, vegetable and animal; the more tenacious, glutinous, vegetable productions are called *gums*, thoſe that are leſs ſo are *mucilages*. The firſt diſtil naturally from trees, the ſecond are the produce of art.

Gum *Arabic*, called alſo *Gum Acanthinum*, *Gum Thebaicum*, *Gum Serapionis*, and the true *Gum Acacia*. It exſudes from the Egyptian acacia, or thorn-tree, whoſe fruit affords the inſpiſſated juice of that name. It is brought from Turkey in ſmall irregular maſſes, of a clear whitiſh, or very pale yellow colour.

The gum ſenega is generally ſold for it; but they are thus diſtinguiſhed: the gum arabic is in whitiſh tranſparent pieces, and is dry and brittle; but the gum ſenega is clammy, tenacious, rougher, of a deeper colour, and in larger pieces.

The gum does not diſſolve in ſpirit, nor in oil: yet when it is ſoftened with water into a mucilage, it is eaſily miſcible with both; alſo with reſins, and renders them miſcible with water. Dr Grew was uſed to mix eſſential oil with water by means of gum arabic; and in the Lond. Med. Obſ. and Inq. vol. i. a variety of experiments are inſerted, by which it appears that oils both expreſſed and diſtilled, reſins, balſams, &c. may by the ſame means be mixed uniformly with water or with ſpirit. Alkaline ſalts both fixed and volatile, though they render pure oil miſcible with water, prevent the mixture of gum with oil. Acids do not in the leaſt prevent the effect of the gum in this particular.

Animal glues have the general qualities of the vegetable gums; with this difference, that the former are more nutrimental, and apt to run into a putrid ſtate. Conſidered as the ſubjects of chemiſtry, their difference is very great: thoſe of the animal kind are changed by fire into a volatile alkaline ſalt, and a fetid oil; the vegetable into an acid liquor, and a very minute portion of oily matter conſiderably leſs fetid than the former.

The medical character of gum arabic is its glutinous quality, in conſequence of which it ſerves to incraſſate and obtund thin acrid humours, ſo proves uſeful in tickling coughs, alvine fluxes, hoarſneſſes, in fluxes of the belly with gripes, and where the mucus is abraded from the bowels or from the urethra. In a dyſuria the true gum arabic is more cooling than the other ſimple gums, ſo ſhould be preferred.

One ounce of gum arabic renders a pint of water conſiderably glutinous; four ounces gives it a thick ſyrupy conſiſtence: but for mucilage, one part gum to two parts water is required; and for ſome purpoſes an equal proportion will be neceſſary.

In Dr Percival's Eſſays we have the following curious account, by Mr Henry, of the faculty which this gum hath of diſſolving and keeping ſuſpended in water not only reſinous but alſo other ſubſtances, which ſhould ſeem not likely to be at all affected by it.

Vol. I. 319, &

"One ſcruple of balſam of tolu, rubbed with half an ounce of diſtilled rain-water, added gradually to it, for 15 minutes, formed a mixture, which on ſtanding about a minute ſubſided, but re-united by ſhaking: being ſet by a few days, the balſam became a concrete maſs, not again miſcible by ſhaking up the bottle. The ſame quantity required more trituration to mix it with common pump-water. One ſcruple of the ſame, rubbed with 15 grains of gum arabic, was nearly as long in perfectly uniting with half an ounce of diſtilled water, as that without the gum. This was perhaps owing to the latter piece being more reſinous; however, though on long ſtanding there was a ſmall ſediment, it immediately reunited a week after by agitation. Fifteen grains of balſam capivi united very ſmoothly with half an ounce of diſtilled water, by the medium of three grains of gum arabic. Five grains of the gum were not ſo effectual with pump-water. Balſam Peru ten drops, with gum arabic three grains, diſtilled water half an ounce, formed a neat white emulſion, but with common water a very unequal mixture. Gum myrrh powdered, that there might be no difference in the ſeveral quantities uſed, half a ſcruple, diſſolved readily with gum arabic three grains, in both kinds of water, and even mixed with them by longer trituration without any medium, but more eaſily with diſtilled than common ſpring water. Olibanum, maſtich, gum guaiacum, and galbanum, may likewiſe be mixed with water by rubbing, without any gum arabic or egg. The ſpring-water made uſe of in theſe experiments was very aluminous.

“ In the making of all the ſaline preparations, when any conſiderable quantities of water are uſed, diſtilled or pure rain or river water is greatly to be preferred: for the calcareous, aluminous, and ſelenitical matter, which ſo much abounds in moſt ſpring water, will render any ſalt diſſolved in it very impure.

“ The ſolution of crude mercury with mucilage of gum arabic being ſo eaſily accompliſhed; and it being very diſagreeable to many patients, and to ſome almoſt impoſſible, to ſwallow pills, boluſes, or electuaries; I was induced to try whether calomel, cinnabar, and the other heavy and metalline bodies commonly adminiſtered only under theſe forms, might not by the ſame means be rendered miſcible with water, ſo as to be given more agreeably in a liquid form. I accordingly rubbed ten grains of cinnabar of antimony and a ſcruple of gum arabic, with a ſufficient quantity of diſtilled water to form a mucilage, and added a drachm of ſimple ſyrup, and three drachms more of water. This makes an agreeable little draught; and having ſtood about half an hour without depoſiting any ſediment, I added three drachms more of water to it; and notwithſtanding the mucilage was rendered ſo much more dilute, very little of the cinnabar ſubſided, even after it had ſtood ſome days.

“ Steel ſimply prepared, and prepared tin, were both mixed with water by their own weight of gum arabic, and remained ſuſpended, except a very ſmall portion of each, which was not reduced to a ſufficiently fine powder.

“ Five grains of calomel were mixed with two drachms of diſtilled water, and half a drachm of ſimple ſyrup, by means of five grains of gum arabic, which kept it ſufficiently ſuſpended: a double quantity of the gum preſerved the mixture uniform ſtill longer. In this form it will be much more eaſily given to children, than in ſyrups, conſerves, &c. as a great part of it is generally waſted, in forcing thoſe viſcid vehicles into them; and it may be joined with ſcammony and other reſinous purgatives by the ſame method, and of theſe perhaps the gum arabic would be the beſt corrector.

“ Gum arabic likewiſe greatly abates the diſagreeable taſte of the corroſive ſublimate, mixed with water inſtead of brandy; and (from the few trials I have made) ſits eaſier on the ſtomach, and will not be ſo apt to betray the patient by the ſmell of the brandy.

Mr Plenck, who firſt inſtructed us in the method of mixing quickſilver with mucilage, obſerves, (and experience confirms the truth of it), that this preparation is not ſo apt to bring on a ſpitting as the *argent. viv.* mixed by any other medium, or as the ſaline and other mercurial preparations.—How far the theory by which he accounts for it may be juſt, is not of much importance; but it may perhaps be worth while to inquire whether it would not be equally effectual in preventing calomel, and the other preparations of mercury, from affecting the mouth.—If ſo, is it not improper, where a ſalivation is intended, to give emulſions with gum arabic and other mucilaginous liquors for the patient's common drink, as by that means the ſpitting may be retarded? And on the contrary, may it not be a uſeful medicine to diminiſh the diſcharge when too copious?

“ The following caſe may in ſome meaſure ſerve to confirm the above obſervation.—A gentleman, always eaſily affected by mercurials, having taken about 26 grains of calomel in doſes from one to three grains, notwithſtanding he was purged every third day, was ſuddenly ſeized with a ſalivation. He ſpat plentifully, his breath was very fetid, teeth looſe, and his gums, fauces, and the margin of his tongue, greatly ulcerated and inflamed. He was directed to uſe the following gargle. ℞. *Gum. arab. ſemiunc. ſolve in aquæ font. bullient.-ſelib. & adde mel. roſac. unc. unam. M. ft. gargar.* And to drink freely of a ptiſan prepared with *aq. hord. lib. ij. gum. arabic. unc. ij. nitr. pur. drachm. ij. ſacchar. alb. unc. j.*

“ His purgative was repeated the ſucceeding morning. The next day his gums were leſs inflamed; but the ſloughs on his tongue, &c. were ſtill as foul: his ſpitting was much the ſame: he had drank about a pint of the ptiſan.—Some *ſpt. vitrioli* was added to the gargle.—From this day to the fourth, he was purged every day without effect—his ſalivation ſtill continued,—his mouth was no better—he had neglected the mucilaginous drink—This evening he was perſuaded to drink about a pint of it which remained, and he had it repeated, and drank very freely of it that night.—On the fifth morning, the purgative was again repeated. Though it operated very little, yet the change was very ſurpriſing; his mouth was nearly well, and his ptyaliſm greatly decreaſed—The ptiſan was repeated; and on the ſixth day, being quite well, he was permitted to go abroad.”

In Mr Haſſelquiſt's travels we have an inſtance of the extraordinary nutritive virtues of this gum. “ The Abyſſinians, (ſays he), make a journey every year to Cairo, to ſell the products of their country. They muſt travel over terrible deſarts, and their journey depends as much on the weather as a voyage at ſea: conſequently they know as little as a ſeaman how long they muſt be on their journey; and the neceſſaries of life may chance to fail them when the journey laſts too long. This happened to the Abyſſinian caravan in the year 1740, their proviſions being conſumed when they had ſtill two months to travel. They were then obliged to ſearch for ſomething among their merchandiſe, wherewith they might ſupport nature; and found nothing more proper than gum Arabic, of which they had carried a conſiderable quantity along with them. This ſerved to ſupport above 1000 perſons for two months; and the caravan at laſt arrived at Cairo without any great loſs of people, either by hunger or diſeaſes.”

GUM *Seneca*, is a gum extremely reſembling gum Arabic. It is brought to us from the country through which the river Senega runs, in looſe or ſingle drops; but theſe are much larger than thoſe of the gum arabic uſually are; ſometimes it is of the bigneſs of an egg, and ſometimes much larger: the ſurface is very rough, or wrinkled; and appears much leſs bright than the inner ſubſtance, where the maſſes are broken. It has no ſmell, and ſcarce any taſte. We are not acquainted with the tree which produces it. The virtues of it are the ſame with the gum arabic; but it is rarely uſed in medicine, unleſs as mixed with the gum arabic: the dyers and other artificers conſume the great quantities of it that are annually imported hither. The negroes diſſolve it in milk, and in that ſtate make it a principal ingredient in many of their diſhes, and often feed on it thus alone.

Gum *Tragacanth*, the gum of the tragacanth, a thorny buſh growing in Crete, Aſia, and Greece. This gum is of a much ſtronger body than either of the foregoing, and does not ſo perfectly diſſolve in water. A dram of it will give the conſiſtence of a ſyrup to a whole pint of water, which an ounce of gum arabic will ſcarce do. Hence it is uſed for forming troches and the like purpoſes, in preference to the other gums. In its general medicinal virtues, it agrees with gum arabic.

Other ſubſtances known by the name of *gums*, are as follow:

Gum *Aloes*, a preparation of aloes. See Pharmacy, n° 613.
Gum *Ammoniac*. See Ammoniac.
Gum *Elemi*. See Elemi.
Gum *Guaiacum*. See Guaiacum.
Gum *Lacca*. See Lacca.

Gum, among gardeners, a kind of gangrene incident to fruit-trees of the ſtone-kind, ariſing from a corruption of the ſap, which, by its viſcidity, not being able to make its way through the fibres of the tree, is, by the protruſion of other juice, made to extravaſate and ooze out upon the bark.

When the diſtemper ſurrounds the branch, it admits of no remedy; but when only on one part of a bough, it ſhould be taken off to the quick, and ſome cowdung clapped on the wound, covered over with a linnen cloth, and tied down. M. Quintinie directs to cut off the morbid branch two or three inches below the part affected.

Gums in anatomy, the hard fleſhly ſubſtance in either jaw, through which the teeth ſpring from the jawbone. See Anatomy, n° 26. g.

The gums are apt to become ſpongy, and to ſeparate from the teeth; but the cauſe is frequently a ſtony kind of cruſt, which forms itſelf therein, which when ſeparated, the gums ſoon return to their former ſtate, eſpecially if rubbed with a mixture of the infuſion of roſes four parts, and the tincture of myrrh one part.—The ſcurvy is another diſorder which affects the gums. This diſorder, when not manifeſt in any other part, ſometimes appears in this: indeed when a ſcorbutic diſorder invades the whole habit, its firſt ſymptom is a putrid ſtate of the gums.

GUN, in the military art, a fire-arm, or weapon of offence, which forcibly diſcharges a ball or other hard and ſolid matter through a cylindric tube, by means of inflamed gun-powder. See *Gun*-Powder.

The word gun now includes moſt of the ſpecies of fire-arms; piſtols and mortars being almoſt the only ones excepted from this denomination. They are divided into great and ſmall guns; the former including all that we alſo call cannon, ordnance, or artillery; the latter includes muſquets, carabines, muſquetoons, blunderbuſſes, fowling-pieces, &c.

It is not known at what time theſe weapons were firſt invented. Though, comparatively ſpeaking, the introduction of guns into the weſtern part of the world is but of a modern date; yet it is certain that in ſome parts of Aſia they have been uſed, though in a very rude and imperfect manner, for many ages.—Philoſtratus ſpeaks of a city near the river Hyphaſis in the Indies, which was ſaid to be impregnable, and that its inhabitants were relations of the gods, becauſe they threw thunder and lightning upon their enemies. Hence ſome imagine that guns were uſed by the eaſtern nations even in the time of Alexander the Great; but however this may be, many of our modern travellers aſſert that they were uſed in China as far back as the year of Chriſt 85, and have continued in uſe ever ſince.

The firſt hint of the invention of guns in Europe, is in the works of Roger Bacon, who flouriſhed in the 13th century. In a treatiſe wrote by him about the year 1280, he propoſes to apply the violent exploſive force of gun-powder, for the deſtruction of armies. In 1320, Bartholomew Schwartz, a German monk, is commonly ſaid to have invented gun-powder; tho' it is certainly known that this compoſition is deſcribed by Bacon in ſome of his treatiſes long before the time of Schwartz. The following is ſaid to have been the manner in which Schwartz invented gun-powder. Having pounded the materials for it in a mortar, which he afterwards covered with a ſtone; a ſpark of fire accidentally fell into the mortar, and ſet the mixture on fire: upon which the exploſion blew the ſtone to a conſiderable diſtance. Hence it is probable that Schwartz might be taught the ſimpleſt method of applying it in war; for Bacon ſeems rather to have conceived the manner of uſing it to be by the violent effort of the flame unconfined, and which is indeed capable of producing aſtoniſhing effects *. The figure and name of *mortars* given to a ſpecies of old artillery, and their employment (which was throwing great ſtone-bullets at an elevation) very much corroborates this conjecture.

Soon after the time of Schwartz, we find guns commonly made uſe of as inſtruments of war. Great guns were firſt uſed. They were originally made of iron bars ſoldered together, and fortified with ſtrong iron-hoops; ſome of which are ſtill to be ſeen, viz. one in the tower of London, two at Woolwich, and one in the royal arſenal at Liſbon. Others were made of thin ſheets of iron rolled up together, and hooped; and on emergencies they were made of leather, with plates of iron or copper. Theſe pieces were made in a rude and imperfect manner, like the firſt eſſays of many new inventions. Stone balls were thrown out of them, and a ſmall quantity of powder uſed on account of their weakneſs. Theſe pieces had no ornaments, were placed on their carriages by rings, and were of a cylindrical form. When or by whom they were made, is uncertain: the Venetians, however, uſed cannon at the ſiege of Claudia Jeſſa, now called *Chioggia*, in 1366, which were brought thither by two Germans, with ſome powder and leaden balls; as likewiſe in their wars with the Genoeſe in 1379. King Edward III. made uſe of cannon at the battle of Creſſy in 1346, and at the ſiege of Calais in 1347. Cannon were made uſe of by the Turks at the ſiege of Conſtantinople, then in poſſeſſion of the Chriſtians, in 1394, and in that of 1452, that threw a weight of 100 lb. but they generally burſt, either the firſt, ſecond, or third ſhot. Louis XII. had one caſt at Tours, of the ſame ſize, which threw a ball from the Baſtile to Charenton. One of thoſe famous cannon was taken at the ſiege of Dieu in 1546, by Don John de Caſtro; and is in the caſtle of St Juiliao da Barra, 10 miles from Liſbon: its length is 20 feet 7 inches, diameter at the centre 6 feet 3 inches, and it diſcharges a ball of 100 lb. It has neither dolphins, rings, nor button; is of a curious kind of metal; and has a large Indoſtan inſcription upon it, which ſays it was caſt in 1400.

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* See G *Powder*.

Formerly the cannon were dignified with uncommon names; for, in 1503, Louis XII. had 12 braſs cannon caſt, of an extraordinary ſize, called after the names of the 12 peers of France. The Spaniſh and Portugueſe called them after their ſaints. The emperor Charles V. when he marched before Tunis, founded the 12 Apoſtles. At Milan there is a 70 pounder, called the *Pimontelle;* and one at Bois-le-duc, called the *Devil.* A 60 pounder at Dover caſtle, called *Queen Elizabeth's pocket-piſtol.* An 80 pounder in the tower of London, (formerly in Stirling caſtle), called *Mounts-meg.* An 80 pounder in the royal arſenal at Berlin, called the *Thunderer.* An 80 pounder at Malaga, called the *Terrible.* Two curious 60 pounders in the arſenal at Bremen, called the *Meſſengers of bad news.* And laſtly, an uncommon 70 pounder in the caſtle of St Angelo at Rome, made of the nails that faſtened the copper-plates which covered the ancient Pantheon, with this inſcription upon it: *Ex clavis trabalibus porticus Agrippæ.*

In the beginning of the 15th century theſe uncommon names were generally aboliſhed, and the following more univerſal ones took place, viz.

		Pounders.	Cwt.
Cannon royal, or carthoun		= 48	about 90
Baſtard cannon, or ¾ carthoun		= 36	79
½ carthoun		= 24	60
Whole culverins		= 18	50
Demi culverins		= 9	30
Falcon		= 6	25
Sacker	loweſt ſort	= 5	13
	ordinary	= 6	15
	largeſt ſize	= 8	18
Baſiliſk		= 48	85
Serpentine		= 4	8
Aſpic		= 2	7
Dragon		= 6	12
Syren		= 60	81
Falconet		= 3, 2, & 1	15,10,5.

Moyens, which carried a ball of 10 or 12 ounces, &c.

Rabinet, which carried a ball of 16 ounces.

Theſe curious names of beaſts and birds of prey were adopted, on account of their ſwiftneſs in motion, or of their cruelty; as the falconet, falcon, ſacker, and culverin, &c. for their ſwiftneſs in flying; the baſiliſk, ſerpentine, aſpike, dragon, ſyren, &c. for their cruelty.

At preſent cannon take their names from the weight of the ball they diſcharge. Thus a piece that diſcharges a ball of 24 pounds, is called a 24 *pounder;* one that caries a ball of 12 pounds, is called a 12 *pounder:* and ſo of the reſt, divided into the following ſorts, viz.

Ship-guns, conſiſting in 42, 36, 32, 24, 18, 12, 9, 6, and 3 pounders.

Garriſon-guns, in 42, 32, 24, 18, 12, 9, and 6 pounders.

Battering-guns, in 24, 18, and 12 pounders.

Field-pieces, in 12, 9, 6, 3, 2, 1½, 1, and ½ pounders.

Mortars are thought to have been fully as ancient as cannon. They were employed in the wars of Italy, to throw balls of red-hot iron, ſtones, &c. long before the invention of ſhells. Theſe laſt are thought to be of German invention, and the uſe of them in war to have been taught by the following accident. A citizen of Venlo, at a certain feſtival celebrated in honour of the duke of Cleves, threw a number of ſhells, one of which fell on a houſe and ſet fire to it, by which misfortune the greateſt part of the town was reduced to aſhes. The firſt account of ſhells uſed for military purpoſes is in 1435, when Naples was beſieged by Charles VIII. Hiſtory informs us with more certainty, that ſhells were thrown out of mortars at the ſiege of Wachtendonk, in Guelderland, in 1588, by the Earl of Mansfield. Mr Malter, an Engliſh engineer, firſt taught the French the art of throwing ſhells, which they practiſed at the ſiege of Motte in 1634. The method of throwing red-hot balls out of mortars was firſt certainly put in practice at the ſiege of Stralſund in 1675 by the elector of Brandenburg; though ſome ſay in 1653 at the ſiege of Bremen. For the proper dimenſions of guns, their weight, the metal of which they are formed, &c. ſee the article Gunnery.

Muſkets were firſt uſed at the ſiege of Rhege in the year 1521. The Spaniards were the firſt who armed part of their foot with theſe weapons. At firſt they were very heavy, and could not be uſed without a reſt. They had match-locks, and did execution at a great diſtance. On their march, the ſoldiers carried only the reſts and ammunition, and had boys to bear their muſkets after them. They were very ſlow in loading; not only by reaſon of the unwieldineſs of their pieces, and becauſe they carried the powder and ball ſeparate, but from the time it took to prepare and adjuſt the match; ſo that their fire was not near ſo briſk as ours is now. Afterwards a lighter matchlock-muſquet came in uſe: and they carried their ammunition in bandeliers, to which were hung ſeveral little caſes of wood, covered with leather, each containing a charge of powder. The balls were carried looſe in a pouch, and a priming horn hanging by their ſide. The muſkets with reſts were uſed as late as the beginning of the civil wars in the time of Charles I. The lighter kind ſucceeded them, and continued till the beginning of the preſent century, when they alſo were diſuſed, and the troops throughout Europe armed with firelocks.

GUNELLUS, in ichthyology. See Blennius.

GUNNER, an officer appointed for the ſervice of the cannon; or one ſkilled to fire the guns.

In the tower of London, and other garriſons, as well as in the field, this officer carries a field ſtaff, and a large powder-horn in a ſtring over his left ſhoulder: he marches by the guns; and when there is any apprehenſion of danger, his field-ſtaff is armed with match: his buſineſs is to lay the gun to paſs, and to help to load and traverſe her.

Maſter GUNNER, a patent-officer of the ordinance, who is appointed to teach all ſuch as learn the art of gunnery, and to certify to the maſter-general the ability of any perſon recommended to be one of the king's gunners. To every ſcholar he adminiſters an oath, not to ſerve, without leave, any other prince or ſtate; or teach any one the art of gunnery, but ſuch as have taken the ſaid oath.

GUNNERY,

IS the art of charging, directing, and exploding fire arms, as cannons, mortars, muſkets, &c. to the beſt advantage.—As this art depends greatly on having the guns and ſhot of a proper ſize and figure, and well adapted to each other, it hence follows that the proper dimenſions, &c. of cannon and ſmall arms come properly to be conſidered under the preſent article.

SECT. I. *Hiſtory of Gunnery.*

1
Hiſtory.

THE ancients, who knew not the uſe of gun-powder and fire-arms, had, notwithſtanding, machines which were capable of diſcharging ſtones, darts, and arrows, with great force. Theſe were actuated chiefly by the elaſtic force of ropes, or of ſtrong ſprings, and required a great number of men to work them; for which reaſon, the exploſion of gun-powder, as acting inſtantaneouſly, and ſeemingly with irreſiſtible force, ſeemed to be a moſt proper ſuccedaneum for all the powers by which the military engines in former times were actuated. It ſoon appeared, however, that this force was not very eaſily applied. Though the experiment of Bartholomew Schwartz, mentioned under the article GUN, had given a good hint towards this application in a ſucceſsful manner, yet the violent reaction of the inflamed powder on the containing veſſels rendered them very apt to burſt, to the great danger of thoſe who ſtood near them. The gun-powder in thoſe days, therefore, was much weaker than it is now made; tho' this proved a very inſufficient remedy for the inconvenience abovementioned. It was alſo ſoon diſcovered, that iron bullets of much leſs weight than ſtone ones would be more efficacious if impelled by greater quantities of ſtronger powder. This occaſioned an alteration in the matter and form of the cannon, which were now caſt of braſs. Theſe were lighter and more manageable than the former, at the ſame time that they were ſtronger in proportion to their bore. Thus they were capable of enduring greater charges of a better powder than what had been formerly uſed; and their iron bullets, (which were from 40 to 60 pounds weight, being impelled with greater velocities, were more effectual than the heavieſt ſtones could ever prove. This change took place about the latter end of the 15th century.

By this means powder compounded in the manner now practiſed over all Europe came firſt in uſe. But the change of the proportion of materials was not the only improvement it received. The method of graining it is undoubtedly a conſiderable advantage. At firſt the powder was always in the form of fine meal, ſuch as it was reduced to by grinding the materials together. It is doubtful whether the firſt graining of powder was intended to increaſe its ſtrength, or only to render it more convenient for filling into ſmall charges and the charging of ſmall arms, to which alone it was applied for many years, whilſt meal-powder was ſtill made uſe of for cannon. But at laſt the additional ſtrength which the grained powder was found to acquire from the free paſſage of the air between the grains, occaſioned the meal-powder to be entirely laid aſide.

For the laſt two hundred years, the formation of cannon hath been very little improved; the beſt pieces of modern artillery differing little in their proportions from thoſe uſed in the time of Charles V. Indeed lighter and ſhorter pieces have been often propoſed and eſſayed; but though they have their advantages in particular caſes, yet it ſeems now to be agreed that they are altogether inſufficient for general ſervice. But though the proportions of the pieces have not been much varied within that period, yet their uſe and application have undergone conſiderable alterations; the ſame ends being now accompliſhed by ſmaller pieces than what were formerly thought neceſſary. Thus the battering cannon now univerſally approved of are thoſe formerly called *demi-cannons*, carrying a ball of 24 pounds weight; it being found by experience, that their ſtroke, though leſs violent than that of larger pieces, is yet ſufficiently adapted to the ſtrength of the uſual profiles of fortification; and that the facility of their carriage and management, and the ammunition they ſpare, give them great advantages beyond the whole cannons formerly employed in making breaches. The method alſo of making a breach, by firſt cutting off the whole wall as low as poſſible before its upper part is attempted to be beat down, ſeems alſo to be a conſiderable modern improvement in the practical part of gunnery. But the moſt conſiderable improvement in the practice is the method of firing with ſmall quantities of powder, and elevating the piece ſo that the bullet may juſt go clear of the parapet of the enemy, and drop into their works. By this means the bullet, coming to the ground at a ſmall angle and with a ſmall velocity, does not bury itſelf, but bounds or rolls along in the direction in which it was fired: and therefore, if the piece be placed in a line with the battery it is intended to ſilence, or the front it is to ſweep, each ſhot rakes the whole length of that battery or front; and has thereby a much greater chance of diſabling the defendants, and diſmounting their cannon, than it would have if fired in the common manner. This method was invented by Vauban, and was by him ſtyled *Batterie a Ricochet*. It was firſt put in practice in the year 1692 at the ſiege of Aeth.—Something ſimilar to this was put in practice by the king of Pruſſia at the battle of Roſbach in 1757. He had ſeveral ſix-inch mortars, made with trunnions and mounted on travelling carriages, which fired obliquely on the enemy's lines and amongſt their horſe. They were charged with eight ounces of powder, and elevated at an angle of one degree fifteen minutes, and did great execution; for the ſhells rolling along the lines with burning fuſes made the ſtouteſt of the enemy not wait for their burſting.

Sect. II. *Theory of Gunnery.*

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The uſe of fire-arms had been known for a long time before any theory concerning them was attempted. The firſt author who wrote profeſſedly on the flight of cannon-ſhot was Tartalea. In 1537 he publiſhed a book, at Venice, entitled *Nova Scientia;* and afterwards another, entitled *Quæſiti et Inventioni diverſi*, printed at the ſame place in 1546, in which he treats profeſſedly on theſe motions. His diſcoveries were but few, on account of the imperfect ſtate of mechanical knowledge at that time. However, he determined, that the greateſt range of cannon was with an elevation of 45 degrees. He likewiſe determined, (contrary to the opinion of practitioners), that no part of the track deſcribed by a bullet was a right line; although the curvature was in ſome caſes ſo little, that it was not attended to. He compared it to the ſurface of the ſea; which, though it appears to be a plane, is yet undoubtedly incurvated round the centre of the earth. He alſo aſſumes to himſelf the invention of the gunner's quadrant, and often gave ſhrewd gueſſes at the event of ſome untried methods. But as he had not opportunities of being converſant in the practice, and founded his opinions only on ſpeculation, he was condemned by moſt of the ſucceeding writers, though often without any ſufficient reaſon. The philoſophers of thoſe times alſo intermeddled in the queſtions hence ariſing; and many diſputes on motion were ſet on foot (eſpecially in Italy), which continued till the time of Galileo, and probably gave riſe to his celebrated *Dialogues on motion*. Theſe were publiſhed in the year 1638; but in this interval, and before Galileo's doctrine was thoroughly eſtabliſhed, many theories of the motion of military projectiles, and many tables of their comparative ranges at different elevations, were publiſhed; all of them egregiouſly fallacious, and utterly irreconcileable with the motions of theſe bodies. Very few of the ancients indeed refrained from indulging themſelves in ſpeculations concerning the difference betwixt natural, violent, and mixed motions; although ſcarce any two of them could agree in their theories.

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It is ſtrange, however, that, during all theſe conteſts, ſo few of thoſe who were intruſted with the charge of artillery thought it worth while to bring theſe theories to the teſt of experiment. Mr Robins informs us, in his Preface to the *New Principles of Gunnery*, that he had met with no more than four authors who had treated on this ſubject. The firſt of theſe is Collado, who has given the ranges of a falconet carrying a three-pound ſhot to each point of the gunner's quadrant. But from his numbers it is manifeſt, that the piece was not charged with its cuſtomary allotment of gun-powder. The reſults of his trials were, that the point-blank ſhot, or that in which the path of the ball did not ſenſibly deviate from a right line, extended 268 paces. At an elevation of one point (or $7^{\circ}\frac{1}{2}$ of the gunner's quadrant) the range was 594 paces; at an elevation of two points, 794 paces; at three points, 954 paces; at four, 1010; at five, 1040; and at ſix, 1053 paces. At the ſeventh point, the range fell between thoſe of the third and fourth; at the eighth point, it fell between the ranges of the ſecond and third; at the ninth point, it fell between the ranges of the firſt and ſecond; at the tenth point, it fell between the point-blank diſtance and that of the firſt point; and at the eleventh point, it fell very near the piece.—The paces ſpoke of by this author are not geometrical ones, but common ſteps.

The year after Collado's treatiſe, another appeared on the ſame ſubject by one Bourne an Engliſhman. His elevations were not regulated by the points of the gunner's quadrant, but by degrees; and he aſcertains the proportions between the ranges at different elevations and the extent of point-blank ſhot. According to him, if the extent of the point-blank ſhot be repreſented by 1, the range at 5° elevation will be $2\frac{2}{9}$, at 10° it will be $3\frac{1}{3}$, at 15° it will be $4\frac{1}{3}$, at 20° it will be $4\frac{5}{6}$, and the greateſt random will be $5\frac{1}{2}$. This laſt, he tells us, is in a calm day when the piece is elevated to 42°; but according to the ſtrength of the wind. and as it favours or oppoſes the flight of the ſhot, it may be from 45° to 36°.—He hath not informed us with what piece he made his trials; tho' by his proportions it ſeems to have been a ſmall one. This however ought to have been attended to, as the relation between the extent of different ranges varies extremely according to the velocity and denſity of the bullet.

After him Eldred and Anderſon, both Engliſhmen, publiſhed treatiſes on this ſubject. The firſt publiſhed his treatiſe in 1646, and has given the actual ranges of different pieces of artillery at ſmall elevations all under ten degrees. His principles were not rigorouſly true, though not liable to very conſiderable errors; yet, in conſequence of their deviation from the truth, he found it impoſſible to make ſome of his experiments agree with his principles.

4
Galileo's theory.

In 1638, Galileo printed his dialogues on motion. In theſe he pointed out the general laws obſerved by nature in the production and compoſition of motion; and was the firſt who deſcribed the action and effects of gravity on falling bodies. On theſe principles he determined, that the flight of a cannon ſhot, or any other projectile, would be in the curve of a parabola, except in as far as it was diverted from that track by the reſiſtance of the air. He has alſo propoſed the means of examining the inequalities which ariſe from thence, and of diſcovering what ſenſible effects that reſiſtance would produce in the motion of a bullet at ſome given diſtance from the piece.

Though Galileo had thus ſhewn, that, independent of the reſiſtance of the air, all projectiles would, in their flight, deſcribe the curve of a parabola; yet thoſe who came after him, ſeem never to have imagined that it was neceſſary to conſider how far the operations of gunnery were affected by this reſiſtance. The ſubſequent writers indeed boldly aſſerted, without making the experiment, that no conſiderable variation could ariſe from the reſiſtance of the air in the flight of ſhells or cannon-ſhot. In this perſuaſion they ſupported themſelves chiefly by conſidering the extreme rarity of the air, compared with thoſe denſe and ponderous bodies; and at laſt it became an almoſt generally eſtabliſhed maxim, that the flight of theſe bodies was nearly in the curve of a parabola.

In

5
New theory by Anderſon.

In 1674, Mr Anderſon above-mentioned publiſhed his treatiſe on the nature and effects of the gun; in which he proceeds on the principles of Galileo, and ſtrenuouſly aſſerts, that the flight of all bullets is in the curve of a parabola; undertaking to anſwer all objections that could be brought to the contrary. The ſame thing was alſo undertaken by Mr Blondel, in a treatiſe publiſhed at Paris in 1683; where, after long diſcuſſion, the author concludes, that the variations from the air's reſiſtance are ſo ſlight as ſcarce to merit notice. The ſame ſubject is treated of in the Philoſophical Tranſactions, N° 216. p. 68. by Dr Halley: and he alſo, ſwayed by the very great diſproportion between the denſity of the air, and that of iron or lead, thinks it reaſonable to believe, that the oppoſition of the air to large metal-ſhot is ſcarcely diſcernible; although in ſmall and light ſhot he owns that it muſt be accounted for.

But though this hypotheſis went on ſmoothly in ſpeculation; yet Anderſon, who made a great number of trials, found it impoſſible to ſupport it without ſome new modification. For, though it does not appear that he ever examined the comparative ranges of either cannon or muſquet ſhot, when fired with their uſual velocities, yet his experiments on the ranges of ſhells thrown with ſmall velocities (in compariſon of thoſe above-mentioned), convinced him that their whole tract was not parabolical. But inſtead of making the proper inferences from hence, and concluding the reſiſtance of the air to be of conſiderable efficacy, he framed a new hypotheſis; which was, that the ſhell or bullet, at its firſt diſcharge, flew to a certain diſtance in a right line, from the end of which line only it began to deſcribe a parabola. And this right line, which he calls the *line* of the *impulſe* of the *fire*, he ſuppoſes to be the ſame in all elevations. Thus, by aſſigning a proper length to this line of impulſe, it was always in his power to reconcile any two ſhots made at different angles, let them differ as widely as we pleaſe to ſuppoſe. But this he could not have done with three ſhots; nor indeed doth he ever tell us the event of his experiments when three ranges were tried at one time.

6
Laws of the air's reſiſtance laid down by Newton.

When Sir Iſaac Newton's *Principia* was publiſhed, he particularly conſidered the reſiſtance of the air to projectiles which moved with ſmall velocities; but as he never had an opportunity of making experiments on thoſe which move with ſuch prodigious ſwiftneſs, he did not imagine that a difference in velocity could make ſuch differences in the reſiſtance as are now found to take place. Sir Iſaac found, that, in ſmall velocities, the reſiſtance was increaſed in the duplicate proportion of the ſwiftneſs with which the body moved; that is, a body moving with twice the velocity of another of equal magnitude, would meet with four times as much reſiſtance as the firſt, with thrice the velocity it would meet with nine times the reſiſtance, &c.—This principle itſelf is now found to be erroneous with regard to military projectiles; though, if it had been properly attended to, the reſiſtance of the air might even from thence have been reckoned much more conſiderable than was commonly done. So far, however, were thoſe who treated this ſubject ſcientifically, from giving a proper allowance for the reſiſtance of the atmoſphere, that their theories differed moſt egregiouſly from the truth. Huygens alone ſeems to have attended to this principle: for, in the year 1690, he publiſhed a treatiſe on Gravity, in which he gave an account of ſome experiments tending to prove, that the track of all projectiles moving with very ſwift motions was widely different from that of a parabola. All the reſt of the learned acquieſced in the juſtneſs of Galileo's doctrine, and very erroneous calculations concerning the ranges of cannon were accordingly given. Nor was any notice taken of theſe errors till the year 1716. At that time Mr Reſſons, a French officer of artillery, diſtinguiſhed by the number of ſieges at which he had ſerved, by his high military rank, and by his abilities in his profeſſion, gave in a memoir to the Royal Academy, of which he was a member, importing, that, "although it was agreed, that theory joined with practice did conſtitute the perfection of every art; yet experience had taught him, that theory was of very little ſervice in the uſe of mortars: That the works of M. Blondel had juſtly enough deſcribed the ſeveral parabolic lines, according to the different degrees of the elevation of the piece; but that practice had convinced him, there was no theory in the effect of gunpowder; for having endeavoured, with the greateſt preciſion, to point a mortar agreebly to theſe calculations, he had never been able to eſtabliſh any ſolid foundation upon them."

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Erroneous in military projectiles.

8
All theſe theories widely di ferent fr the truth

From the hiſtory of the academy, it doth not appear that the ſentiments of Mr Reſſon's were at any time controverted, or any reaſon offered for the failure of the theory of projectiles when applied to uſe. Nothing farther, however, was done till the time of Benjamin Robins, who in 1742 publiſhed a treatiſe, entitled, New Principles of Gunnery, in which he hath treated particularly not only of the reſiſtance of the atmoſphere, but almoſt every thing elſe relating to the flight of military projectiles, and indeed advanced the theory of gunnery much nearer perfection than ever it was before.

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Mr Robi firſt intr duces a t theory.

10
His met of deter ning the force of gun po der.

The firſt thing conſidered by Mr Robins, and which is indeed the foundation of all other particulars relative to gunnery, is the exploſive force of gunpowder. This he determined to be owing to an elaſtic fluid ſimilar to our atmoſphere, having its elaſtic force greatly increaſed by the heat. "If a red-hot iron (ſays he) be included in a receiver, and the receiver be exhauſted, and gunpowder be then let fall on the iron, the powder will take fire, and the mercurial gage will ſuddenly deſcend upon the exploſion; and though it immediately aſcends again, it will never riſe to the height it firſt ſtood at, but will continue depreſſed by a ſpace proportioned to the quantity of powder which was let fall on the iron.—The ſame production likewiſe takes place when gunpowder is fired in the air: for if a ſmall quantity of powder is placed in the upper part of a glaſs tube, the lower part of which is immerſed in water, and the fluid be made to riſe ſo near the top, that only a ſmall portion of air is left in that part where the gunpowder is placed; if in this ſituation the communication of the upper part of the tube with the external air is cloſed, and the gunpowder fired, which may be eaſily done by means of a burning-glaſs, the water will in this experiment deſcend on the exploſion, as the quickſilver did in the laſt; and will always continue depreſſed below the place at which it ſtood before

fore the exploſion. The quantity of this depreſſion will be greater if the quantity of powder be increaſed, or the diameter of the tube be diminiſhed.

"When any conſiderable quantity of gunpowder is fired in an exhauſted receiver, by being let fall on a red-hot iron, the mercurial gage inſtantly deſcends upon the exploſion, and as ſuddenly aſcends again. After a few vibrations, none of which except the firſt are of any great extent, it ſeemingly fixes at a point lower than where it ſtood before the exploſion. But even when the gage has acquired this point of apparent reſt, it ſtill continues riſing for a conſiderable time, although by ſuch imperceptible degrees, that it can only be diſcovered by comparing its place at diſtant intervals: however, it will not always continue to aſcend; but will riſe ſlower and ſlower, till at laſt it will be abſolutely fixed at a point lower than where the mercury ſtood before the exploſion. The ſame circumſtances nearly happen, when powder is fired in the upper part of an unexhauſted tube, whoſe lower part is immerſed in water.

"That the elaſticity or preſſure of the fluid produced by the firing of gunpowder is, *cæteris paribus*, directly as its denſity, may be proved from hence, that if in the ſame receiver a double quantity of powder be let fall, the mercury will ſubſide twice as much as in the firing of a ſingle quantity. Alſo the deſcents of the mercury, when equal quantities of powder are fired in different receivers, are reciprocally as the capacities of thoſe receivers, and conſequently as the denſity of produced fluid in each. But as, in the uſual method of trying this experiment, the quantities of powder are ſo very ſmall that it is difficult to aſcertain theſe proportions with the requiſite degree of exactneſs, I took a large receiver containing about 520 inches, and letting fall at once on the red-hot iron one drachm or the ſixteenth part of an ounce avoirdupois of powder, the receiver being firſt nearly exhauſted: the mercury, after the exploſion, was ſubſided two inches exactly, and all the powder had taken fire. Then heating the iron a ſecond time, and exhauſting the receiver as before, two drachms were let down at once, which ſunk the mercury three inches and three quarters; and a ſmall part of the powder had fallen beſide the iron, which (the bottom of the receiver being wet) did not fire, and the quantity which thus eſcaped did appear to be nearly ſufficient, had it fallen on the iron, to have ſunk the mercury a quarter of an inch more; in which caſe the two deſcents, viz. two inches and four inches, would have been accurately in the proportion of the reſpective quantities of powder; from which proportion, as was, they very little varied.

"As different kinds of gunpowder produce different quantities of this fluid, in proportion to their different degrees of goodneſs, before any definite determination of this kind can take place, it is neceſſary to aſcertain the particular ſpecies of p owder that is propoſed to be uſed. (Here Mr Robins determines in all his experiments to make uſe of government-powder, as conſiſting of a certain and invariable proportion of materials, and therefore preferable to ſuch kinds as are made according to the fancy of private perſons.)

"This being ſettled, we muſt further premiſe theſe two principles: 1. That the elaſtity of this fluid increaſes by heat and diminiſhes by cold, in the ſame manner as that of the air; 2. That the denſity of this fluid, and conſequently its weight, is the ſame with the weight of an equal bulk of air, having the ſame elaſticity and the ſame temperature. Now from the laſt experiment it appears, that $\frac{1}{16}$ of an ounce avoirdupoiſe or about 27 grains Troy of powder, ſunk the gage, on its exploſion, two inches; and the mercury in the barometer ſtanding at near 30 inches, $\frac{15}{16}$ths of an ounce avoirdupois, or 410 grains Troy, would have filled the receiver with a fluid whoſe elaſticity would have been equal to the whole preſſure of the atmoſphere, or the ſame with the elaſticity of the air we breathe; and the content of the receiver being about 520 cubic inches, it follows, that $\frac{15}{16}$ths of an ounce of powder will produce 520 cubic inches of a fluid poſſeſſing the ſame degree of elaſticity with the common air; whence, an ounce of powder will produce near 575 cubic inches of ſuch a fluid.

"But in order to aſcertain the denſity of this fluid, we muſt conſider what part of its elaſticity, at the time of this determination, was owing to the heat it received from the included hot-iron and the warm receiver. Now the general heat of the receiver being manifeſtly leſs than that of boiling water, which is known to increaſe the elaſticity of the air to ſomewhat more than $\frac{1}{4}$ of its augmented quantity; I collect from hence and other circumſtances, that the augmentation of elaſticity from this cauſe was about $\frac{1}{5}$ of the whole: that is, if the fluid ariſing from the exploſion had been reduced to the temperature of the external air, the deſcent of the mercurial gage, inſtead of two inches, would have been only $1\frac{1}{5}$ inch; whence 575, reduced in the proportion of five to four, becomes 460; and this laſt number repreſents the cubic inches of an elaſtic fluid equal in denſity and elaſticity with common air, which are produced from the exploſion of 1 ounce avoirdupoiſe of gunpowder; the weight of which quantity of fluid, according to the uſual eſtimation of the weight of air, is 131 grains; whence the weight of this fluid is $\frac{131}{437}$ or $\frac{3}{10}$ths nearly of the weight of the generating powder. The ratio of the bulk of gunpowder to the bulk of this fluid may be determined from conſidering that 17 drams avoirdupoiſe of powder fill two cubic inches, if the powder be well ſhook together: therefore, augmenting the number laſt found in the proportion of 16 to 17, the reſulting term $488\frac{3}{4}$ is the number of cubic inches of an elaſtic fluid, equal in denſity with the air produced from two cubic inches of powder: whence the ratio of the reſpective bulk of the powder, and of the fluid produced from it, is in round numbers as 1 to 244."—This calculation was afterwards juſtified by experiments.

"If this fluid, inſtead of expanding when the powder was fired, had been confined in the ſame ſpace which the powder filled before the exploſion; then it would have had, in that confined ſtate, a degree of elaſticity 244 times greater than that of common air; and this independent of the great augmentation this elaſticity would receive from the action of the fire in that inſtant.

"Hence, then, we are certain, that any quantity of powder fired in a confined ſpace, which it adequately fills, exerts, at the inſtant of its exploſion, againſt the ſides of the veſſel containing it, and the bodies it impels before it, a force at leaſt 244 times greater than the elaſticity of the common air, or, which is the ſame thing, than the preſſure of the atmoſphere; and this without conſidering the great addition which this force will receive from the violent degree of heat with which it is affected at that time.

"To determine how far the elaſticity of air is augmented when heated to the extremeſt degree of red-hot iron, I took a piece of a muſquet-barrel about ſix inches in length, and ordered one end to be cloſed up entirely; but the other end was drawn out conically, and finiſhed in an aperture of about $\frac{1}{8}$ of an inch in diameter. The tube thus fitted, was heated to the extremity of a red heat in a ſmith's forge; and was then immerged with its aperture downwards in a bucket of water, and kept there till it was cool; after which it was taken out carefully, and the water which had entered it in cooling was exactly weighed. The heat given to the tube at each time, was the beginning of what workmen call a *white heat*; and to prevent the ruſhing in of the aqueous vapour at the immerſion, which would otherwiſe drive out great part of the air, and render the experiment fallacious, I had an iron wire filed tapering, ſo as to fit the aperture of the tube, and with this I always ſtopped it up before it was taken from the fire, letting the wire remain in till the whole was cool, when, removing it, the due quantity of water would enter. The weight of the water thus taken in at three different trials was 600 grains, 595 grains, and 600 grains, reſpectively. The content of the whole cavity of the tube was 796 grains of water; whence the ſpaces remaining unfilled in theſe three experiments were 186, 201, and 196 grains reſpectively. Theſe ſpaces undoubtedly contained all the air which, when the tube was red-hot, extended thro' its whole concavity; conſequently the elaſticity of the air, when heated to the extreme heat of red-hot iron, was to the elaſticity of the ſame air, when reduced to the temperature of the ambient atmoſphere, as the whole capacity of the tube to the reſpective ſpaces taken up by the cooled air; that is, as 796 to 186, 201, 196; or, taking the medium of theſe three trials, as 796 to $194\frac{1}{3}$.

"As air and this fluid appear to be equally affected by heat and cold, and conſequently have their elaſticities equally augmented by the addition of equal degrees of heat to each; if we ſuppoſe the heat with which the flame of fired powder is endowed, to be the ſame with that of the extreme heat of red-hot iron, then the elaſticity of the generated fluid will be greater at the time of the exploſion than afterwards, when it is reduced to the temperature of the ambient air, in the ratio of 796 to $194\frac{1}{3}$ nearly. It being allowed then, (which ſurely is very reaſonable), that the flame of gunpowder is not leſs hot than red-hot iron, and the elaſticity of the air, and conſequently of the fluid generated by the exploſion, being augmented in the extremity of this heat in the ratio of $194\frac{1}{3}$ to 796, it follows, that if 244 be augmented in this ratio, the reſulting number which is $999\frac{1}{3}$, will determine how many times the elaſticity of the flame of fired powder exceeds the elaſticity of common air, ſuppoſing it to be confined in the ſame ſpace which the powder filled before it was fired.—Hence then the abſolute quantity of the preſſure exerted by gunpowder at the moment of its exploſion may be aſſigned; for, ſince the fluid then generated has an elaſticity of $999\frac{1}{3}$, or in round numbers 1000 times greater than that of the atmoſphere, and ſince common air by its elaſticity exerts a preſſure on any given ſurface equal to the weight of the incumbent atmoſphere with which it is in equilibrio, the preſſure exerted by fired powder before it dilated itſelf is 1000 times greater than the preſſure of the atmoſphere: and conſequently the quantity of this force, on a ſurface of an inch ſquare, amounts to above ſix ton weight; which force, however, diminiſhes as the fluid dilates itſelf.

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"But though we have here ſuppoſed that the heat of gunpowder, when fired in any conſiderable quantity, is the ſame with iron heated to the extremity of red heat, or to the beginning of a white heat, yet it cannot be doubted but that the fire produced in the exploſion is ſomewhat varied (like all other fires) by a greater or leſſer quantity of fuel; and it may be preſumed, that, according to the quantity of powder fired together, the flame may have all the different degrees, from a languid red heat, to that ſufficient for the vitrification of metals. But as the quantity of powder requiſite for the production of this laſt mentioned heat, is certainly greater than what is ever fired together for any military purpoſe, we cannot be far from our ſcope, if we ſuppoſe the heat of ſuch quantities as are uſually fired to be nearly the ſame with that of red-hot iron; allowing a gradual augmentation to this heat in larger quantities, and diminiſhing it when the quantities are very ſmall."

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Having thus determined the force of the gunpowder, Mr Robins next proceeds to determine the velocity with which the ball is diſcharged. The ſolution of this problem depends on the two following principles. 1. That the action of the powder on the bullet ceaſes as ſoon as the bullet is got out of the piece. 2. That all the powder of the charge is fired and converted into elaſtic fluid before the bullet is ſenſibly moved from its place.

"The firſt of theſe (ſays Mr Robins) will appear manifeſt when it is conſidered how ſuddenly the flame will extend itſelf on every ſide, by its own elaſticity, when it is once got out of the mouth of the piece; for by this means its force will then be diſſipated, and the bullet no longer ſenſibly affected by it.

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"The ſecond principle is indeed leſs obvious, being contrary to the general opinion of almoſt all writers on this ſubject. It might however be ſufficient for the proof of this poſition, to obſerve the prodigious compreſſion of the flame in the chamber of the piece. Thoſe who attend to this circumſtance, and to the eaſy paſſage of the flame through the intervals of the grains, may ſoon ſatisfy themſelves, that no one grain contained in that chamber can continue for any time uninflamed, when thus ſurrounded and preſſed by ſuch an active fire. However, not to rely on mere ſpeculation in a matter of ſo much conſequence, I conſidered, that if part only of the powder is fired, and that ſucceſſively; then by laying a greater weight before the charge, (ſuppoſe two or three bullets inſtead of one), a greater quantity of powder would neceſſarily be fired, ſince a heavier weight would be a longer time in paſſing through the barrel. Whence it ſhould follow, that two or three bullets would be impelled by a much greater force than one only. But the contrary to this appears by experiment; for firing one, two, and three bullets laid contiguous to each other with the ſame charge reſpectively, I have found that their velocities were not much different from the reciprocal of their ſubduplicate quantities of matter; that is, if a given charge would communicate to one bullet a velocity of 1700 feet in a ſecond, the ſame charge would communicate to two bullets a velocity from 1250 to 1300 feet in a ſecond, and to three bullets a velocity from 1050 to 1110 feet in the ſame time. From hence it appears, that, whether a piece is loaded with a greater or leſs weight of hullet, the action is nearly the ſame; ſince all mathematicians know, that if bodies containing different quantities of matter are ſucceſſively impelled through the ſame ſpace by the ſame power acting with a determined force at each point of that ſpace; then the velocities given to theſe different bodies will be reciprocally in the ſubduplicate ratio of their quantities of matter. The exceſs of the velocities of the two and three bullets above what they ought to have been by this rule, (which are that of 1200 and 980 feet in a ſecond) undoubtedly ariſes from the flame, which, eſcaping by the ſide of the firſt bullet, acts on the ſurface of the ſecond and third.

"Now, this exceſs has in many experiments been imperceptible, and the velocities have been reciprocally in the ſubduplicate ratios of the number of bullets, to ſufficient exactneſs; and where this error has been greater, it has never ariſen to an eighth part of the whole: but, if the common opinion was true, that a ſmall part only of the powder fires at firſt, and other parts of it ſucceſſively as the bullet paſſes through the barrel, and that a conſiderable part of it is often blown out of the piece without firing at all; then the velocity which three bullets received from the exploſion ought to have been much greater than we have found it to be.—But the truth of this ſecond poſtulate more fully appears from thoſe experiments, by which it is ſhewn, that the velocities of bullets may be aſcertained to the ſame exactneſs when they are acted on through a barrel of four inches in length only, as when they are diſcharged from one of four feet.

"With reſpect to the grains of powder which are often blown out unfired, and which are always urged as a proof of the gradual firing of the charge, I believe Diego Uffano, a perſon of great experience in the art of gunnery, has given the true reaſon for this accident; which is, that ſome ſmall part of the charge is often not rammed up with the reſt, but is left in the piece before the wad, and is by this means expelled by the blaſt of air before the fire can reach it. I muſt add, that, in the charging of cannon and ſmall arms, eſpecially after the firſt time, this is ſcarcely to be avoided by any method I have yet ſeen practiſed. Perhaps, too, there may be ſome few grains in the beſt powder, of ſuch an heterogeneous compoſition as to be leſs ſuſceptible of firing; which, I think, I have myſelf obſerved: and theſe, though they are ſurrounded by the flame, may be driven out unfired.

"Theſe poſtulates being now allowed to be juſt, let AB repreſent the axis of any piece of artillery, A the breech, and B the muzzle; DC the diameter of its bore, and DEGC a part of its cavity filled with powder. Suppoſe the ball that is to be impelled to lie with its hinder ſurface at the line GE; then the preſſure exerted at the exploſion on the circle of which GE is the diameter, or, which is the ſame thing, the preſſure exerted in the direction FB on the ſurface of the ball, is eaſily known from the known dimenſions of that circle. Draw any line FH perpendicular to FB, and AI parallel to FH; and through the point H, to the aſymptotes IA and AB, deſcribe the hyperbola KHNQ; then, if FH repreſents the force impelling the ball at the point F, the force impelling the ball at any other point as at M, will be repreſented by the line MN, the ordinate to the hyperbola at that point. For when the fluid impelling the body along has dilated itſelf to M, its denſity will be then to its original denſity in the ſpace DEGC reciprocally as the ſpaces through which it is extended; that is, as FA to MA, or as MN to FH; but it has been ſhewn, that the impelling force or elaſticity of this fluid is directly as its denſity; therefore, if FH repreſents the force at the point F, MN will repreſent the like force at the point M.

"Since the abſolute quantity of the force impelling the ball at the point F is known, and the weight of the ball is alſo known, the proportion between the force with which the ball is impelled and its own gravity is known. In this proportion take FH to FL, and draw LP parallel to FB; then, MN the ordinate to the hyperbola in any point will be to its part MR, cut off by the line LP, as the impelling force of the powder in that point M to the gravity of the ball; and conſequently the line LP will determine a line proportional to the uniform force of gravity in every point; whilſt the hyperbola HNQ determines in like manner ſuch ordinates as are proportional to the impelling force of the powder in every point; whence by the 39th Prop. of lib. I. of Sir Iſaac Newton's Principia, the areas FLPB and FHQB are in the duplicate proportion of the velocities which the ball would acquire when acted upon by its own gravity through the ſpace FB, and when impelled through the ſame ſpace by the force of the powder. But ſince the ratio of AF to AB and the ratio of FH to FL are known, the ratio of the area FLPB to the area FHQB is known; and thence its ſubduplicate. And ſince the line FB is given in magnitude, the velocity which a heavy body would acquire when impelled through this line by its own gravity is known; being no other than the velocity it would acquire by falling through a ſpace equal to that line: find then another velocity to which this laſt mentioned velocity bears the given ratio of the ſubduplicate of the area FLPB to the area FHQB; and this velocity thus found is the velocity the ball will acquire when impelled thro' the ſpace FB by the action of the inflamed powder.

"Now to give an example of this: Let us ſuppoſe AB, the length of the cylinder, to be 45 inches; its diameter DC, or rather the diameter of the ball, to be $\frac{3}{4}$ of an inch; and AF, the extent of the powder, to be $2\frac{1}{8}$ inches; to determine the velocity which will be communicated to a leaden bullet by the exploſion, ſuppoſing the bullet to be laid at firſt with its ſurface contiguous to the powder.

"By the theory we have laid down, it appears, that at the firſt inſtant of the exploſion the flame will exert, on the bullet lying cloſe to it, a force 1000 times greater than the preſſure of the atmoſphere. The medium preſſure of the atmoſphere is reckoned equal to a column of water 33 feet in height; whence, lead being to water as 11,345 to 1, this preſſure will be equal to that of a column of lead 34,9 inches in height. Multiplying this by 1000, therefore, a column of lead 34900 inches (upwards of half a mile) in height, would produce a preſſure on the bullet equal to what is exerted by the powder in the firſt inſtant of the exploſion; and the leaden ball being $\frac{3}{4}$ of an inch in diameter, and conſequently equal to a cylinder of lead of the ſame baſe half an inch in height, the preſſure at firſt acting on it will be equal to 34900×2, or 69800 times its weight: whence FL to FH as 1 to 69800; and FB to FA as $45-2\frac{5}{8}$; or $42\frac{3}{8}$ to $2\frac{5}{8}$; that is, as 339 to 21; whence the rectangle FLPB is to the rectangle AFHS as 339 to 21×69800, that is, as 1 to 4324—And from the known application of the logarithms to the menſuration of the hyperbolic ſpaces it follows, that the rectangle AFHS is to the area FHQB as 43,429, &c. is to the tabular logarithm of $\frac{AB}{AF}$; that is, of $\frac{160}{21}$ which is 1,2340579; whence the ratio of the rectangle FLPB to the hyperbolic area FHQB is compounded of the ratios of 1 to 4324— and of ,43429, &c. to 1,2340579; which together make up the ratio of 1 to 12263, the ſubduplicate of which is the ratio of 1 to 110,7; and in this ratio is the velocity which the bullet would acquire by gravity in falling thro' a ſpace equal to FB, to the velocity the bullet will acquire from the action of the powder impelling it thro' FB. But the ſpace FB being $42\frac{3}{8}$ inches, the velocity a heavy body will aquire in falling through ſuch a ſpace is known to be what would carry it nearly at the rate of 15.07 feet in a ſecond; whence the velocity to which this has the ratio of 1 to 110,7 is a velocity which would carry the ball at the rate of 1668 feet in one ſecond. And this is the velocity which, according to the theory, the bullet in the preſent circumſtances would acquire from the action of the powder during the time of its dilatation.

"Now this velocity being once computed for one caſe, is eaſily applied to any other; for if the cavity DEGC left behind the bullet be only in part filled with powder, then the line HF, and conſequenlty the area FHQB will be diminiſhed in the proportion of the whole cavity to the part filled. If the diameter of the bore be varied, the lengths AB and AF remaining the ſame, then the quantity of powder and the ſurface of the bullet which it acts on, will be varied in the duplicate proportion of the diameter, but the weight of the bullet will vary in the triplicate proportion of the diameter; wherefore the line FH, which is directly as the abſolute impelling force of the powder, and reciprocally as the gravity of the bullet, will change in the reciprocal proportion of the diameter of the bullet. If AF, the heighth of the cavity left behind the bullet, be increaſed or diminiſhed, the rectangle of the hyperbola, and conſequently the area correſponding to ordinates in any given ratio, will be increaſed or diminiſhed in the ſame proportion. From all which it follows, that the area FHQB, which is in the duplicate proportion of the velocity of the impelled body, will be directly as the logarithm $\frac{AB}{AF}$ (where AB repreſents the length of the barrel, and AF the length of the cavity left behind the bullet); alſo directly as the part of that cavity filled with powder; and inverſely, as the diameter of the bore, or rather of the bullet; likewiſe directly as AF, the height of the cavity left behind the bullet. Conſequently the velocity being computed as above, for a bullet of a determined diameter, placed in a piece of a given length, and impelled by a given quantity of powder, occupying a given cavity behind that bullet; it follows, that, by means of theſe ratios, the velocity of any other bullet may be thence deduced; the neceſſary circumſtances of its poſition, quantity of powder, &c. being given. Where note, That in the inſtance of this ſuppoſition, we have ſuppoſed the diameter of the ball to be $\frac{3}{4}$ of an inch; whence the diameter of the bore will be ſomething more, and the quantity of powder contained in the ſpace DEGC, will amount exactly to twelve pennyweight, a ſmall wad of tow included.

"In order to compare the velocities communicated to bullets by the exploſion, with the velocities reſulting from the theory by computation; it is neceſſary that the actual velocities with which bullets move ſhould be diſcovered. The only methods hitherto practiſed for this purpoſe, have been either by obſerving the time of the flight of a ſhot through a given ſpace, or by meaſuring the range of a ſhot at a given elevation; and thence computing, on the parabolic hypotheſis, what degree of velocity would produce this range.—The firſt method labours under this inſurmountable difficulty, that the velocities of theſe bodies are often ſo ſwift, and conſequently the time obſerved is ſo ſhort, that an imperceptible error in that time, may occaſion an error in the velocity thus found of 2, 3, 4, 5, or 600 feet, in a ſecond. The other method is ſo fallacious, by reaſon of the reſiſtance of the atmoſphere (to which inequality the firſt is alſo liable), that the velocities thus aſſigned may not perhaps be the tenth part of the actual velocities ſought.

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"The ſimpleſt method of determining this velocity is by means of the inſtrument repreſented Plate CXLII. fig. 5. where ABCD repreſents the body of the machine compoſed of the three poles B, C, D, ſpreading at bottom, and joining together at the top A; being the ſame with what is vulgarly uſed in lifting and weighing very heavy bodies, and is called by workmen the *triangles*. On two of theſe poles, towards their tops, are ſcrewed on the ſockets RS; and on theſe ſockets the pendulum EFGHIK is hung by means of its croſs-piece EF, which becomes its axis of ſuſpenſion, and on which it muſt be made to vibrate with great freedom. The body of this pendulum is made of iron, having a broad part at bottom, and its lower part is covered with a thick piece of wood GKIH, which is faſtened to the iron by ſcrews. Something lower than the bottom of the pendulum there is a brace OP, joining the two poles to which the pendulum is ſuſpended; and to this brace there is faſtened a contrivance MNU, made with two edges of ſteel, bearing on each other in the line UN, ſomething in the manner of a drawing-pen; the ſtrength with which theſe edges preſs on each other being diminiſhed or increaſed at pleaſure by means of a ſcrew Z going through the upper piece. There is faſtened to the bottom of the pendulum a narrow ribbon LN, which paſſes between theſe ſteel edges, and which afterwards, by means of an opening cut in the lower piece of ſteel, hangs looſely down, as at W.

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"This inſtrument thus fitted, if the weight of the pendulum be known, and likewiſe the reſpective diſtances of its centre of gravity, and of its centre of oſcillation from its axis of ſuſpenſion, it will thence be known, what motion will be communicated to this pendulum by the percuſſion of a body of a known weight moving with a known degree of celerity, and ſtriking it in a given point; that is, if the pendulum be ſuppoſed at reſt before the percuſſion, it will be known what vibration it ought to make in conſequence of ſuch a determined blow; and, on the contrary, if the pendulum, being at reſt, is ſtruck by a body of a known weight, and the vibration, which the pendulum makes after the blow, is known, the velocity of the ſtriking body may from thence be determined.

"Hence then, if a bullet of a known weight ſtrikes the pendulum, and the vibration, which the pendulum makes in conſequence of the ſtroke, be aſcertained; the velocity, with which the ball moved, is thence to be known.

"Now the extent of the vibration, made by the pendulum after the blow, may be meaſured to great accuracy by the ribbon LN. For let the preſſure of the edges UN on the ribbon be ſo regulated by the ſcrew Z, that the motion of the ribbon between them may be free and eaſy, though with ſome minute reſiſtance; then ſettling the pendulum at reſt, let the part LN between the pendulum and the edges be drawn ſtrait, but not ſtrained, and fix a pin in that part of the ribbon which is then contiguous to the edges: let now a ball impinge on the pendulum; then the pendulum ſwinging back will draw out the ribbon to the juſt extent of its vibration, which will conſequently be determined by the interval on the ribbon between the edges UN and the place of the pin.

"The weight of the whole pendulum, wood and all, was 56 lb. 3 oz. its centre of gravity was 52 inches diſtant from its axis of ſuſpenſion, and 200 of its ſmall ſwings were performed in the time of 253 ſeconds; whence its centre of oſcillation (determined from hence) is $62\frac{2}{3}$ inches diſtant from that axis. The centre of the piece of wood GKIH is diſtant from the ſame axis 66 inches.

"In the compound ratio of 66 to $62\frac{2}{3}$, and 66 to 52, take the quantity of matter of the pendulum to a 4th quantity, which will be 42 lb. $\frac{1}{2}$ oz. Now geemeters will know, that if the blow be ſtruck on the centre of the piece of wood GKIH, the pendulum will reſiſt to the ſtroke in the ſame manner as if this laſt quantity of matter only (42 lb. $\frac{1}{2}$ oz.) was concentrated in that point, and the reſt of the pendulum was taken away: whence, ſuppoſing the weight of the bullet impinging in that point to be the $\frac{1}{12}$ of a pound, or the $\frac{1}{504}$ of this quantity of matter nearly, the velocity of the point of oſcillation after the ſtroke will, by the laws obſerved in the congreſs of ſuch bodies as rebound not from each other, be the $\frac{1}{505}$ of the velocity the bullet moved with before the ſtroke; whence the velocity of this point of oſcillation after the ſtroke being aſcertained, that multiplied by 505 will give the velocity with which the ball impinged.

"But the velocity of the point of oſcillation after the ſtroke is eaſily deduced from the chord of the arch, through which it aſcends by the blow; for it is a well-known propoſition, that all pendulous bodies aſcend to the ſame height by their vibratory motion as they would do, if they were projected directly upwards from their loweſt point, with the ſame velocity they have in that point: wherefore, if the verſed ſine of the aſcending arch be found, (which is eaſily determined from the chord and radius being given), this verſed ſine is the perpendicular height, to which a body projected upwards with the velocity of the point of oſcillation would ariſe; and, conſequently, what that velocity is, can be eaſily computed by the common theory of falling bodies.

"For inſtance, the chord of the arch, deſcribed by the aſcent of the pendulum after the ſtroke meaſured on the ribbon, has been ſometimes $17\frac{1}{4}$ inches; the diſtance of the ribbon from the axis of ſuſpenſion is $71\frac{1}{8}$ inches; whence reducing $17\frac{1}{4}$ in the ratio of $71\frac{1}{8}$ to 66, the reſulting number, which is nearly 16 inches, will be the chord of the arch through which the centre of the board GKIH aſcended after the ſtroke: now the verſed ſine of the arch, whoſe chord is 16 inches, and its radius 66, is 1.93939; and the velocity, which would carry a body to this height, or, which is the ſame thing, the velocity which a body would acquire by deſcending through this ſpace, is nearly that of $3\frac{1}{4}$ feet in 1″.

"To determine then the velocity with which the bullet impinged on the centre of the wood, when the chord of the arch deſcribed by the aſcent of the pendulum, in conſequence of the blow, was $17\frac{1}{4}$ inches meaſured on the ribbon, no more is neceſſary than to multiply $3\frac{1}{4}$ by 505, and the reſulting number 1641 will be the feet which the bullet would deſcribe in 1″, if it moved with the velocity it had at the moment of its percuſſion: for the velocity of the point of the pendulum, on which the bullet ſtruck, we have juſt now determined to be that of $3\frac{1}{4}$ feet in 1″; and we have before ſhewn, that this is the $\frac{1}{505}$ of the velocity of the bullet. If then a bullet weighing $\frac{1}{12}$ of a pound ſtrikes the pendulum in the centre of the wood GKIH, and the ribbon be drawn out $17\frac{1}{4}$ inches by the blow; the velocity of the bullet is that of 1641 feet in 1″. And ſince the length the ribbon is drawn is always nearly the chord of the arch deſcribed by the aſcent, (it being placed ſo as to differ inſenſibly from thoſe chords which moſt frequently occur), and theſe chords are known to be in the proportion of the velocities of the pendulum acquired from the ſtroke; it follows, that the proportion between the lengths of ribbon drawn out at different times, will be the ſame with that of the velocities of the impinging bullets; and conſequently, by the proportion of theſe lengths of ribbon to $17\frac{1}{4}$, the proportion of the velocity with which the bullets impinge to the known velocity of 1641 feet in 1″, will be determined.

18 Cautions to be obſerved in making theſe experiments.

"Hence then is ſhewn, in general, how the velocities of bullets of all kinds may be found out by means of this inſtrument; but that thoſe who may be diſpoſed to try theſe experiments may not have unforeſeen difficulties to ſtruggle with, we ſhall here ſubjoin a few obſervations, which it will be neceſſary for them to attend to, both to ſecure ſucceſs to their trials, and ſafety to their perſons.

"And firſt, that they may not conceive the piece of wood GKIH to be an unneceſſary part of the machine, we muſt inform them, that if a bullet impelled by a full charge of powder ſhould ſtrike directly on the iron, the bullet would be beaten into ſhivers by the ſtroke, and theſe ſhivers will rebound back with ſuch violence, as to bury themſelves in any wood they chance to light on, as I have found by hazardous experience; and beſides the danger, the pendulum will not in this inſtance aſcertain the velocity of the bullet, becauſe the velocity with which the parts of it rebound is unknown.

" The weight of the pendulum, and the thickneſs of the wood, muſt be in ſome meaſure proportioned to the ſize of the bullets which are uſed. A pendulum of the weight here deſcribed will do very well for all bullets under three or four ounces, if the thickneſs of the board be increaſed to ſeven or eight inches for the heavieſt bullets; beech is the tougheſt and propereſt wood for this purpoſe.

" It is hazardous ſtanding on the ſide of the pendulum, unleſs the board be ſo thick, that the greateſt part of the bullet's force is loſt before it comes at the iron; for if it ſtrikes the iron with violence, the ſhivers of lead, which cannot return back thro' the wood, will force themſelves out between the wood and iron, and will fly to a conſiderable diſtance.

" As there is no effectual way of faſtening the wood to the iron but by ſcrews, the heads of which muſt come through the board; the bullets will ſometimes light on thoſe ſcrews, from whence the ſhivers will diſperſe themſelves on every ſide.

" When in theſe experiments ſo ſmall a quantity of powder is uſed, as will not give to the bullet a velocity of more than 400 or 500 feet in 1″; the bullet will not ſtick in the wood, but will rebound from it entire, and (if the wood be of a very hard texture) with a very conſiderable velocity. Indeed I have never examined any of the bullets which have thus rebounded; but I have found them indented by the bodies they have ſtruck againſt in their rebound.

" To avoid then theſe dangers, to the braving of which in philoſophical reſearches no honour is annexed; it will be convenient to fix whatſoever barrel is uſed, on a ſtrong heavy carriage, and to fire it with a little ſlow match. Let the barrel too be very well fortified in all its length; for no barrel (I ſpeak of muſket barrels) forged with the uſual dimenſions will bear many of the experiments without burſting. The barrel I have moſt relied on, and which I procured to be made on purpoſe, is nearly as thick at the muzzel as at the breech; that is, it has in each place nearly the diameter of its bore in thickneſs of metal.

" The powder uſed in theſe experiments ſhould be exactly weighed: and that no part of it be ſcattered in the barrel, the piece muſt be charged with a ladle in the ſame manner as is practiſed with cannon; the wad ſhould be of tow, of the ſame weight each time, and no more than is juſt neceſſary to confine the powder in its proper place: the length of the cavity left behind the ball ſhould be determined each time with exactneſs; for the increaſing or diminiſhing that ſpace will vary the velocity of the ſhot, although the bullet and quantity of powder be not changed. The diſtance of the mouth of the piece from the pendulum ought to be ſuch, that the impulſe of the flame may not act on the pendulum; this will be prevented in a common barrel charged with $\frac{1}{2}$ an ounce of powder, if it be at the diſtance of 16 or 18 feet: in larger charges the impulſe is ſenſible farther off, I have found it to extend to above 25 feet; however, between 25 and 18 feet is the diſtance I have uſually choſen."

19 Account o Mr Robins's experiments.

With this inſtrument, or others ſimilar to it, Mr Robins made a great number of experiments on barrels of different lengths, and with different charges of powder. He hath given us the reſults of 61 of theſe; and having compared the actual velocities with the computed ones, his theory appears to have come as near the truth as could well be expected. In ſeven of the experiments there was a perfect coincidence; the charges of powder being ſix or twelve pennyweights; the barrels 45, 24.312, and 7.06 inches in length. The diameter of the firſt (marked A) was $\frac{3}{4}$ of an inch; of the ſecond (B) was the ſame; and of D, 83 of an inch. In the reſt of the experiments, another barrel (C) was uſed, whoſe length was 12.375 inches, and the diameter of its bore $\frac{3}{4}$ inches.---In 14 more of the experiments, the difference between the length of the chord of the pendulum's arch ſhewn by the theory and the actual experiment was one-tenth of an inch over or under. This ſhewed an error in the theory varying according to the different lengths of the chord from $\frac{1}{171}$ to $\frac{1}{47}$ of the whole; the charges of powder were the ſame as in the laſt.---In 16 other experiments, the error was two-tenths of an inch, varying from $\frac{1}{85}$ to $\frac{1}{25}$ of the whole: the charges of powder were 6, 8, 9, or 12 pennyweights.---In ſeven other experiments, the error was three-tenths of an inch, varying from $\frac{1}{62}$ to $\frac{1}{23}$ of the whole; the charges of powder ſix, or twelve, pennyweights. In eight experiments, the difference was four-tenths of an inch, indicating an error from $\frac{1}{42}$ to $\frac{1}{23}$ of the whole; the charges being 6, 9, 12, and 24 pennyweights of powder. In three experiments, the error was five-tenths, varying from $\frac{1}{38}$ to $\frac{1}{12}$ of the whole; the charges 8 and 12 pennyweights of powder.---In two experiments the error was ſix-tenths, in one caſe amounting to ſomething leſs than $\frac{1}{32}$, in the other to $\frac{1}{22}$ of the whole; the charges 12 and 36 pennyweights of powder. By one experiment the error was ſeven, and by another eight, tenths; the firſt amounting to $\frac{1}{10}$ nearly, the latter to almoſt $\frac{1}{9}$ of the whole: the charges of powder 6 or 12 pennyweights. The laſt error, however, Mr Robins aſcribes to the wind. The two remaining experiments varied from the theory by 1.3 inches, ſomewhat more than $\frac{1}{9}$ of the whole: the charges of powder were 12 pennyweights in each; and Mr Robins aſcribes the error to the dampneſs of the powder. In another caſe, he aſcribes an error of ſix-tenths to the blaſt of the powder on the pendulum.

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From theſe experiments Mr Robins deduces the following concluſions. " The variety of theſe experiments, and the accuracy with which they correſpond to the theory, leave us no room to doubt of its certainty.—This theory, as here eſtabliſhed, ſuppoſes, that, in the firing of gunpowder, about $\frac{3}{10}$ of its ſubſtance is converted by the ſudden inflammation into a permanently elaſtic fluid, whoſe elaſticity, in proportion to its heat and denſity, is the ſame with that of common air in the like circumſtances; it farther ſuppoſes, that all the force exerted by gunpowder in its moſt violent operations, is no more than the action of the elaſticity of the fluid thus generated; and theſe principles enable us to determine the velocities of bullets impelled from fire-arms of all kinds, and are fully ſufficient for all purpoſes where the force of gunpowder is to be eſtimated.

“ From this theory many deductions may be made, of the greateſt conſequence to the practical part of gunnery. From hence the thickneſs of a piece, which will enable it to confine, without burſting, any given charge of powder, is eaſily determined, ſince the effort of the powder is known. From hence appears the inconcluſiveneſs of what ſome modern authors have advanced, relating to the advantages of particular forms of chambers for mortars and cannon; for all their laboured ſpeculations on this head are evidently founded on very erroneous opinions about the action of fired powder. From this theory too we are taught the neceſſity of leaving the ſame ſpace behind the bullet when we would, by the ſame quantity of powder, communicate to it an equal degree of velocity; ſince, on the principles already laid down, it follows, that the ſame powder has a greater or leſs degree of elaſticity, according to the different ſpaces it occupies. The method which I have always practiſed for this purpoſe has been by marking the rammer; and this is a maxim which ought not to be diſpenſed with when cannon are fired at an elevation, particularly in thoſe called by the French *batteries a ricochet*.

“ From the continued action of the powder, and its manner of expanding deſcribed in this theory, and the length and weight of the piece, one of the moſt eſſential circumſtances in the well directing of artillery may be eaſily aſcertained. All practitioners are agreed, that no ſhot can be depended on, unleſs the piece be placed on a ſolid platform: for if the platform ſhakes with the firſt impulſe of the powder, it is impoſſible but the piece muſt alſo ſhake; which will alter its direction, and render the ſhot uncertain. To prevent this accident, the platform is uſually made extremely firm to a conſiderable depth backwards; ſo that the piece is not only well ſupported in the beginning of its motion, but likewiſe through a great part of its recoil. However, it is ſufficiently obvious, that when the bullet is ſeparated from the piece, it can be no longer affected by the trembling of the piece or platform; and, by a very eaſy computation, it will be found, that the bullet will be out of the piece before the latter hath recoiled half an inch: whence, if the platform be ſufficiently ſolid at the beginning of the recoil, the remaining part of it may be much ſlighter; and hence a more compendious method of conſtructing platforms may be found out.

“ From this theory alſo it appears how greatly theſe authors have been miſtaken, who have attributed the force of gunpowder, or at leaſt a conſiderable part of it, to the action of the air contained either in the powder, or between the intervals of the grains: for they have ſuppoſed that air to exiſt in its natural elaſtic ſtate, and to receive all its addition of force from the heat of the exploſion. But from what hath been already delivered concerning the increaſe of the air's elaſticity by heat, we may conclude that the heat of the exploſion cannot augment this elaſticity to five times its common quantity; conſequently the force ariſing from this cauſe only cannot amount to more than the 200th part of the real force exerted on the occaſion.

“ If the whole ſubſtance of the powder was converted into an elaſtic fluid at the inſtant of the exploſion, then from the known elaſticity of this fluid aſſigned by our theory, and its known denſity, we could eaſily determine the velocity with which it would begin to expand, and could thence trace out its future augmentations in its progreſs through the barrel: but as we have ſhewn that the elaſtic fluid, in which the activity of the gunpowder conſiſts, is only $\frac{3}{10}$ of the ſubſtance of the powder, the remaining $\frac{7}{10}$ will, in the exploſion, be mixed with the elaſtic part, and will by its weight retard the activity of the exploſion; and yet they will not be ſo completely united as to move with one common motion; but the unelaſtic part will be leſs accelerated than the reſt, and ſome will not even be carried out of the barrel, as appears by the conſiderable quantity of unctuous matter which adheres to the inſide of all fire-arms after they have been uſed.—Theſe inequalities in the expanſive motion of the flame oblige us to recur to experiments for its accurate determination.

21
Experiments for determining the velocity of fired gunpowder.

“ The experiments made uſe of for this purpoſe were of two kinds. The firſt was made by charging the barrel A with 12 penny-weights of powder, and a ſmall wad of tow only; and then placing its mouth 19 inches from the centre of the pendulum. On firing it in this ſituation, the impulſe of the flame made it aſcend through an arch whoſe chord was 13.7 inches; whence, if the whole ſubſtance of the powder was ſuppoſed to ſtrike againſt the pendulum, and each part to ſtrike with the ſame velocity, that common velocity muſt have been at the rate of about 2650 feet in a ſecond.—But as ſome part of the velocity of the flame was loſt in paſſing through 19 inches of air; I made the remaining experiments in a manner not liable to this inconvenience.

“ I fixed the barrel A on the pendulum, ſo that its axis might be both horizontal, and alſo perpendicular to the plane HK; or, which is the ſame thing, that it might be in the plane of the pendulum's vibration: the height of the axis of the piece above the centre of the pendulum was ſix inches; and the weight of the piece, and of the iron that faſtened it, &c. was 12½ lb. The barrel in this ſituation being charged with 12 penny-weights of powder, without either ball or wad, only put together with the rammer; on the diſcharge the pendulum aſcended through an arch whoſe chord was 10 inches, or reduced to an equivalent blow in the centre of the pendulum, ſuppoſing the barrel away, it would be 14.4 inches nearly.—The ſame experiment being repeated, the chord of the aſcending arch was 10.1 inches, which, reduced to the centre, is 14.6 inches.

“ To determine what difference of velocity there was in the different parts of the vapour, I loaded the piece again with 12 penny-weights of powder, and rammed it down with a wad of tow, weighing one penny-weight. Now, I conceived that this wad being very light, would preſently acquire that velocity with which the elaſtic part of the fluid would expand itſelf when uncompreſſed; and I acordingly found, that the chord of the aſcending arch was by this means increaſed to 12 inches, or at the centre to 17.3: whence, as the medium of the other two experiments is 14.5, the pendulum aſcended through an arch 2.8 inches longer, by the additional motion of one penny-weight of matter, moving with the velocity of the ſwifteſt part of the vapour; and conſequently the velocity with which this penny-weight of matter moved, was that of about 7000 feet in a ſecond.

“ It will perhaps be objected to this determination, that the augmentation of the arch through which the pendulum vibrated in this caſe was not all of it owing to the quantity of motion given to the wad, but part of it was produced by the confinement of the powder, and the greater quantity thereby fired. But if it were true that a part only of the powder fired when there was no wad, it would not happen that in firing different quantities of powder without a wad the chord would increaſe and decreaſe nearly in the ratio of theſe quantities; which yet I have found it to do: for with nine pennyweights that chord was 7.3 inches, which with 12 pennyweights we have ſeen was only 10, and 10.1 inches; and even with three pennyweights the chord was two inches; deficient from this proportion by .5 only; for which defect too other valid reaſons are to be aſſigned.

“ And there is ſtill a more convincing proof that all the powder is fired, although no wad be placed before the charge, which is, that the part of the recoil ariſing from the expanſion of powder alone, is found to be no greater when it impels a leaden bullet before it, than when the ſame quantity is fired without any wad to confine it. We have ſeen that the chord of the arch through which the pendulum roſe from the expanſive force of the powder alone is 10, or 10.1; and the chord of that arch, when the piece was charged in the cuſtomary manner with a bullet and wad, I found to be the firſt time $22\frac{1}{4}$, and the ſecond $22\frac{7}{8}$, or at a medium 22.56. Now the impulſe of the ball and wad, if they were ſuppoſed to ſtrike the pendulum in the ſame place in which the barrel was ſuſpended, with the velocity they had acquired at the mouth of the piece, would drive it through an arch whoſe chord would be about 12.3; as is known from the weight of the pendulum, the weight and poſition of the barrel, and the velocity of the bullet determined by our former experiments; whence, ſubtracting this number 12.3 from 22.56, the remainder 10.26 is nearly the chord of the arch which the pendulum would have aſcended through from the expanſion of the powder alone with a bullet laid before it. And this number, 10.26, differs but little from 10.1, which we have above found to be the chord of the aſcending arch, when the ſame quantity of powder expanded itſelf freely without either bullet or wad before it.

“ Again, that this velocity of 7000 feet in a ſecond is not much beyond what the moſt active part of the flame acquires in expanding, is evinced from hence, that in ſome experiments a ball has been found to be diſcharged with a velocity of 2400 feet in a ſecond; and yet it appeared not that the action of the powder was at all diminiſhed on account of this immenſe celerity: conſequently the degree of ſwiftneſs with which, in this inſtance, the powder followed the ball without loſing any part of its preſſure, muſt have been much ſhort of what the powder alone would have expanded with, had not the ball been there.

“ From theſe determinations may be deduced the force of petards; ſince their action depends entirely on the impulſe of the flame: and it appears that a quantity of powder properly diſpoſed in ſuch a machine, may produce as violent an effort as a bullet of twice its weight, moving with a velocity of 1400 or 1500 feet in a ſecond.

23
A bullet flies off with the greateſt v locity whe laid at a d ſtance fro the powde

“ In many of the experiments already recited, the ball was not laid immediately contiguous to the powder, but at a ſmall diſtance, amounting, at the utmoſt, only to an inch and a half. In theſe caſes the theory agreed very well with the experiments. But if a bullet is placed at a greater diſtance from the powder, ſuppoſe at 12, 18, or 24 inches, we cannot then apply to this ball the ſame principles which may be applied to thoſe laid in contact, or nearly ſo, with the powder; for when the ſurface of the fired powder is not confined by a heavy body, the flame dilates itſelf with a velocity far exceeding that which it can communicate to a bullet by its continued preſſure: conſequently, as at the diſtance of 12, 18, or 24 inches, the powder will have acquired a conſiderable degree of this velocity of expanſion, the firſt motion of the ball will not be produced by the continued preſſure of the powder, but by the actual percuſſion of the the flame; and it will therefore begin to move with a quantity of motion proportioned to the quantity of this flame, and the velocities of its reſpective parts.

“ From hence then it follows, that the velocity of the bullet, laid at a conſiderable diſtance before the charge, ought to be greater than what would be communicated to it by the preſſure of the powder acting in the manner already mentioned: and this deduction from our theory we have confirmed by manifold experience; by which we have found, that a ball laid in the barrel A, with its hinder part $11\frac{1}{4}$ inches from its breech, and impelled by twelve pennyweights of powder, has acquired a velocity of about 1400 feet in a ſecond; when, if it had been acted on by the preſſure of the flame only, it would not have acquired a velocity of 1200 feet in a ſecond. The ſame we have found to hold true in all other greater diſtances, (and alſo in leſſer, though not in the ſame degree), and in all quantities of powder: and we have likewiſe found, that theſe effects nearly correſpond with what has been already laid down about the velocity of expanſion and the elaſtic and unelaſtic parts of the flame.

“ From hence too ariſes another conſideration of great conſequence in the practice of gunnery; which is, that no bullet ſhould at any time be placed at a conſiderable diſtance before the charge, unleſs the piece is extremely well fortified: for a moderate charge of powder, when it has expanded itſelf through the vacant ſpace, and reaches the ball, will, by the velocity each part has acquired, accumulate itſelf behind the ball, and thereby be condenſed prodigiouſly; whence, if the barrel be not extremely firm in that part, it muſt, by means of this re-inforced elaſticity, infallibly burſt. The truth of this reaſoning I have experienced in an exceeding good Tower-muſket, forged of very tough iron; for, charging it with twelve pennyweights of powder, and placing the ball 16 inches from the breech, on firing it, the part of the barrel juſt behind the bullet was ſwelled out to double its diameter like a blown bladder, and two large pieces of two inches long were burſt out of it.

"Having ſeen that the entire motion of a bullet laid at a conſiderable diſtance from the charge, is acquired by two different methods in which the powder acts on it; the firſt being the percuſſion of the parts of the flame with the velocity they had reſpectively acquired by expanding, the ſecond the continued preſſure of the flame through the remaining part of the barrel; I endeavoured to ſeparate theſe different actions, and to retain that only which aroſe from the continued preſſure of the flame. For this purpoſe I no longer placed the powder at the breech, from whence it would have full ſcope for its expanſion; but I ſcattered it as uniformly as I could through the whole cavity left behind the bullet; imagining that by this means the progreſſive velocity of the flame in each part would be prevented by the expanſion of the neighbouring parts: and I found, that the ball being laid $11\frac{1}{4}$ inches from the breech, its velocity, inſtead of 1400 feet in a ſecond, which it acquired in the laſt experiments, was now no more than 1100 feet in the ſecond, which is 100 feet ſhort of what according to the theory ſhould ariſe from the continued preſſure of the powder only.

"The reaſon of this deficiency was, doubtleſs, the inteſtine motion of the flame: for the accenſion of the powder thus diſtributed through ſo much larger a ſpace than it could fill, muſt have produced many reverberations and pulſations of the flame; and from theſe internal agitations of the fluid, its preſſure on the containing ſurface will (as is the caſe of all other fluids) be conſiderably diminiſhed; and in order to avoid this irregularity, in all other experiments I took care to have the powder cloſely confined in as ſmall a ſpace as poſſible, even when the bullet lay at ſome little diſtance from it.

3 the re- nce of ir to motion llets.

"With regard to the reſiſtance of the air, which ſo remarkably affects all military projectiles, it is neceſſary to premiſe, that the greateſt part of authors have eſtabliſhed it as a certain rule, that while the ſame body moves in the ſame medium, it is always reſiſted in the duplicate proportion of its velocity; that is, if the reſiſted body move in one part of its track with three times the velocity with which it moved in ſome other part, then its reſiſtance to the greater velocity will be nine times the reſiſtance to the leſſer. If the velocity in one place be four times greater than in another, the reſiſtance of the fluid will be 16 times greater in the firſt than in the ſecond, &c. This rule, however, though pretty near the truth when the velocities are confined within certain limits, is exceſſively erroneous when applied to military projectiles, where ſuch reſiſtances often occur as could ſcarcely be effected, on the commonly received principles, even by a treble augmentation of its denſity.

"By means of the machine already deſcribed, I have it in my power to determine the velocity with which a ball moves in any part of its track, provided I can direct the piece in ſuch a manner as to cauſe the bullet to impinge on the pendulum placed in that part: and therefore, charging a muſket-barrel three times ſucceſſively with a leaden ball $\frac{3}{4}$ of an inch in diameter, and about half its weight of powder; and taking ſuch precaution in weighing of the powder and placing it, that I was aſſured, by many previous trials, that the velocity of the ball could not differ by 20 feet in a ſecond from its medium quantity; I fired it againſt the pendulum placed at 25, 75, and 125 feet diſtance from the mouth of the piece reſpectively; and I found that it impinged againſt the pendulum, in the firſt caſe, with a velocity of 1670 feet in a ſecond; in the ſecond caſe, with a velocity of 1550 feet in a ſecond; and in the third caſe, with a velocity of 1425 feet in a ſecond: ſo that, in paſſing through 50 feet of air, the bullet loſt a velocity of 120 or 125 feet in a ſecond; and the time of its paſſing through that ſpace being about $\frac{1}{32}$d or $\frac{1}{30}$th of a ſecond, the medium quantity of reſiſtance muſt, in theſe inſtances, have been about 120 times the weight of the ball; which (as the ball was nearly $\frac{1}{12}$th of a pound) amounts to about 10 lb avoirdupoiſe.

"Now, if a computation be made according to the method laid down for compreſſed fluids in the 38th propoſition of Newton's *Principia*, ſuppoſing the weight of water to that of air as 850 to 1, it will be found, that the reſiſtance to a globe of $\frac{3}{4}$ of an inch diameter, moving with a velocity of about 1600 feet in a ſecond, will not, on theſe principles, amount to any more than $4\frac{1}{6}$ lb avoirdupoiſe; whence, as we know that the rules contained in that propoſition are very accurate with regard to ſlow motions, we may hence conclude, that the reſiſtance of the air in ſlow motions is leſs than that in ſwift motions, in the ratio of $4\frac{1}{6}$ to 10; a proportion between that of 1 to 2, and 1 to 3.

"Again, I charged the ſame piece a number of times with equal quantities of powder, and balls of the ſame weight, taking all poſſible care to give to every ſhot an equal velocity; and, firing three times againſt the pendulum placed only 25 feet from the mouth of the piece, the medium of the velocities with which the ball impinged was nearly that of 1690 feet in a ſecond: then removing the piece 175 feet from the pendulum, I found, taking the medium of five ſhots, that the velocity with which the ball impinged at this diſtance, was 1300 feet in a ſecond; whence the ball, in paſſing through 150 feet of air, loſt a velocity of about 390 feet in a ſecond; and the reſiſtance computed from theſe numbers, comes out ſomething more than in the preceding inſtance, it amounting here to between 11 and 12 pounds avoirdupoiſe; whence, according to theſe experiments, the reſiſting power of the air to ſwift motions is greater than to ſlow ones, in a ratio which approaches nearer to that of 3 to 1 than in the preceding experiments.

"Having thus examined the reſiſtance to a velocity of 1700 feet in a ſecond, I next examined the reſiſtance to ſmaller velocities: and for this purpoſe, I charged the ſame barrel with balls of the ſame diameter, but with leſs powder, and placing the pendulum at 25 feet diſtance from the piece, I fired againſt it five times with an equal charge each time: the medium velocity with which the ball impinged, was that of 1180 feet in a ſecond; then, removing the pendulum to the diſtance of 250 feet, the medium velocity of five ſhots, made at this diſtance, was that of 950 feet in a ſecond: whence the ball, in paſſing through 225 feet of air, loſt a velocity of 230 feet in a ſecond;

Theory. and as it paſſed through that interval in about $\frac{3}{14}$th of a ſecond, the reſiſtance to the middle velocity will come out to be near $33\frac{1}{2}$ times the gravity of the ball, or 2 lb. 10 oz. avoirdupoiſe. Now, the reſiſtance to the ſame velocity, according to the laws obſerved in ſlower motions, amounts to $\frac{7}{11}$ of the ſame quantity; whence, in a velocity of 1065 feet in a ſecond, the reſiſting power of the air is augmented in no greater a proportion than that of 7 to 11; whereas we have ſeen in the former experiments, that to ſtill greater degrees of velocity the augmentation approached very near the ratio of one to three.

" But farther, I fired three ſhot, of the ſame ſize and weight with thoſe already mentioned, over a large piece of water; ſo that their dropping into the water being very diſcernible, both the diſtance and time of their flight might be accurately aſcertained. Each ſhot was diſcharged with a velocity of 400 feet in a ſecond; and I had ſatisfied myſelf by many previous trials of the ſame charge with the pendulum, that I could rely on this velocity to ten feet in a ſecond. The firſt ſhot flew 313 yards in four ſeconds and a quarter, the ſecond flew 319 yards in four ſeconds, and the third 373 yards in five ſeconds and an half. According to the theory of reſiſtance eſtabliſhed for ſlow motions, the firſt ſhot ought to have ſpent no more than 3.2 ſeconds in its flight, the ſecond 3.28, and the third 4 ſeconds: whence it is evident that every ſhot was retarded conſiderably more than it ought to have been had that theory taken place in its motion; conſequently the reſiſtance of the air is very ſenſibly increaſed, even in ſuch a ſmall velocity as that of 400 feet in a ſecond.

Plate CXLII. fig. 6.

" As no large ſhot are ever projected in practice with velocities exceeding that of 1700 feet in a ſecond, it will be ſufficient for the purpoſes of a practical gunner to determine the reſiſtance to all leſſer velocities, which may be thus exhibited. Let AB be taken to AC, in the ratio of 1700 feet in a ſecond to the given velocity to which the reſiſting power of the air is required. Continue the line AB to D, ſo that BD may be to AD, as the reſiſting power of the air to ſlow motions is to its reſiſting power to a velocity of 1700 feet in a ſecond; then ſhall CD be to AD, as the reſiſting power of the air to ſlow motions is to its reſiſting power to the given velocity repreſented by AC.

" From the computations and experiments already mentioned, it plainly appears, that a leaden ball of $\frac{3}{4}$ of an inch diameter, and weighing nearly $1\frac{1}{3}$ oz. avoirdupoiſe, if it be fired from a barrel of 45 inches in length, with half its weight of powder, will iſſue from that piece with a velocity which, if it were uniformly continued, would carry it near 1700 feet in a ſecond.—If, inſtead of a leaden ball, an iron one, of an equal diameter, was placed in the ſame ſituation in the ſame piece, and was impelled by an equal quantity of powder, the velocity of ſuch an iron-bullet would be greater than that of the leaden one in the ſubduplicate ratio of the ſpecific gravities of lead and iron; and ſuppoſing that ratio to be as three to two, and computing on the principles already laid down, it will appear, that an iron-bullet of 24 lb. weight, ſhot from a piece of ten feet in length, with 16 lb. of powder, will acquire from the exploſion a velocity which, if uniformly continued, would carry it nearly 1650 feet in a ſecond.

" This is the velocity, which, according to our theory, a cannon-ball of 24 lb weight is diſcharged with when it is impelled by a full charge of powder; but if, inſtead of a quantity of powder weighing two thirds of the ball, we ſuppoſe the charge to be only half the weight of it, then its velocity will on the ſame principles be no more than 1490 feet in a ſecond. The ſame would be the velocities of every leſſer bullet fired with the ſame proportions of powder, if the lengths of all pieces were conſtantly in the ſame ratio with the diameters of their bore: and although, according to the uſual dimenſions of the ſmaller pieces of artillery, this proportion does not always hold, yet the difference is not great enough to occaſion a very great variation from the velocities here aſſigned; as will be obvious to any one who ſhall make a computation thereon. But in theſe determinations we ſuppoſe the windage to be no more than is juſt ſufficient for putting down the bullet eaſily; whereas in real ſervice, either through negligence or unſkilfulneſs, it often happens, that the diameter of the bore ſo much exceeds the diameter of the bullet, that great part of the inflamed fluid eſcapes by its ſide; whence the velocity of the ſhot in this caſe may be conſiderably leſs than what we have aſſigned. However, this perhaps may be compenſated by the greater heat which in all probability attends the firing of theſe large quantities of powder.

24 Solutio of the culty co cerning point-b ſhot.

" From this great velocity of cannon-ſhot we may clear up the difficulty concerning the point-blank ſhot which occaſioned the invention of Anderſon's ſtrange hypotheſis *. Here our author was deceived by his not knowing how greatly the primitive velocity of the heavieſt ſhot is diminiſhed in the courſe of its flight by the reſiſtance of the air. And the received opinion of practical gunners is not more difficult to account for; ſince, when they agree that every ſhot flies in a ſtraight line to a certain diſtance from the piece, which imaginary diſtance they have called the *extent of the point-blank ſhot*, we need only ſuppoſe, that, within that diſtance which they thus determine, the deviation of the path of the ſhot from a ſtraight line is not very perceptible in their method of pointing. Now, as a ſhot of 24 lb. fired with two thirds of its weight of powder will, at the diſtance of 500 yards from the piece, be ſeparated from the line of its original direction by an angle of little more than half a degree; thoſe who are acquainted with the inaccurate methods often uſed in the directing of cannon will eaſily allow, that ſo ſmall an aberration may not be attended to by the generality of practitioners, and the path of the ſhot may conſequently be deemed a ſtraight line; eſpecially as other cauſes of error will often intervene much greater than what ariſes from the incurvation of this line by gravity.

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" We have now determined the velocity of the ſhot, both when fired with two thirds of its weight and with half its weight of powder reſpectively; and on this occaſion I muſt remark, that on the principles of our theory, the increaſing the charge of powder will increaſe the velocity of the ſhot, till the powder arrives at a certain quantity; after which, if the powder be increaſed, the velocity of the ſhot will diminiſh. The quantity producing the greateſt velocity and the proportion between that greateſt velocity, and the velocity communicated by greater and leſſer charges, may be thus aſſigned. Let AB repreſent the axis of the piece; draw AC perpendicular to it, and to the aſymptotes AC and AB draw any hyperbola LF, and draw BF parallel to AC; find out now the point D, where the rectangle ADEG is equal to the hyperbolic area DEFB; then will AD repreſent that height of the charge which communicates the greateſt velocity to the ſhot: whence AD being to AB as 1 to 2.71828, as appears by the table of logarithms, from the length of the line AD thus determined, and the diameter of the bore, the quantity of powder contained in this charge is eaſily known. If, inſtead of this charge, any other filling the cylinder to the height AI be uſed, draw IH parallel to AC, and thro' the point H, to the ſame aſymptotes AC and AB deſcribe the hyperbola HK; then the greateſt velocity will be to the velocity communicated by the charge AI, in the ſubduplicate proportion of the rectangle AE to the ſame rectangle diminiſhed by the trilinear ſpace KKE.

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* See

"It hath been already ſhewn, that the reſiſtance of the air on the ſurface of a bullet of $\frac{3}{4}$ of an inch diameter moving with a velocity of 1670 feet in a ſecond, amounted to about 10 lb. It hath alſo been ſhewn, that an iron bullet weighing 24 lb. if fired with 16 lb. of powder (which is uſually eſteemed its proper battering charge) acquires a velocity of about 1650 feet in a ſecond, ſcarcely differing from the other: whence, as the ſurface of this laſt bullet is more than 54 times greater than the ſurface of a bullet of $\frac{3}{4}$ of an inch diameter, and their velocities are nearly the ſame, it follows, that the reſiſtance on the larger bullet will amount to more than 540 lb. which is near 23 times its own weight.

"The two laſt propoſitions are principally aimed againſt thoſe theoriſts who have generally agreed in ſuppoſing the flight of ſhot and ſhells to be nearly in the curve of a parabola. The reaſon given by thoſe authors for their opinion is the ſuppoſed inconſiderable reſiſtance of the air; ſince, as it is agreed on all ſides that the track of projectiles would be a perfect parabola if there was no reſiſtance, it has from thence been too raſhly concluded, that the interruption which the ponderous bodies of ſhells and bullets would receive from ſuch a rare medium as air would be ſcarcely ſenſible, and conſequently that their parabolic flight would be hereby ſcarcely affected.

"Now the prodigious reſiſtance of the air to a bullet of 24 lb. weight, ſuch as we have here eſtabliſhed it, ſufficiently confutes this reaſoning; for how erroneous muſt that hypotheſis be, which neglects, as inconſiderable, a force amounting to more than 20 times the weight of the moving body?" But here it is neceſſary to aſſume a few particulars, the demonſtrations of which, on the commonly received principles, may be ſeen under the article PROJECTILES.

"1. If the reſiſtance of the air be ſo ſmall, that the motion of a projected body is in the curve of a parabola; then the axis of that parabola will be perpendicular to the horizon; and conſequently the part of the curve in which the body aſcends will be equal and ſimilar to that in which it deſcends.

"2. If the parabola in which the body moves, be terminated on a horizontal plane; then the vertex of the parabola will be equally diſtant from its two extremities.

"3. Alſo the moving body will fall on that horizontal plane in the ſame angle, and with the ſame velocity with which it was firſt projected.

"4. If a body be projected in different angles, but with the ſame velocity; then its greateſt horizontal range will be when it is projected in an angle of 45 with the horizon.

"5. If the velocity with which the body is projected be known, then this greateſt horizontal range may be thus found. Compute, according to the common theory of gravity, what ſpace the projected body ought to fall through to acquire the velocity with which it is projected: then twice that ſpace will be the greateſt horizontal range, or the horizontal range when the body is projected in an angle of 45° with the horizon.

"6. The horizontal ranges of a body, when projected with the ſame velocity at different angles, will be between themſelves as the ſines of twice the angle in which the line of projection is inclined to the horizon.

"7. If a body is projected in the ſame angle with the horizon, but with different velocities; the horizontal ranges will be in the duplicate proportion of thoſe velocities.

28 Prodigious errors of the common theory.

"Theſe poſtulates which contain the principles of the modern art of gunnery, are all of them falſe: for it hath been already ſhewn, that a muſket-ball $\frac{3}{4}$ of an inch in diameter, fired with half its weight of powder, from a piece 45 inches long, moves with a velocity of near 1700 feet in a ſecond. Now, if this ball flew in the curve of a parabola, its horizontal range at 45° would be found by the fifth poſtulate to be about 17 miles. But all the practical writers aſſure us, that this range is really ſhort of half a mile. Diego Uſano aſſigns to an arquebuſs, four feet in length, and carrying a leaden ball of $1\frac{1}{2}$ oz. weight (which is very near our dimenſions), an horizontal range of 797 common paces, when it is elevated between 40 and 50 degrees, and charged with a quantity of fine powder equal in weight to the ball. Merſennus alſo tells us, that he found the horizontal range of an arquebuſs at 45° to be leſs than 400 fathom, or 800 yards; whence, as either of theſe ranges are ſhort of half an Engliſh mile, it follows, that a muſket ſhot, when fired with a reaſonable charge of powder at the elevation of 45°, flies not $\frac{1}{34}$ part of the diſtance it ought to do if it moved in a parabola. Nor is this great contraction of the horizontal range to be wondered at, when it is conſidered, that the reſiſtance of this bullet, when it firſt iſſues from the piece, amounts to 120 times its gravity, as hath been experimentally demonſtrated, n° 23.

"To prevent objections, our next inſtance ſhall be in an iron bullet of 24 lb weight, which is the heavieſt in common uſe for land-ſervice. Such a bullet fired from a piece of the common dimenſions with its greateſt allotment of powder hath a velocity of 1650 feet in ſecond, as already ſhewn. Now, if the horizontal range of this ſhot, at 45°, be computed on the parabolic hypotheſis by the fifth poſtulate, it will come out to be about 16 miles, which is between five and ſix times its real quantity; for the practical writers all agree in making it leſs than three miles.

"But farther, it is not only when projectiles move with theſe very great velocities, that their flight ſenſibly varies from the curve of a parabola; the ſame aberration often takes place in ſuch as move ſlow enough to have their motion traced out by the eye: for there are few projectiles that can be thus examined, which do not viſibly diſagree with the firſt, ſecond, and third poſtulate; obviouſly deſcending thro' a curve, which is ſhorter and leſs inclined to the horizon than that in which they aſcended. Alſo the higheſt point of their flight, or the vertex of the curve, is much nearer the place where they fall to the ground than to that from whence they were at firſt diſcharged.

"I have found too by experience; that the fifth, ſixth, and ſeventh poſtulates are exceſſively erroneous, when applied to the motions of bullets moving with ſmall velocities. A leaden bullet $\frac{3}{4}$ of an inch in diameter, diſcharged with a velocity of about 400 feet in a ſecond, and in an angle of 19° 5′ with the horizon, ranged on the horizontal plane no more than 448 yards: whereas its greateſt horizontal range, being found by the fifth poſtulate, to be at leaſt 1700 yards, the range at 19° 5′ ought by the ſixth poſtulate to have been 1050 yards; whence, in this experiment, the range was not $\frac{3}{7}$ of what it muſt have been, had the commonly received theory been true."

29
Rotatory motion of bullets a great ſource of deflection.

From this and other experiments it is clearly proved, that the track deſcribed by the flight even of the heavieſt ſhot, is neither a parabola, nor approaching to a parabola, except when they are projected with very ſmall velocities. The nature of the curve really deſcribed by them is explained under the article PROJECTILES. But as a ſpecimen of the great complication of that ſubject, we ſhall here inſert an account of a very extraordinary circumſtance which frequently takes place therein.

"As gravity acts perpendicularly to the horizon, it is evident, that if no other power but gravity deflected a projected body from its courſe, its motion would be conſtantly performed in a plane perpendicular to the horizon, paſſing through the line of its original direction: but we have found, that the body in its motion often deviates from this plane; ſometimes to the right hand, and at other times to the left; and this in an incurvated line, which is convex towards that plane: ſo that the motion of a bullet is frequently in a line having a double curvature, it being bent towards the horizon by the force of gravity, and again bent out of its original direction to the right or left by ſome other force: in this caſe no part of the motion of the bullet is performed in the ſame plane, but its track will lie in the ſurface of a kind of cylinder, whoſe axis is perpendicular to the horizon.

"This propoſition may be indiſputably proved by the experience of every one in the leaſt converſant with the practice of gunnery. The ſame piece which will carry its bullet within an inch of the intended mark at 10 yards diſtance, cannot be relied on to 10 inches in 100 yards, much leſs to 30 inches in 300 yards. Now this inequality can only ariſe from the tract of the bullet being incurvated ſideways as well as downwards: for by this means the diſtance between that incurvated line and the line of direction will increaſe in a much greater ratio than that of the diſtance; theſe lines being coincident at the mouth of the piece, and afterwards ſeparating in the manner of a curve and its tangent, if the mouth of the piece be conſidered as the point of contact.—To put this matter out of all doubt, however, I took a barrel carrying a ball $\frac{3}{4}$ of an inch diameter, and fixing it on a heavy carriage, I ſatisfied myſelf of the ſteadineſs and truth of its direction, by firing at a board $1\frac{1}{7}$ feet ſquare, which was placed at 180 feet diſtance; for I found, that in 16 ſucceſſive ſhot I miſſed the mark but once. Now, the ſame barrel being fixed on the ſame carriage, and fired with a ſmaller quantity of powder, ſo that the ſhock on the diſcharge would be much leſs, and conſequently the direction leſs changed, I found, that at 760 yards diſtance, the ball flew ſometimes 100 yards to the right of the line it was pointed on, and ſometimes as much to the left. I found too, that its direction in the perpendicular line was not leſs uncertain, it falling one time above 200 yards ſhort of what it did at another; although, by the niceſt examination of the piece after the diſcharge, it did not appear to have ſtarted in the leaſt from the poſition it was placed in.

"The reality of this doubly curvated tract being thus demonſtrated, it may perhaps be aſked, What can be the cauſe of a motion ſo different from what has been hitherto ſuppoſed? And to this I anſwer, that the deflection in queſtion muſt be owing to ſome power acting obliquely to the progreſſive motion of the body; which power can be no other than the reſiſtance of the air. If it be farther aſked, How the reſiſtance of the air can ever come to be oblique to the progreſſive motion of the body? I farther reply, that it may ſometimes ariſe from inequalities in the reſiſted ſurface; but that its general cauſe is doubtleſs a whirling motion acquired by the bullet about its axis: for by this motion of rotation, combined with the progreſſive motion, each part of the bullet's ſurface will ſtrike the air very differently from what it would do if there was no ſuch whirl; and the obliquity of the action of the air ariſing from this cauſe, will be greater as the motion of the bullet is greater in proportion to its progreſſive one.

"This whirling motion undoubtedly ariſes from the friction of the bullet againſt the ſides of the piece: and as the rotatory motion will in ſome part of its revolution conſpire with the progreſſive one, and in another part be equally oppoſed to it; the reſiſtance of the air on the fore part of the bullet will be hereby affected, and will be increaſed in that part where the whirling motion conſpires with the progreſſive one, and diminiſhed where it is oppoſed to it: and by this means, the whole effort of the reſiſtance, inſtead of being oppoſite to the direction of the body, will become oblique thereto, and will produce thoſe effects already mentioned. If it was poſſible to predict the poſition of the axis round which the bullet ſhould whirl, and if that axis was unchangeable during the whole flight of the bullet, then the aberration of the bullet by this oblique force would be in a given direction ; and the incurvation produced thereby, would regularly extend the ſame way from one end of its track to the other. For inſtance, if the axis of the whirl was perpendicular to the horizon, then the incurvation would be to the right or left. If that axis was horizontal, and perpendicular to the direction of the bullet, then the incurvation would be upwards or downwards. But as the firſt poſition of this axis is uncertain, and as it may perpetually ſhift in the courſe of the bullet's flight ; the deviation of the bullet is not neceſſarily either in one certain direction, or tending to the ſame ſide in one part of its track that it does in another, but more uſually is continually changing the tendency of its deflection, as the axis round which it whirls muſt frequently ſhift its poſition to the progreſſive motion by many inevitable accidents.

" That a bullet generally acquires ſuch a rotatory motion, as here deſcribed, is, I think, demonſtrable ; however, to leave no room for doubt or diſpute, I confirmed it, as well as ſome other parts of my theory, by the following experiments.

" I cauſed the machine to be made, repreſented, Plate CXLII. fig. 7. BCDE, is a braſs-barrel, moveable on its axis, and ſo adjuſted by means of friction-wheels, not repreſented in the figure, as to have no friction worth attending to. The frame in which this barrel is fixed is ſo placed, that its axis may be perpendicular to the horizon. The axis itſelf is continued above the upper plate of the frame, and has faſtened on it a light hollow cone, AFG. From the lower part of this cone, there is extended a long arm of wood, GH, which is very thin, and cut feather-edged. At its extremity, there is a contrivance for fixing on the body, whoſe reſiſtance is to be inveſtigated, (as here the globe P) ; and to prevent the arm GH from ſwaying out of its horizontal poſition by the weight of the annexed body P, there is a brace, AH, of fine wire, faſtened to the top of the cone which ſupports the end of the arm.

" Round the barrel BCDE, there is wound a fine ſilk line, the turns of which appear in the figure ; and after this line hath taken a ſufficient number of turns, it is conducted nearly in a horizontal direction to the pully L over which it is paſſed, and then a proper weight M is hung to its extremity. If this weight be left at liberty, it is obvious that it will deſcend by its own gravity, and will, by its deſcent, turn round the barrel BCDE, together with the arm GH, and the body P faſtened to it. And whilſt the reſiſtance on the arm GH and on the body P is leſs than the weight M, that weight will accelerate its motion ; and thereby the motion of GH and P will increaſe, and conſequently their reſiſtance will increaſe, till at laſt this reſiſtance and the weight M become nearly equal to each other. The motion with which M deſcends, and with which P revolves, will not then ſenſibly differ from an equable one. Whence, it is not difficult to conceive, that, by proper obſervations made with this machine, the reſiſtance of the body P may be determined. The moſt natural method of proceeding in this inveſtigation, is as follows : Let the machine firſt have acquired its equable motion, which it will uſually do in about five or ſix turns from the beginning ; and then let it be obſerved, by counting a number of turns, what time is taken up by one revolution of the body P : then taking off the body P and the weight M, let it be examined what ſmaller weight will make the arm GH revolve in the ſame time as when P was fixed to it : this ſmaller weight being taken from M, the remainder is obviouſly equal in effort to the reſiſtance of the revolving body P ; and this remainder being reduced in the ratio of the length of the arm to the ſemidiameter of the barrel, will then become equal to the abſolute quantity of the reſiſtance. And as the time of one revolution is known, and conſequently the velocity of the revolving body, there is hereby diſcovered the abſolute quantity of the reſiſtance to the given body P moving with a given degree of celerity.

" Here, to avoid all objections, I have generally choſe, when the body P was removed, to fix in its ſtead a thin piece of lead of the ſame weight, placed horizontally ; ſo that the weight which was to turn round the arm GH, without the body P, did alſo carry round this piece of lead. But mathematicians will eaſily allow that there was no neceſſity for this precaution.—The diameter of the barrel BCDE, and of the ſilk ſtring wound round it, was 2.06 inches. The length of the arm GH, meaſured from the axis to the ſurface of the globe P, was 49.5 inches. The body P, the globe made uſe of, was of paſteboard ; its ſurface very neatly coated with marbled-paper. It was not much diſtant from the ſize of a 12lb. ſhot, being in diameter 4.5 inches, ſo that the radius of the circle deſcribed by the centre of the globe was 51.75 inches. When this globe was fixed at the end of the arm, and a weight of half a pound was hung at the end of the ſtring at M, it was examined how ſoon the motion of the deſcending weight M, and of the revolving body P, would become equable as to ſenſe. With this view, three revolutions being ſuffered to elapſe, it was found that the next 10 were performed in $27''\frac{3}{4}$, 20 in leſs than $55''$, and 30 in $82''\frac{1}{2}$; ſo that the firſt ten were performed in $27''\frac{3}{4}$, the ſecond in $27''\frac{1}{4}$, and the third in $27''\frac{1}{2}$.

" Theſe experiments ſufficiently evince, that even with half a pound, the ſmalleſt weight made uſe of, the motion of the machine was ſufficiently equable after the firſt three revolutions.

" The globe above-mentioned being now fixed at the end of the arm, there was hung on at M a weight of $3\frac{1}{4}$ lb ; and ten revolutions being ſuffered to elapſe, the ſucceeding 20 were performed in $21''\frac{1}{2}$. Then the globe being taken off, and a thin plate of lead, equal to it in weight, placed in its room ; it was found, that inſtead of $3\frac{1}{4}$ lb. a weight of one pound would make it revolve in leſs time than it did before ; performing now 20 revolutions after 10 were elapſed, in the ſpace of $19''$.

" Hence then it follows, that from the $3\frac{1}{4}$ lb. firſt hung on, there is leſs than 1 lb. to be deducted for the reſiſtance on the arm ; and conſequently the reſiſtance on the globe itſelf is not leſs than the effort of $2\frac{1}{4}$ lb. in the ſituation M ; and it appearing from the former meaſures, that the radius of the barrel is nearly $\frac{1}{50}$ of the radius of the circle, deſcribed by the centre of the globe ; it follows, that the abſolute reſiſtance of the globe, when it revolves 20 times in $21''\frac{1}{2}$, (about 25 feet in a ſecond), is not leſs than the fiftieth part of two pounds and a quarter, or of 36 ounces ;

and this being conſiderably more than half an ounce, and the globe nearly the ſize of a twelve-pound ſhot, it irreſragrably confirms a propoſition I had formerly laid down from theory, that the reſiſtance of the air to a twelve-pound iron ſhot, moving with a velocity of 25 feet in a ſecond, is not leſs than half an ounce.

" The reſt of the experiments were made, in order to confirm another propoſition, namely, that the reſiſtance of the air within certain limits is nearly in the duplicate proportion of the velocity of the reſiſted body. To inveſtigate this point, there were ſucceſſively hung on at M, weights in the proportion of the numbers 1, 4, 9, 16; and letting 10 revolutions firſt elapſe, the following obſervations were made on the reſt.—With ½ lb. the globe went 20 turns in 54″½, with 2 lb. it went 20 turns in 27″¼, with 4½ lb. it went 30 turns in 27½, and with 8 lb. it went 40 turns in 27½.—Hence it appears, that to reſiſtances proportioned to the numbers 1, 4, 9, 16, there correſpond velocities of the reſiſted body in the proportion of the numbers 1, 2, 3, 4: which proves, with great nicety, the propoſition above-mentioned.

" With regard to the rotatory motion, the firſt experiment was to evince, that the whirling motion of a ball combining with its progreſſive motion, would produce ſuch an oblique reſiſtance and deflective power as already mentioned. For this purpoſe a wooden ball of 4½ inches diameter was ſuſpended by a double ſtring, about eight or nine feet long. Now, by turning round the ball and twiſting the double ſtring, the ball when left to itſelf would have a revolving motion given it from the untwiſting of the ſtring again. And if, when the ſtring was twiſted, the ball was drawn to a conſiderable diſtance from the perpendicular, and there let go; it would at firſt, before it had acquired its revolving motion, vibrate ſteadily enough in the ſame vertical plane in which it firſt began to move: but when, by the untwiſting of the ſtring, it had acquired a ſufficient degree of its whirling motion, it conſtantly deflected to the right or left of its firſt track; and ſometimes proceeded ſo far as to have its direction at right angles to that in which it began its motion; and this deviation was not produced by the ſtring itſelf, but appeared to be entirely owing to the reſiſtance being greater on the one part of the leading ſurface of the globe, than the other. For the deviation continued when the ſtring was totally untwiſted; and even during the time that the ſtring, by the motion the globe had received, was twiſting the contrary way. And it was always eaſy to predict before the ball was let go, which way it would deflect, only by conſidering on which ſide the whirl would be combined with the progreſſive motion; for on that ſide always the deflective power acted, as the reſiſtance was greater here than on the ſide where the whirl and progreſſive motion were oppoſed to one another."

Though Mr Robins conſidered this experiment as an inconteſtable proof of the truth of his theory, he undertook to give ocular demonſtration of this deflection of muſket-bullets even in the ſhort ſpace of 100 yards.

" As all projectiles," ſays he, " in their flight, are acted upon by the power of gravity, the deflection of a bullet from its primary direction, ſuppoſes that deflection to be upwards or downwards in a vertical plane; becauſe, in the vertical plane, the action of gravity is compounded and entangled with the deflective force. And for this reaſon my experiments have been principally directed to the examination of that deflection which carries the bullet to the right or left of that plane in which it began to move. For if it appears at any time that the bullet has ſhifted from that vertical plane in which the motion began, this will be an inconteſtable proof of what we have advanced.—Now, by means of ſcreens of exceeding thin paper, placed parallel to each other at proper diſtances, this deflexion in queſtion may be many ways inveſtigated. For by firing bullets which ſhall traverſe theſe ſcreens, the flight of the bullet may be traced; and it may eaſily appear whether they do or do not keep invariably to one vertical plane. This examination may proceed on three different principles, which I ſhall here ſeparately explain.

" For firſt, an exactly vertical plane may be traced out upon all theſe ſcreens, by which the deviation of any ſingle bullet may be more readily inveſtigated, only by meaſuring the horizontal diſtance of its trace from the vertical plane thus delineated; and by this means the abſolute quantity of its aberration may be known. Or if the deſcription of ſuch a vertical plane ſhould be eſteemed a matter of difficulty and nicety, a ſecond method may be followed; which is that of reſting the piece in ſome fixed notch or ſocket, ſo that though the piece may have ſome little play to the right and left, yet all the lines in which the bullet can be directed ſhall interſect each other in the centre of that fixed ſocket: by this means, if two different ſhot are fired from the piece thus ſituated, the horizontal diſtances made by the two bullets on any two ſcreens ought to be in the ſame proportion to each other as the reſpective diſtances of the ſcreens from the ſocket in which the piece was laid. And if theſe horizontal diſtances differ from that proportion, then it is certain that one of the ſhot at leaſt hath deviated from a vertical plane, although the abſolute quantity of that deviation cannot hence be aſſigned; becauſe it cannot be known what part of it is to be imputed to one bullet, and what to the other.

" But if the conſtant and invariable poſition of the notch or ſocket in which the piece was placed, be thought too hard an hypotheſis in this very nice affair; the third method, and which is the ſimpleſt of all, requires no more than that two ſhot be fired through three ſcreens without any regard to the poſition of the piece each time: for in this caſe, if the ſhots diverge from each other, and both keep to a vertical plane, then if the horizontal diſtances of their traces on the firſt ſcreen be taken from the like horizontal diſtances on the ſecond and third, the two remainders will be in the ſame proportion with the diſtances of the ſecond and third ſcreen from the firſt. And if they are not in this proportion, then it will be certain that one of them at leaſt hath been deflected from the vertical plane; though here, as in the laſt caſe, the quantity of that deflexion in each will not be known.

31 Remar able de tions o bullets the rig and le

" All theſe three methods I have myſelf made uſe of at different times, and have ever found the ſucceſs agreeable to my expectation. But the moſt eligible method ſeemed to be a compound of the two laſt. The apparatus was as follows.—Two ſcreens were ſet up in the large walk in the charter-houſe garden; the firſt of them at 250 feet diſtance from the wall, which was to ſerve for a third ſcreen; and the ſecond 200 feet from the ſame wall. At 50 feet before the firſt ſcreen, or at 300 feet from the wall, there was placed a large block weighing about 200 lb. weight, and having fixed into it an iron bar with a ſocket at its extremity, in which the piece was to be laid. The piece itſelf was of a common length, and bored for an ounce ball. It was each time loaded with a ball of 17 to the pound; ſo that the windage was extremely ſmall, and with a quarter of an ounce of good powder. The ſcreens were made of the thinneſt iſſue paper; and the reſiſtance they gave to the bullet, (and conſequently their probability of deflecting it) was ſo ſmall, that a bullet lighting one time near the extremity of one of the ſcreens, left a fine thin fragment of it towards the edge entire, which was ſo very weak that it was difficult to handle it without breaking. Theſe things thus prepared, five ſhot were made with the piece reſted in the notch abovementioned; and the horizontal diſtances between the firſt ſhot, which was taken as a ſtandard, and the four ſucceeding ones, both on the firſt and ſecond ſcreen and on the wall, meaſured in inches, were as follows:

	1ſt Screen.	2d Screen.	Wall.
1 to 2	1,75 R.	3,15 R.	16,7 R.
3	10 L.	15,6 L.	69,25 L.
4	1,25 L.	4,5 L.	15,0 L.
5	2,15 L.	5,1 L.	19,0 L.

"Here the letters R and L denote that the ſhot in queſtion went either to the right or left of the firſt.

"If the poſition of the ſocket in which the piece was placed be ſuppoſed fixed, then the horizontal diſtances meaſured above on the firſt and ſecond ſcreen, and on the wall, ought to be in proportion to the diſtances of the firſt ſcreen, the ſecond ſcreen, and the wall from the ſocket. But by only looking over theſe numbers, it appears, that none of them are in that proportion; the horizontal diſtance of the firſt and third, for inſtance, on the wall being above nine inches more than it ſhould be by this analogy.

"If, without ſuppoſing the invariable poſition of the ſocket, we examine the comparative horizontal diſtances according to the third method deſcribed above, we ſhall in this caſe diſcover divarications ſtill more extraordinary; for, by the numbers ſet down, it appears, that the horizontal diſtances of the ſecond and third ſhot on the two ſcreens, and on the wall, are as under.

1ſt Screen.	2d Screen.	Wall.
11.75	18.75	83.95

Here, if, according to the rule given above, the diſtance on the firſt ſcreen be taken from the diſtances on the other two, the remainder will be 7, and 74.2: and theſe numbers, if each ſhot kept to a vertical plane, ought to be in the proportion of 1 to 5; that being the proportion of the diſtances of the ſecond ſcreen and of the wall from the firſt: but the laſt number 74.2 exceeds what it ought to be by this analogy by 39.2; ſo that between them there is a deviation from the vertical plane of above 39 inches, and this too in a tranſit of little more than 80 yards.

"But farther, to ſhew that theſe irregularities do not depend on any accidental circumſtance of the balls fitting or not fitting the piece, there were five ſhots more made with the ſame quantity of powder as before; but with ſmaller bullets, which ran much looſer in the piece. And the horizontal diſtances being meaſured in inches from the trace of the firſt bullet to each of the ſucceeding ones, the numbers were as under.

	1ſt Screen.	2d Screen.	Wall.
1 to 2	15.6 R.	31.1 R.	94.0 R.
3	6.4 L.	12.75 L.	23.0 L.
4	4.7 R.	8.5 R.	15.5 R.
5	12.6 R.	24.0 R.	63.5 R.

Here, again, on the ſuppoſed fixed poſition of the piece, the horizontal diſtance on the wall between the firſt and third will be found above 15 inches leſs than it ſhould be if each kept to a vertical plane; and like irregularities, though ſmaller, occur in every other experiment. And if they are examined according to the third method ſet down above, and the horizontal diſtances of the third and fourth, for inſtance, are compared, thoſe on the firſt and ſecond ſcreen, and on the wall, appear to be thus.

1ſt Screen.	2d Screen.	Wall.
11.1.	21.25.	38.5.

And if the horizontal diſtance on the firſt ſcreen be taken from the other two, the remainders will be 10.15, and 27.4; where the leaſt of them, inſtead of being five times the firſt, as it ought to be, is 23.35 ſhort of it; ſo that here is a deviation of 23 inches.

"From all theſe experiments, the deflection in queſtion ſeems to be inconteſtably evinced. But to give ſome farther light to this ſubject, I took a barrel of the ſame bore with that hitherto uſed; and bent it at about three or four inches from its muzzle to the left, the bend making an angle of three or four degrees with the axis of the piece. This piece thus bent was fired with a looſe ball, and the ſame quantity of powder hitherto uſed, the ſcreens of the laſt experiment being ſtill continued. It was natural to expect, that if this piece was pointed by the general direction of its axis, the ball would be canted to the left of that direction by the bend near its mouth. But as the bullet, in paſſing through that bent part, would, as I conceived, be forced to roll upon the right-hand ſide of the barrel, and thereby its left ſide would turn up againſt the air, and would increaſe the reſiſtance on that ſide; I predicted to the company then preſent, that if the axis, on which the bullet whirled, did not ſhift its poſition after it was ſeparated from the piece; then, notwithſtanding the bend of the piece to the left, the bullet itſelf might be expected to incurvate towards the right; and this, upon trial, did moſt remarkably happen. For, one of the bullets fired from this bent piece, paſſed through the firſt ſcreen about 1½ inch diſtant from the trace of one of the ſhot fired from the ſtraight piece in the laſt ſet of experiments. On the ſecond ſcreen, the traces of the ſame bullets were about three inches diſtant; the bullet from the crooked piece paſſing on both ſcreens to the left of the other: but, comparing the places of theſe bullets on the wall, it appeared, that the bullet from the crooked piece, though it diverged from the track on the two ſcreens, had now croſſed that track, and was deflected conſiderably to the right of it; ſo that it was obvious, that though the bullet from the crooked piece might firſt be canted to the left, and had diverged from the track of the other

other bullet with which it was compared, yet by degrees it deviated again to the right, and a little beyond the ſecond ſcreen croſſed that track from which it before diverged, and on the wall was deflected 14 inches, as I remember, on the contrary ſide. And this experiment is not only the moſt convincing proof of the reality of this deflection here contended for; but is likewiſe the ſtrongeſt confirmation that it is brought about in the very manner and by the very circumſtances which we have all along deſcribed.

"I have only now to add, that as I ſuſpected the conſideration of the revolving motion of the bullet, compounded with its progreſſive one, might be conſidered as a ſubject of mathematical ſpeculation, and that the reality of any deflecting force thence ariſing might perhaps be denied by ſome computiſts upon the principles hitherto received of the action of fluids; I thought proper to annex a few experiments, with a view of evincing the ſtrange deficiency of all theories of this ſort hitherto eſtabliſhed, and the unexpected and wonderful varieties which occur in theſe matters: The propoſition which I advanced for this purpoſe being, That two equal ſurfaces meeting the air with the ſame degree of obliquity, may be ſo differently reſiſted, that though in one of them the reſiſtance is leſs than that of a perpendicular ſurface meeting the ſame quantity of air, yet in another it ſhall be conſiderably greater.

32
Strange anomaly in the reſiſtance of the air.

"To make out this propoſition, I made uſe of the machine already deſcribed: and having prepared a paſteboard pyramid, whoſe baſe was four inches ſquare, and whoſe planes made angles of 45° with the plane of its baſe; and alſo a parallellogram four inches in breadth, and $5\frac{7}{8}$ in length, which was equal to the ſurface of the pyramid, the globe P was taken off from the machine, and the pyramid was firſt fixed on; and 2 lb. being hung at M, and the pyramid ſo fitted as to move with its vertex forwards, it performed 20 revolutions after the firſt ten were elapſed, in 33″. Then the pyramid being turned, ſo that its baſe, which was a plane of four inches ſquare, went foremoſt, it now performed 20 revolutions with the ſame weight in $38''\frac{1}{4}$.—After this, taking off the pyramid, and fixing on the parallellogram with its longer ſide perpendicular to the arm, and placing its ſurface in an angle of 45° with the horizon by a quadrant, the parallellogram, with the ſame weight, performed 20 revolutions in $43''\frac{1}{2}$.

"Now here this parallellogram and the ſurface of the pyramid are equal to each other, and each of them met the air in an angle of 45°; and yet one of them made 20 revolutions in 33″, whilſt the other took up $43\frac{1}{2}$. And at the ſame time it appears, that a flat ſurface, ſuch as the baſe of a pyramid, which meets the ſame quantity of air perpendicularly, makes 20 revolutions in $38''\frac{1}{4}$, which is the medium between the other two.

"But to give another, and ſtill more ſimple, proof of this principle; there was taken a parallellogram four inches broad, and $8\frac{1}{4}$ long. This being fixed at the end of the arm, with its long ſide perpendicular thereto, and being placed in an angle of 45° with the horizon, there was a weight hung on at M of $3\frac{1}{2}$ lb. with which the parallellogram made 20 revolutions in $40''\frac{1}{4}$. But after this, the poſition of the parallellogram was ſhifted, and it was placed with its ſhorter ſide perpendicular to the arm, though its ſurface was ſtill inclined to an angle of 45° with the horizon; and now, inſtead of going ſlower, as might be expected from the greater extent of part of its ſurface from the axis of the machine, it went round much faſter: for in this laſt ſituation it made 20 revolutions in $35''\frac{1}{4}$, ſo that there were 5″ difference in the time of 20 revolutions; and this from no other change of circumſtance than as the larger or ſhorter ſide of the oblique plane was perpendicular to the line of its direction."

33
Why the art of gu nery cann become perfect.

Theſe are the principal experiments made by Mr Robins, in confirmation of his theory, and which not only far exceed every thing that had been formerly done, but even bid fair for advancing the art of gunnery to its *ne plus ultra*. It muſt be obſerved, however, that in this art it is impoſſible we ſhould ever arrive at abſolute perfection; that is, it can never be expected that a gunner, by any method of calculation whatever, could be enabled to point his guns in ſuch a manner, that the ſhot would hit the mark if placed any where within its range. Aberrations which can by no means be either foreſeen or prevented, will take place from a great number of different cauſes. A variation in the denſity of the atmoſphere, in the dampneſs of the powder, or in the figure of the ſhot, will cauſe variations in the range of the bullet, which cannot by any means be reduced to rules, and conſequently muſt render the event of each ſhot very precarious. The reſiſtance of the atmoſphere ſimply conſidered, without any of thoſe anomalies ariſing from its denſity at different times, is a problem, which, notwithſtanding the labours of Mr Robins and others, hath not been completely ſolved: and indeed, if we conſider the matter in a phyſical light, we ſhall find, that without ſome other data than thoſe which are yet obtained, an exact ſolution of it is impoſſible.

34
The air as a mov ing pow as well reſiſting one.

It is an objection that hath been made to the mathematical philoſophy, and to which in many caſes it is moſt certainly liable, that it conſiders the *reſiſtance* of matter more than its capacity of giving motion to other matter. Hence, if in any caſe matter acts both as a reſiſting and a moving power, and the mathematician overlooks its effort towards motion, founding his demonſtrations only upon its property of reſiſting, theſe demonſtrations will certainly be falſe, tho' they ſhould be ſupported by all the powers of geometry. It is to an error of this kind that we are to attribute the great differences already taken notice of between the calculations of Sir Iſaac Newton, with regard to the reſiſting force of fluids, and what actually takes place upon trial. Theſe calculations were made upon the ſuppoſition that the fluid through which a body moved could do nothing elſe but reſiſt it; yet it is certain, that the air (the fluid with which we have to do at preſent) proves a ſource of *motion*, as well as reſiſtance, to all bodies which move in it.

Plate CXLII fig. 8.

To underſtand this matter fully, let ABC repreſent a crooked tube made of any ſolid matter, and *a*, *b*, two piſtons which exactly fill the cavity. If the ſpace between theſe piſtons is full of air, it is plain they cannot come into contact with each other on account of the elaſticity of the included air, but will remain at ſome certain diſtance as repreſented in the figure. If the piſton *b* is drawn up, the air which preſſes in the direction

tion C*b* acts as a reſiſting power, and the piſton will not be drawn up with ſuch eaſe as if the whole was *in vacuo*. But though the column of air preſſing in the direction C*b* acts as a reſiſting power on the piſton *b*, the column preſſing in the direction A*a* will act as a moving power upon the piſton *a*. It is therefore plain, that if *b* is moved upwards till it comes to the place marked *d*, the other will deſcend to that marked *c*. Now if we ſuppoſe the piſton *a* to be removed, it is plain, that when *b* is pulled upwards to *d*, the air deſcending through the leg A*a*CB will preſs on the under ſide of the piſton *b*, as ſtrongly as it would have done upon the upper ſide of the piſton *a*, had it been preſent. Therefore, though the air preſſing down thro' the leg CB reſiſts the motion of the piſton *b* when drawn upwards, the air preſſing down through the leg AB forwards it as much; and accordingly the piſton *b* may be drawn up or puſhed down at pleaſure, and with very little trouble. But if the orifice at A is ſtopped, ſo that the air can only exert its reſiſting power on the piſton *b*, it will require a conſiderable degree of ſtrength to move the piſton from *b* to *d*.

If now we ſuppoſe the tube to be entirely removed (which indeed anſwers no other purpoſe than to render the action of the air more evident), it is plain, that if the piſton is moved either up or down, or in any other direction we can imagine, the air preſſes as much upon the back part of it, as it reſiſts it on the fore part; and of conſequence, a ball moving through the air with any degree of velocity, ought to be as much accelerated by the action of the air behind, as it is retarded by the action of that before.—Here then it is natural to aſk, If the air accelerates a moving body as much as it retards it, how comes it to make any reſiſtance at all? yet certain it is, that this fluid doth reſiſt, and that very conſiderably. To this it may be anſwered, that the air is always kept in ſome certain ſtate or conſtitution by another power which rules all its motions, and it is this power undoubtedly which gives the reſiſtance. It is not to our purpoſe at preſent to inquire what that power is; but we ſee that the air is often in very different ſtates: one day, for inſtance, its parts are violently agitated by a ſtorm; and another, perhaps, they are comparatively at reſt in a calm. In the firſt caſe, nobody heſitates to own, that the ſtorm is occaſioned by ſome cauſe or other, which violently reſiſts any other power that would prevent the agitation of the air. In a calm, the caſe is the ſame; for it would require the ſame exertion of power to excite a tempeſt in a calm day, as to allay a tempeſt in a ſtormy one. Now it is evident, that all projectiles, by their motion, agitate the atmoſphere in an unnatural manner; and conſequently are reſiſted by that power, whatever it is, which tends to reſtore the equilibrium, or bring back the atmoſphere to its former ſtate.

If no other power beſides that above-mentioned acted upon projectiles, it is probable, that all reſiſtance to their motion would be in the duplicate proportion of their velocities; and accordingly, as long as the velocity is ſmall, we find it generally is ſo. But when the velocity comes to be exceedingly great, other ſources of reſiſtance ariſe. One of theſe, is a ſubtraction of part of the moving power; which though not properly a *reſiſtance*, or oppoſing another power to it, is an equivalent thereto. This ſubtraction ariſes from the following cauſe. The air, as we have already obſerved, preſſes upon the hinder part of the moving body by its gravity, as much as it reſiſts the forepart of it by the ſame property. Nevertheleſs, the velocity with which the air preſſes upon any body by means of its gravity, is limited; and it is poſſible that a body may change its place with ſo great velocity that the air hath not time to ruſh in upon the back part of it, in order to aſſiſt its progreſſive motion. When this happens to be the caſe, there is in the firſt place a deficiency of the moving power equivalent to 15 pounds on every ſquare inch of ſurface; at the ſame time that there is a poſitive reſiſtance of as much more on the forepart, owing to the gravity of the atmoſphere, which muſt be overcome before the body can move forward.

This deficiency of moving power, and increaſe of reſiſtance, do not only take place when the body moves with a very great degree of velocity, but in all motions whatever. It is not in all caſes perceptible, becauſe the velocity with which the body moves, frequently bears but a very ſmall proportion to the velocity with which the air preſſes in behind it. Thus, ſuppoſing the velocity with which the air ruſhes into a vacuum to be 1200 feet in a ſecond, if a body moves with a velocity of 30, 40, or 50 feet in a ſecond, the force with which the air preſſes on the back part is but $\frac{1}{25}$ at the utmoſt leſs than that which reſiſts on the forepart of it, which will not be perceptible: but if, as in the caſe of bullets, the velocity of the projectile comes to have a conſiderable proportion to the velocity wherewith the air ruſhes in behind it; then a very perceptible, and otherwiſe unaccountable reſiſtance is obſerved, as we ſeen in the experiments already related by Mr Robins. Thus, if the air preſſes in with a velocity of 1200 feet in a ſecond, if the body changes its place with a velocity of 600 feet in the ſame time, there is a reſiſtance of 15 pounds on the fore part, and a preſſure of only $7\frac{1}{2}$ on the back part. The reſiſtance therefore not only overcomes the moving power of the air by $7\frac{1}{2}$ pounds, but there is a deficiency of other $7\frac{1}{2}$ pounds owing to the want of half the preſſure of the atmoſphere on the back part, and thus the whole loſs of the moving power is equivalent to 15 pounds; and hence the exceeding great increaſe of reſiſtance obſerved by Mr Robins beyond what it ought to be according to the common computations.—The velocity with which the air ruſhes into a vacuum is therefore a deſideratum in gunnery. Mr Robin's ſuppoſes that it is the ſame with the velocity of ſound; and that when a bullet moves with a velocity greater than that of 1200 feet in a ſecond, it leaves a perfect vacuum behind it. Hence he accounts for the great increaſe of reſiſtance to bullets moving with ſuch velocities; but as he doth not take notice of the loſs of the air's moving power, the anomalies of all leſſer velocities are inexplicable on his principles. Nay, he even tell us, that Sir Iſaac Newton's rule for computing reſiſtances may be applied in all velocities leſs than 1100 or 1200 feet in a ſecond, though this is expreſsly contradicted by his own experiments mentioned n°23.

35
It reſiſts by its elaſticity as well as gravity.

Though for theſe reaſons it is evident how great difficulties muſt occur in attempting to calculate the reſiſtance of the air to military projectiles, we have not even yet diſcovered all the ſources of reſiſtance to theſe bodies when moving with immenſe velocities. Another

ther power by which they are oppoſed, (and which at laſt becomes greater than any of thoſe hitherto mentioned), is the air's elaſticity. This, however, will not begin to ſhew itſelf in the way of reſiſtance till the velocity of the moving body becomes conſiderably greater than that by which the air preſſes into a vacuum. Having therefore firſt aſcertained this velocity, which we ſhall ſuppoſe to be 1200 feet in a ſecond, it is plain, that if a body moves with a velocity of 1800 feet in a ſecond, it muſt compreſs the air before it; becauſe the fluid hath neither time to expand itſelf in order to fill the vacuum left behind the moving body, nor to ruſh in by its gravity. This compreſſion it will reſiſt by its elaſtic power, which thus becomes a new ſource of reſiſtance increaſing, without any limit, in proportion to the velocity of the moving body. If now we ſuppoſe the moving body to ſet out with a velocity of 2400 feet in a ſecond, it is plain, that there is not only a vacuum left behind the body, but the air before it is compreſſed into half its natural ſpace. The loſs of motion in the projectile therefore is now very conſiderable. It firſt loſes 15 pounds on every ſquare inch of ſurface on account of the deficiency of the moving power of the air behind it; then it loſes 15 pounds more on account of the reſiſtance of the air before it; again it loſes 15 pounds on account of the elaſticity of the compreſſed air; and laſtly another 15 pounds on account of the vacuum behind, which takes off the weight of the atmoſphere, that would have been equivalent to one half of the elaſticity of the air before it. The whole reſiſtance therefore upon every ſquare inch of ſurface moving with this velocity is 60 pounds, beſides that which ariſes from the power tending to preſerve the general ſtate of the atmoſphere, and which increaſes in the duplicate proportion of the velocity as already mentioned. If the body is ſuppoſed to move with a velocity of 4800 feet in a ſecond, the reſiſtance from the air's elaſticity will then be quadrupled, or amount to 60 pounds on the ſquare inch of ſurface; which added to the other cauſes, produces a reſiſtance of 105 pounds upon the ſquare inch; and thus would the reſiſtance from the elaſticity of the air go on continually increaſing, till at laſt the motion of the projectile would be as effectually ſtopped as if it was fired againſt a wall. This obſtacle therefore we are to conſider as really *inſuperable* by any art whatever, and therefore it is not adviſeable to uſe larger charges of powder than what will project the ſhot with a velocity of 1200 feet in a ſecond. To this velocity the elaſticity of the air will not make great reſiſtance, if indeed it do make any at all: for tho' Mr Robins hath conjectured that air ruſhes into a vacuum with the velocity of ſound, or between 11 and 1200 feet in a ſecond; yet we have no deciſive proof of the truth of this ſuppoſition. At this velocity indeed, according to Mr Robins, a very ſudden increaſe of reſiſtance takes place: but this is denied by Mr Glenie *, who ſuppoſes that the aſſiſtance proceeds gradually; and indeed it ſeems to be pretty obvious, that the reſiſtance cannot very *ſuddenly* increaſe, if the velocity is only increaſed in a ſmall degree. Yet it is certain, that the ſwifteſt motions with which cannon-balls can be projected are very ſoon reduced to this ſtandard; for Mr Robins acquaints us, that "a 24-pound ſhot when diſcharged with a velocity of 2000 feet in a ſecond, will be reduced to that of 1200 feet in a ſecond in a flight of little more than 500 yards."

SECT. III. *Practice of Gunnery.*

WITH regard to the practical part of gunnery, which ought to conſiſt in directing the piece in ſuch a manner as always to hit the object againſt which it is pointed, there can be no certain rules given. The following maxims are laid down by Mr Robin's as of uſe in practice.

1. In any piece of artillery whatever, the greater the quantity of powder it is charged with, the greater will be the velocity of the bullet.

2. If two pieces of the ſame bore, but of different lengths, are fired with the ſame charge of powder, the longer will impel the bullet with a greater celerity than the ſhorter.

3. If two pieces of artillery different in weight, and formed of different metals, have yet their cylinders of equal bores and equal lengths; then with like charges of powder and like bullets they will each of them diſcharge their ſhot with nearly the ſame degree of celerity.

4. The ranges of pieces at a given elevation are no juſt meaſures of the velocity of the ſhot; for the ſame piece fired ſucceſſively at an invariable elevation, with the powder, bullet, and every other circumſtance as nearly the ſame as poſſible, will yet range to very different diſtances.

5. The greateſt part of that uncertainty in the ranges of pieces which is deſcribed in the preceding maxim, can only ariſe from the reſiſtance of the air.

6. The reſiſtance of the air acts upon projectiles in a twofold manner: for it oppoſes their motion, and by that means continually diminiſhes their celerity; and it beſides diverts them from the regular track they would otherwiſe follow; whence ariſe thoſe deviations and inflections already treated of.

7. That action of the air by which it retards the motion of projectiles, though much neglected by writers on artillery, is yet, in many inſtances, of an immenſe force; and hence the motion of theſe reſiſted bodies is totally different from what it would otherwiſe be.

8. This retarding force of the air acts with different degrees of violence, according as the projectile moves with a greater or leſſer velocity; and the reſiſtances obſerve this law, That to a velocity which is double another, the reſiſtance within certain limits is fourfold; to a treble velocity, ninefold; and ſo on.

9. But this proportion between the reſiſtances to two different velocities, does not hold if one of the velocities be leſs than that of 1200 feet in a ſecond, and the other greater. For in that caſe the reſiſtance to the greater velocity is near three times as much as it would come out by a compariſon with the ſmaller, according to the law explained in the laſt maxim.

10. To the extraordinary power exerted by the reſiſtance of the air it is owing, that when two pieces of different bores are diſcharged at the ſame elevation, the piece of the largeſt bore uſually ranges fartheſt, provided they are both fired with fit bullets, and the cuſtomary allotment of powder.

11. The greateſt part of military projectiles will at

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* Hiſt. of Gunnery, p. 48, 50.

the time of their diſcharge acquire a whirling motion round their axis by rubbing againſt the inſide of their reſpective pieces; and this whirling motion will cauſe them to ſtrike the air very differently from what they would do had they no other than a progreſſive motion. By this means it will happen, that the reſiſtance of the air will not always be directly oppoſed to their flight; but will frequently act in a line oblique to their courſe, and will thereby force them to deviate from the regular tract they would otherwiſe deſcribe. And this is the true cauſe of the irregularities deſcribed in maxim 4.

12. From the ſudden trebling the quantity of the air's reſiſtance, when the projectile moves ſwifter than at the rate of 1200 feet in a ſecond (as hath been explained in maxim 9), it follows, that whatever be the regular range of a bullet diſcharged with this laſt mentioned velocity, that range will be but little increaſed how much ſoever the velocity of the bullet may be ſtill farther augmented by greater charges of powder.

13. If the ſame piece of cannon be ſucceſſively fired at an invariable elevation, but with various charges of powder, the greateſt charge being the whole weight of the bullet in powder, and the leaſt not leſs than the fifth part of that weight; then if the elevation be not leſs than eight or ten degrees, it will be found, that ſome of the ranges with the leaſt charge will exceed ſome of thoſe with the greateſt.

14. If two pieces of cannon of the ſame bore, but of different lengths, are ſucceſſively fired at the ſame elevation with the ſame charge of powder; then it will frequently happen, that ſome of the ranges with the ſhorter piece will exceed ſome of thoſe with the longer.

15. In diſtant cannonadings, the advantages ariſing from long pieces and large charges of powder are but of little moment.

16. In firing againſt troops with grape-ſhot, it will be found, that charges of powder much leſs than thoſe generally uſed are the moſt advantageous.

17. The principal operations in which large charges of powder appear to be more efficacious than ſmall ones, are the ruining of parapets, the diſmounting of batteries covered by ſtout merlons, or battering in breach; for, in all theſe caſes, if the object be but little removed from the piece, every increaſe of velocity will increaſe the penetration of the bullet.

18. Whatever operations are to be performed by artillery, the leaſt charges of powder, with which they can be effected, are always to be preferred.

19. Hence, then, the proper charge of any piece of artillery is not that allotment of powder which will communicate the greateſt velocity to the bullet (as moſt practitioners formerly maintained); nor is it to be determined by an invariable proportion of its weight to the weight of the ball: but, on the contrary, it is ſuch a quantity of powder as will produce the leaſt velocity for the purpoſe in hand; and, inſtead of bearing always a fixed ratio to the weight of the ball, it muſt be different according to the different buſineſs which is to be performed.

20. No field-piece ought at any time to be loaded with more than $\frac{1}{8}$, or at the utmoſt $\frac{1}{5}$, of the weight of its bullet in powder; nor ſhould the charge of any battering piece exceed $\frac{1}{3}$ of the weight of its bullet.

21. Although precepts very different from thoſe we have here given have been often advanced by artilleriſts, and have been ſaid to be derived from experience; yet is that pretended experience altogether fallacious: ſince from our doctrine of reſiſtance eſtabliſhed above, it follows, that every ſpeculation on the ſubject of artillery, which is only founded on the experimental ranges of bullets diſcharged with conſiderable velocities, is liable to great uncertainty.

36
Deſcription and uſe of rifled barrels.

The greateſt irregularities in the motion of bullets are, as we have ſeen, owing to the whirling motion on their axis, acquired by the friction againſt the ſides of the piece. The beſt method hitherto known of preventing theſe is by the uſe of pieces with *rifled barrels*. Theſe pieces have the inſides of their cylinders cut with a number of ſpiral channels: ſo that it is in reality a female ſcrew, varying from the common ſcrews only in this, that its threads or rifles are leſs deflected, and approach more to a right line; it being uſual for the threads with which the rifled barrel is indented, to take little more than one turn in its whole length. The numbers of theſe threads are different in each barrel, according to the ſize of the piece and the fancy of the workman; and in like manner the depth to which they are cut is not regulated by any invariable rule.

The uſual method of charging theſe pieces is this: When the proper quantity of powder is put down, a leaden bullet is taken, a ſmall matter larger than the bore of the piece was before the rifles were cut: and this bullet being laid on the mouth of the piece, and conſequently too large to go down of itſelf, it is forced by a ſtrong rammer impelled by a mallet, and by repeated blows is driven home to the powder; and the ſoftneſs of the lead giving way to the violence with which the bullet is impelled, that zone of the bullet which is contiguous to the piece varies its arcular form, and takes the ſhape of the inſide of the barrel; ſo that it becomes part of a male ſcrew exactly anſwering to the indents of the rifle.

In ſome parts of Germany and Switzerland, however, an improvement is added to this practice; eſpecially in the larger pieces which are uſed for ſhooting at great diſtances. This is done by cutting a piece of very thin leather, or of thin fuſtian, in a circular ſhape, ſomewhat larger than the bore of the barrel. This circle being greaſed on one ſide, is laid upon the muzzle with its greaſy ſide downwards; and the bullet being then placed upon it, is forced down the barrel with it: by which means the leather or fuſtian incloſes the lower half of the bullet, and, by its interpoſition between the bullet and the rifles, prevents the lead from being cut by them. But it muſt be remembered, that in the barrels where this is practiſed, the rifles are generally ſhallow, and the bullet ought not to be too large.—But as both theſe methods of charging at the mouth take up a good deal of time; the rifled barrels which have been made in Britain, are contrived to be charged at the breech, where the piece is for this purpoſe made larger than in any other part. The powder and bullet are put in through the ſide of the barrel by an opening, which, when the piece is loaded, is then filled up with a ſcrew. By this means, when the piece is fired, the bullet is forced through the rifles, and acquires the ſpiral motion already deſcribed;

ſcribed; and perhaps ſomewhat of this kind, ſays Mr Robins, tho' not in the manner now practiſed, would be of all others the moſt perfect method for the conſtruction of theſe kinds of barrels.

From the whirling motion communicated by the rifles, it happens, that when the piece is fired, that indented zone of the bullet follows the ſweep of the rifles; and thereby, beſides its progreſſive motion, acquires a circular motion round the axis of the piece; which circular motion will be continued to the bullet after its ſeparation from the piece; and thus a bullet diſcharged from a rifled barrel is conſtantly made to whirl round an axis which is coincident with the line of its flight. By this whirling on its axis, the aberration of the bullet which proves ſo prejudicial to all operations in gunnery, is almoſt totally prevented. The reaſon of this may be eaſily underſtood from conſidering the flow motion of an arrow through the air. For example, if a bent arrow, with its wings not placed in ſome degree in a ſpiral poſition, ſo as to make it revolve round its axis as it flies through the air, were ſhot at a mark with a true direction, it would conſtantly deviate from it, in conſequence of being preſſed to one ſide by the convex part oppoſing the air obliquely. Let us now ſuppoſe this deflection in a flight of 100 yards to be equal to 10 yards. Now, if the ſame bent arrow were made to revolve round its axis once every two yards of its flight, its greateſt deviation would take place when it had proceeded only one yard, or made half a revolution; ſince at the end of the next half revolution it would again return to the ſame direction it had at firſt; the convex ſide of the arrow having been once in oppoſite poſitions. In this manner it would proceed during the whole courſe of its flight, conſtantly returning to the true path at the end of every two yards; and when it reached the mark, the greateſt deflection to either ſide that could happen would be equal to what it makes in proceeding one yard, equal to $\frac{1}{100}$th part of the former, or 3.6 inches, a very ſmall deflection when compared with the former one. In the ſame manner, a cannon-ball which turns not round its axis, deviates greatly from the true path, on account of the inequalities on its ſurface; which, although ſmall, cauſe great deviations by reaſon of the reſiſtance of the air, at the ſame time that the ball acquires a motion round its axis in ſome uncertain direction occaſioned by the friction againſt its ſides. But by the motion acquired from the rifles, the error is perpetually corrected in the manner juſt now deſcribed; and accordingly ſuch pieces are much more to be depended on, and will do execution at a much greater diſtance, than the others.

The reaſons commonly alleged for the ſuperiority of rifle-barrels over common ones, are, either that the inflammation of the powder is greater, by the reſiſtance which the bullet makes by being thus forced into the barrel, and that hereby it receives a much greater impulſe; or that the bullet by the compounding of its circular and revolving motions, did as it were bore the air, and thereby flew to a much greater diſtance than it would otherwiſe have have done; or that by the ſame boring motion it made its way through all ſolid ſubſtances, and penetrated into them much deeper than when fired in the common manner. But Mr Robins hath proved theſe reaſons to be altogether erroneous, by a great number of experiments made with rifle-barrelled pieces. "In theſe experiments," ſays he, "I have found that the velocity of the bullet fired from a rifled barrel was uſually leſs than that of the bullet fired from a common piece with the ſame proportion of powder. Indeed it is but reaſonable to expect that this ſhould be the caſe; for if the rifles are very deep, and the bullet is large enough to fill them up, the friction bears a very conſiderable proportion to the effort of the powder. And that in this caſe the friction is of conſequence enough to have its effects obſerved, I have diſcovered by the continued uſe of the ſame barrel. For the metal of the barrel being ſoft, and wearing away apace, its bore by half a year's uſe was conſiderably enlarged, and conſequently the depth of its rifles diminiſhed; and then I found that the ſame quantity of powder would give to the bullet a velocity near a tenth part greater than what it had done at firſt. And as the velocity of the bullet is not increaſed by the uſe of rifled barrels, ſo neither is the diſtance to which it flies, nor the depth of its penetration into ſolid ſubſtances. Indeed theſe two laſt ſuppoſitions ſeem at firſt ſight too chimerical to deſerve a formal confutation. But I cannot help obſerving that thoſe who have been habituated to the uſe of rifled pieces are very excuſable in giving way to theſe prepoſſeſſions. For they conſtantly found, that with them they could fire at a mark with tolerable ſucceſs, though it were placed at three or four times the diſtance to which the ordinary pieces were ſuppoſed to reach. And therefore, as they were ignorant of the true cauſe of this variety, and did not know that it aroſe only from preventing the deflection of the ball; it was not unnatural for them to imagine that the ſuperiority of effect in the rifled piece was owing either to a more violent impulſe at firſt, or to a more eaſy paſſage through the air.

"In order to confirm the foregoing theory of rifle-barrelled pieces, I made ſome experiments by which it might be ſeen whether one ſide of the ball diſcharged from them uniformly keeps foremoſt during the whole courſe. To examine this particular, I took a rifled barrel carrying a bullet of ſix to the pound; but inſtead of its leaden bullet I uſed a wooden one of the ſame ſize, made of a ſoft ſpringy wood, which bent itſelf eaſily into the rifles without breaking. And firing the piece thus loaded againſt a wall at ſuch a diſtance as the bullet might not be ſhivered by the blow, I always found, that the ſame ſurface which lay foremoſt in the piece continued foremoſt without any ſenſible deflection during the time of its flight. And this was eaſily to be obſerved, by examining the bullet; as both the marks of the rifles, and the part that impinged on the wall, were ſufficiently apparent. Now, as theſe wooden bullets were but the 16th part of the weight of the leaden ones; I conclude, that if there had been any unequal reſiſtance or deflective power, its effects muſt have been extremely ſenſible upon this light body, and conſequently in ſome of the trials I made the ſurface which came foremoſt from the piece muſt have been turned round into another ſituation.

"But again, I took the ſame piece, and, loading it now with a leaden ball, I ſet it nearly upright, ſloping it only three or four degrees from the perpendicular in the direction of the wind; and firing it in this ſituation, the bullet generally continued about half a minute in the air, it riſing by computation to near three quarters of a mile perpendicular height. In theſe trials I found that the bullet commonly came to the ground to the leeward of the piece, and at ſuch a diſtance from it, as nearly correſponded to the angle of its inclination, and to the effort of the wind; it uſually falling not nearer to the piece than 100, nor farther from it than 150, yards. And this is a ſtrong confirmation of the almoſt ſteady flight of this bullet, for about a mile and a half: for were the ſame trial made with a common piece, I doubt not but the deviation would often amount to half a mile, or perhaps conſiderably more; though this experiment would be a very difficult one to examine, on account of the little chance there would be of diſcovering where the ball fell.

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"It muſt be obſerved, however, that though the bullet impelled from a rifle-barrelled piece keeps for a time to its regular track with ſufficient nicety; yet if its flight be ſo far extended that the track becomes conſiderably incurvated, it will then undergo conſiderable deflections. This, according to my experiments, ariſes from the angle at laſt made by the axis on which the bullet turns, and the direction in which it flies: for that axis continuing nearly parallel to itſelf, it muſt neceſſarily diverge from the line of the flight of the bullet, when that line is bent from its original direction; and when it once happens that the bullet whirls on an axis which no longer coincides with the line of its flight, then the unequal reſiſtance formerly deſcribed will take place, and the deflecting power hence ariſing will perpetually increaſe as the track of the bullet by having its range extended becomes more and more incurvated.—This matter I have experienced in a ſmall rifle-barrelled piece, carrying a leaden ball of near half an ounce weight. For this piece, charged with one drachm of powder, ranged about 550 yards at an angle of 12 degrees with ſufficient regularity; but being afterwards elevated to an angle of 24 degrees, it then ranged very irregularly, generally deviating from the line of its direction to the left, and in one caſe not leſs than 100 yards. This apparently aroſe from the cauſe above-mentioned, as was confirmed from the conſtant deviation of the bullet to the left; for by conſidering how the revolving motion was continued with the progreſſive one, it appeared that a deviation that way was to be expected.

"The beſt remedy I can think of for this defect, is the making uſe of bullets of an egg-like form inſtead of ſpherical ones. For if ſuch a bullet hath its ſhorter axis made to fit the piece, and it be placed in the barrel with its ſmaller end downwards; then it will acquire by the rifles a rotation round its larger axis; and its centre of gravity lying nearer to its fore than its hinder part, its longer axis will be conſtantly forced by the reſiſtance of the air into the line of its flight; as we ſee, that by the ſame means arrows conſtantly lie in the line of their direction, however that line be incurvated.

"But, beſides this, there is another circumſtance in the uſe of theſe pieces, which renders the flight of their bullets uncertain when fired at a conſiderable elevation. For I find by my experiments, that the velocity of a bullet fired with the ſame quantity of powder from a rifled barrel, varies much more from itſelf in different trials, than when fired from a common piece.—This, as I conceive, is owing to the great quantity of friction, and the impoſſibility of rendering it equal in each experiment. Indeed, if the rifles are not deeply cut, and if the bullet is nicely fitted to the piece, ſo as not to require a great force to drive it down, and if leather or fuſtain well greaſed is made uſe of between the bullet and barrel, perhaps, by a careful attention to all theſe particulars, great part of the inequality in the velocity of the bullet may be prevented, and the difficulty in queſtion be in ſome meaſure obviated: but, till this be done, it cannot be doubted, that the range of the ſame piece, at an elevation, will vary conſiderably in every trial; although the charge be each time the ſame. And this I have myſelf experienced, in a number of diverſified trials, with a rifle-barrelled piece loaded at the breech in the Engliſh manner. For here the rifles being indented very deep, and the bullet ſo large as to fill them up completely; I found, that though it flew with ſufficient exactneſs to the diſtance of four or five hundred yards; yet, when it was raiſed to an angle of about 12 degrees, (at which angle, being fired with one-fifth of its weight in powder, its medium range is nearly 1000 yards); in this caſe, I ſay, I found that its range was variable, although the greateſt care was taken to prevent any inequalities in the quantity of powder, or in the manner of charging. And as, in this caſe, the angle was too ſmall for the firſt-mentioned irregularity to produce the obſerved effects; they can only be imputed to the different velocities which the bullet each time received by the unequal action of the friction."

Thus we ſee, that it is in a manner impoſſible entirely to correct the aberrations ariſing from the reſiſtance of the atmoſphere; as even the rifle-barrelled pieces cannot be depended upon for more than one half of their actual range at any conſiderable elevation. It becomes therefore a problem very difficult of ſolution, to know, even within a very conſiderable diſtance, how far a piece will carry its ball with any probability of hitting its mark, or doing any execution. The beſt rules hitherto laid down on this ſubject, are thoſe of Mr Robins. The foundation of all his calculations, is the velocity with which the bullet flies off from the mouth of the piece. Mr Robins himſelf had not opportunities of making many experiments on the velocities of cannon-balls, and the calculations from ſmaller ones cannot always be depended upon. In the 68th volume of the Phil. Tranſ. Mr Hutton hath recited a number of experiments made on cannon carrying balls from one to three pounds weight. His machine for diſcovering the velocities of theſe balls was the ſame with that of Mr Robins, only of a larger ſize. His charges of powder were two, four, and eight ounces; and the reſults of 15 experiments which ſeem to have been the moſt accurate, are as follow.

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Mr Hutton's experiments on the velocity of cannon-balls.

	Velocity with two ounces.	Velocity with four ounces.	Velocity with eight ounces.
	702 feet in 1"	1068 feet in 1"	1419 feet in 1"
	682	1020	1352
	695	948	1443
	703	973	1360
	725	957	1412
	5)3507	5)4966	5)6986
Mean velocities	701	993	1397

In another courſe, the mean velocities, with the ſame charges of powder, were 613, 873, 1162. "The mean velocities of the balls in the firſt courſe of experiments, ſays Mr Hutton, with two, four, and eight ounces of powder, are as the numbers 1, 1.414, and 1.993; but the ſubduplicate ratio of the weights (two, four, and eight) give the numbers 1, 1.414, and 2, to which the others are ſufficiently near. It is obvious, however, that the greateſt difference lies in the laſt number, which anſwers to the greateſt velocity. It will ſtill be a little more in defect if we make the allowance for the weights of the balls; for the mean weights of the balls with the two and four ounces is $18\frac{3}{4}$ ounces, but of the eight ounces it is $18\frac{3}{5}$: diminiſhing therefore the number 1.993 in the reciprocal ſubduplicate ratio of $18\frac{3}{5}$ to $18\frac{3}{4}$, it becomes 1.985, which falls ſhort of the number 2 by .015, or the 133d part of itſelf. A ſimilar defect was obſerved in the other courſe of experiments; and both are owing to three evident cauſes, viz. 1. The leſs length of cylinder through which the ball was impelled; for with the eight-ounce charge, it lay three or four inches nearer to the muzzle of the piece than with the others. 2. The greater quantity of elaſtic fluid which eſcaped in this caſe than in the others by the windage. This happens from its moving with a greater velocity; in conſequence of which, a greater quantity eſcapes by the vent and windage than in ſmaller velocities. 3. The greater quantity of powder blown out unfired in this caſe than in that of the leſſer velocities; for the ball which was impelled with the greater velocity, would be ſooner out of the piece than the others, and the more ſo as it had a leſs length of the bore to move through; and if powder fire in time, which cannot be denied, though indeed that time is manifeſtly very ſhort, a greater quantity of it muſt remain unfired when the ball with the greater velocity iſſues from the piece, than when that which has the leſs velocity goes out, and ſtill the more ſo as the bulk of powder which was at firſt to be inflamed in the one caſe ſo much exceeded that in the others.

"Let us now compare the correſponding velocities in both caſes. In the one they are, 701, 993, 1397; in the other, 613, 873, 1162. Now the ratio of the firſt two numbers, or the velocities with two ounces of powder, is that of 1 to 1.1436, the ratio of the next two is that of 1 to 1.1375, and the ratio of the laſt is that of 1 to 1.2022. But the mean weight of the ſhot for two and four ounces of powder, was $28\frac{1}{3}$ ounces in the firſt courſe, and $18\frac{3}{4}$ in this; and for eight ounces of powder, it was $28\frac{2}{3}$ in the firſt, and $18\frac{3}{5}$ in this. Taking therefore the reciprocal ſubduplicate ratios of theſe weights of ſhot, we obtain the ratio of 1 to 1.224 for that of the balls which were fired with two ounces and four ounces of powder, and the ratio of 1 to 1.241 for the balls which were fired with eight ounces. But the real ratios above found are not greatly different from theſe; and the variation of the actual velocities from this law of the weights of ſhot, inclines the ſame way in both courſes of experiments. We may now collect into one view the principal inferences that have reſulted from theſe experiments.

1. "It is evident from them, that powder fires almoſt inſtantaneouſly.

2. "The velocities communicated to balls or ſhot of the ſame weight with different quantities of powder, are nearly in the ſubduplicate ratio of theſe quantities; a very ſmall variation in defect taking place when the quantities of powder become great.

3. "When ſhot of different weights are fired with the ſame quantity of powder, the velocities communicated to them are nearly in the reciprocal ſubduplicate ratio of their weights.

4. "Shot which are of different weights, and impelled by different quantities of powder, acquire velocities which are directly as the ſquare roots of the quantities of powder, and inverſely as the ſquare roots of the weights of the ſhot nearly."

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Mr Robins's method of finding the ranges of bullets.

The velocities of the bullets being thus found as nearly as poſſible, the ranges may be found by the following rules laid down by Mr Robins.

1. "Till the velocity of the projectile ſurpaſſes that of 1100 feet in a ſecond, the reſiſtance may be reckoned to be in the duplicate proportion of the velocity, and its mean quantity may be reckoned about half an ounce avoirdupoiſe on a 12-pound ſhot moving with a velocity of about 25 or 26 feet in a ſecond.

2. "If the velocity be greater than that of 1100 or 1200 feet in a ſecond, then the abſolute quantity of the reſiſtance in theſe greater velocities will be near three times as great as it ſhould be by a compariſon with the ſmaller velocities.—Hence then it appears, that if a projectile begins to move with a velocity leſs than that of 1100 feet in 1″, its whole motion may be ſuppoſed to be conſidered on the hypotheſis of a reſiſtance in the duplicate ratio of the velocity. And if it begins to move with a velocity greater than this laſt mentioned, yet if the firſt part of its motion, till its velocity be reduced to near 1100 feet in 1″, be conſidered ſeparately from the remaining part in which the velocity is leſs than 1100 feet in 1″; it is evident, that both parts may be truly aſſigned on the ſame hypotheſis; only the abſolute quantity of the reſiſtance is three times greater in the firſt part than in the laſt. Wherefore, if the motion of a projectile on the hypotheſis of a reſiſtance in the duplicate ratio of the velocity be truly and generally aſſigned, the actual motions of reſiſted bodies may be thereby determined, notwithſtanding the increaſed reſiſtances in the great velocities. And, to avoid the diviſion of the motion into two, I ſhall ſhow how to compute the whole at one operation with little more trouble than if no ſuch increaſed reſiſtance took place.

"To avoid frequent circumlocutions, the diſtance to which any projectile would range in a vacuum on the horizontal plain at 45° of elevation, I ſhall call the potential random of that projectile; the diſtance to which the projectile would range *in vacuo* on the horizontal plane at any angle different from 45°, I ſhall call the potential range of the projectile at that angle; and the diſtance to which a projectile really ranges, I ſhall call its actual range.

"If the velocity with which a projectile begins to move is known, its potential random and its potential range at any given angle are eaſily determined from the common theory of projectiles*; or more generally, if either its original velocity, its potential random, or its potential range, at a given angle, are known, the other two are eaſily found out.

"To facilitate the computation of reſiſted bodies, it is neceſſary, in the conſideration of each reſiſted body, to aſſign a certain quantity, which I ſhall denominate F, adapted to the reſiſtance of that particular projectile. To find this quantity F to any projectile given, we may proceed thus: Firſt find, from the principles we already delivered, with what velocity the projectile muſt move, ſo that its reſiſtance may be equal to its gravity. Then the height, from whence a body muſt deſcend in a vacuum to acquire this velocity, is the magnitude of F ſought. But the conciſeſt way of finding this quantity F to any ſhell or bullet is this: If it be of ſolid iron, multiply its diameter meaſured in inches by 300, the product will be the magnitude of F expreſſed in yards. If, inſtead of a ſolid iron-bullet, it is a ſhell or a bullet of ſome other ſubſtance; then, As the ſpecific gravity of iron is to the ſpecific gravity of the ſhell or bullet given, ſo is the F correſponding to an iron bullet of the ſame diameter, to the proper F for the ſhell or bullet given. The quantity F being thus aſſigned, the neceſſary computations of theſe reſiſted motions may be diſpatched by the three following propoſitions, always remembering that theſe propoſitions proceed on the hypotheſis of the reſiſtancce being in the duplicate proportion of the velocity of the reſiſted body. How to apply this principle, when the velocity is ſo great as to have its reſiſtance augmented beyond this rate, ſhall be ſhewn in a corollary to be annexed to the firſt propoſition.

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* See Pr *jectile*.

Actual ranges expreſſed in F.	Correſponding potential ranges expreſſed in F.	Actual ranges expreſſed in F.	Correſponding potential ranges expreſſed in F	Actual ranges expreſſed in F.	Correſponding potential ranges expreſſed in F.
0,01	0,0100	1,5	2,6422	3,25	13,2556
0,02	0,0201	1,55	2,7890	3,3	13,8258
0,04	0,0405	1,6	2,9413	3,35	14,4195
0,06	0,0612	1,65	3,0994	3,4	15,0377
0,08	0,0822	1,7	3,2635	3,45	15,6814
0,1	0,1034	1,75	3,4338	3,5	16,3517
0,12	0,1249	1,8	3,6107	3,55	17,0497
0,14	0,1468	1,85	3,7944	3,6	17,7768
0,15	0,1578	1,9	3,9851	3,65	18,5341
0,2	0,2140	1,95	4,1833	3,7	19,3229
0,25	0,2722	2,	4,3890	3,75	20,1446
0,3	0,3324	2,05	4,6028	3,8	21,0006
0,35	0,3947	2,1	4,8249	3,85	21,8925
0,4	0,4591	2,15	5,0557	3,9	22,8218
0,45	0,5258	2,2	5,2955	3,95	23,7901
0,5	0,5949	2,25	5,5446	4,0	24,7991
0,55	0,6664	2,3	5,8036	4,05	25,8506
0,6	0,7404	2,35	6,0728	4,1	26,9465
0,65	0,8170	2,4	6,3526	4,15	28,0887
0,7	0,8964	2,45	6,6435	4,2	29,2792
0,75	0,9787	2,5	6,9460	4,25	30,5202
0,8	1,0638	2,55	7,2605	4,3	31,8138
0,85	1,1521	2,6	7,5875	4,35	33,1625
0,9	1,2436	2,65	7,9276	4,4	34,5686
0,95	1,3383	2,7	8,2813	4,45	36,0346
1,0	1,4366	2,75	8,6492	4,5	37,5632
1,05	1,5384	2,8	9,0319	4,55	39,1571
1,1	1,6439	2,85	9,4300	4,6	40,8193
1,15	1,7534	2,9	9,8442	4,65	42,4527
1,2	1,8669	2,95	10,2752	4,7	44,3605
1,25	1,5845	3,0	10,7237	4,75	46,2460
1,3	2,1066	3,05	11,1904	4,8	48,2127
1,35	2,2332	3,1	11,6761	4,85	50,2641
1,4	2,3646	3,15	12,1816	4,9	52,4040
1,45	2,5008	3,2	12,7078	4,95	54,6363
				5,0	56,9653

"PROP. I. Given the actual range of a given ſhell or bullet at any ſmall angle not exceeding 8° or 10°, to determine its potential range, and conſequently its potential random and original velocity.

"Sol. Let the actual range given be divided by the F correſponding to the given projectile, and find the quote in the firſt column of the preceding Table. Then the correſponding number in the ſecond column multiplied into F, will be the potential range ſought; and thence, by the methods already explained, the potential random and the original velocity of the projectile is given.

"Exam. An 18 pounder, the diameter of whoſe ſhot is about 5 inches, when loaded with 2lb. of powder, ranged at an elevation of 3° 30′, to the diſtance of 975 yards.

"The F correſponding to this bullet is 1500 yards, and the quote of the actual range by this number is 65; correſponding to which, in the ſecond column, is ,817; whence, 817 F, or 1225 yards, is the potential range ſought; and this, augmented in the ratio of the ſine of twice the angle of elevation to the radius, gives 10050 yards for the potential random; whence it will be found, that the velocity of this projectile was that of 984 feet in a ſecond.

"Cor. 1ſt. If the converſe of this propoſition be deſired; that is, if the potential range in a ſmall angle be given, and thence the actual range be ſought; this may be ſolved with the ſame facility by the ſame table. For if the given potential range be divided by its correſpondent F, then oppoſite to the quote ſought in the ſecond column, there will be found in the firſt column a number, which multiplied into F will give the actual range required. And from hence it follows, that, if the actual range be given at one angle, it may be found at every other angle not exceeding 8° or 10°.

"Cor. 2d. If the actual range at a given ſmall angle be given, and another actual range be given, to which the angle is ſought; this will be determined by finding the potential ranges correſponding to the two given actual ranges; then the angle correſponding to one of theſe potential ranges being known, the angle correſponding to the other will be found by the common theory of projectiles.

"Cor. 3d. If the potential random deduced from the actual range by this propoſition exceeds 13000 yards; then the original velocity of the projectile was ſo great as to be affected by the treble reſiſtance deſcribed above; and conſequently the real potential random will be greater than what is here determined. However, in this caſe, the true potential random may be thus nearly aſſigned. Take a 4th continued proportional to 13000 yards, and the potential random found by this propoſition, and the 4th proportional thus found may be aſſumed for the true potential random ſought. In like manner, when the true potential random is given greater than 13000 yards, we muſt take two mean proportionals between 13000 and this random*: and the firſt of theſe mean proportionals muſt be aſſumed inſtead of the random given, in every operation deſcribed in theſe propoſitions and their corollaries. And this method will nearly allow for the increaſed reſiſtance in large velocities, the difference only amounting to a few minutes in the angle of direction of the projected body, which, provided that angle exceeds two or three degrees, is uſually ſcarce worth attending to.

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* The operations directed in this corollary are beſt performed by the table of logarithms.

Of this proceſs take the following example.

"A 24 pounder fired with 12 pounds of powder, when elevated at 7° 15′, ranged about 2500 yards. Here the F being near 1700 yards, the quote to be ſought in the firſt column is 147, to which the number correſponding in the ſecond column is 2,556; whence the potential range is near 4350 yards, and the potential random thence reſulting 17400. But this being more than 13,000, we muſt, to get the true potential random, take a 4th continued proportional to 13000 and 17400; and this 4th proportional, which is about 31000 yards, is to be eſteemed the true potential random ſought; whence the velocity is nearly that of 1730 feet in a ſecond.

"Scholium. This propoſition is confined to ſmall angles, not exceeding 8° or 10°. In all poſſible caſes of practice, this approximation, thus limited, will not differ from the moſt rigorous ſolution by ſo much as what will often intervene from the variation of the denſity of the atmoſphere in a few hours time; ſo that the errors of the approximation are much ſhort of other inevitable errors, which ariſe from the nature of this ſubject.

"PROP. II. Given the actual range of a given ſhell or bullet, at any angle not exceeding 45°, to determine its potential range at the ſame angle; and thence its potential random and original velocity.

"Sol. Diminiſh the F correſponding to the ſhell or bullet given in the proportion of the radius to the coſine of $\frac{3}{4}$ of the angle of elevation. Then, by means of the preceding table, operate with this reduced F in the ſame manner as is preſcribed in the ſolution of the laſt propoſition, and the reſult will be the potential range ſought; whence the potential random, and the original velocity, are eaſily determined.

"Exam. A mortar for ſea-ſervice, charged with 30℔ of powder, has ſometimes thrown its ſhell, of 12$\frac{3}{4}$ inches diameter, and of 231 lb. weight, to the diſtance of 2 miles, or 5450 yards. This at an elevation of 45°.

"The F to this ſhell, if it were ſolid, is 3825 yards; but as the ſhell is only $\frac{4}{5}$ of a ſolid globe, the true F is no more than 3060 yards. This, diminiſhed in the ratio of the radius to the coſine of $\frac{3}{4}$ of the angle of elevation, becomes 2544. The quote of the potential range by this diminiſhed F is 1,384; which ſought in the firſt column of the preceding table gives 2,280 for the correſponding number in the ſecond column; and this multiplied into the reduced F, produces 5800 yards for the potential range ſought, which, as the angle of elevation was 45°, is alſo the potential random: and hence the original velocity of this ſhell appears to be that of about 748 feet in a ſecond.

"Cor. The converſe of this propoſition, that is, the determination of the actual range from the potential range given, is eaſily deduced from hence by means of the quote of the potential range divided by the reduced F; for this quote ſearched out in the ſecond column will give a correſponding number in the firſt column, which multiplied into the reduced F, will be the actual range ſought.

Alſo, if the potential random of a projectile be given, or its actual range at a given angle of elevation; its actual range at any other angle of elevation, not greater than 45°, may hence be known. For the potential random will aſſign the potential range at any given angle; and thence, by the method of this corollary, the actual range may be found.

"Exam. A fit muſquet-bullet fired from a piece of the ſtandard dimenſions, with $\frac{1}{5}$ of its weight in good powder, acquires a velocity of near 900 feet in a ſecond; that is, it has a potential random of near 8400 yards. If now the actual range of this bullet at 15° was ſought, we muſt proceed thus:

"From the given potential random it follows, that the potential range at 15° is 4200 yards; the diameter of the bullet is $\frac{3}{4}$ of an inch; and thence, as it is of lead, its proper F is 337,5 yards, which, reduced in the ratio of the radius to the coſine of $\frac{3}{4}$ of 15°, becomes 331 yards. The quote of 4200 by this number is 12,7 nearly; which, being ſought in the ſecond column, gives 3,2 nearly for the correſponding number in the firſt column; and this multiplied into 331 yards (the reduced F) makes 1059 yards for the actual range ſought.

"Exam. II. The ſame bullet, fired with its whole weight in powder, acquires a velocity of about 2100 feet in a ſecond, to which there correſponds a potential random of about 45700 yards. But this number greatly exceeding 13,000 yards, it muſt be reduced by the method deſcribed in the third corollary of the firſt propoſition, when it becomes 19700 yards. If now the actual range of this bullet at 15° was required, we ſhall from hence find, that the potential range at 15° is 9850 yards; which, divided by the reduced F of the laſt example, gives for a quote 2975: and thence following the ſteps preſcribed above, the actual range of this bullet comes out 1396 yards, exceeding the former range by no more than 337 yards; whereas the difference between the two potential ranges is above ten miles. Of ſuch prodigious efficacy is the reſiſtance of the air, which hath been hitherto treated as too inſignificant a power to be attended to in laying down the theory of projectiles!

"Schol. I muſt here obſerve, that as the denſity of the atmoſphere perpetually varies, increaſing and diminiſhing often by $\frac{1}{30}$ part, and ſometimes more, in a few hours; for that reaſon I have not been over rigorous in forming theſe rules, but have conſidered them as ſufficiently exact when the errors of the approximation do not exceed the inequalities which would take place by a change of $\frac{1}{30}$ part in the denſity of the atmoſphere. With this reſtriction, the rules of this propoſition may be ſafely applied in all poſſible caſes of practice. That is to ſay, they will exhibit the true motions of all kinds of ſhells and cannon-ſhot, as far as 45° of elevation, and of all muſket bullets fired with their largeſt cuſtomary charges, if not elevated more than 30°. Indeed, if experiments are made with extraordinary quantities of powder, producing potential randoms greatly ſurpaſſing the uſual rate; then in large angles ſome farther modifications may be neceſſary. And though, as theſe caſes are beyond the limits of all practice, it may be thought unneceſſary to conſider them; yet, to enable thoſe who are ſo diſpoſed to examine theſe uncommon caſes, I ſhall here inſert a propoſition, which will determine the actual motion of a projectile at 45°, how enormous ſoever its original velocity may be. But as this propoſition will rather relate to ſpeculative than practical caſes, inſtead of ſuppoſing the actual range known, thence to aſſign the potential random, I ſhall now ſuppoſe the potential random given, and the actual range to be thence inveſtigated.

"PROP. III. Given the potential random of a given ſhell or bullet, to determine its actual range at 45°.

Sol. Divide the given potential random by the F correſponding to the ſhell or bullet given, and call the quotient q, and let l be the difference between the tabular logarithms of 25 and of q, the logarithm of 10 being ſuppoſed unity; then the actual range ſought is $3{,}4\,F \mp 2lF - \frac{ll}{10}F$, where the double ſine of 2lF is to be thus underſtood; that if q be leſs than 25, it muſt be — 2lF; if it be greater, then it muſt be + 2lF. In this ſolution, q may be any number not leſs than 3, nor more than 2500.

"Cor. Computing in the manner here laid down, we ſhall find the relation between the potential randoms, and the actual range at 45°, within the limits of this propoſition, to be as expreſſed in the following table.

Potential Random.	Actual Range at 45°.
3 F	1,5 F
6 F	2,1 F
10 F	2,6 F
20 F	3,2 F
30 F	3,6 F
40 F	3,8 F
50 F	4,0 F
100 F	4,6 F
200 F	5,1 F
500 F	5,8 F
1000 F	6,4 F
2500 F	7,0 F

Whence it appears, that, when the potential random is increaſed from 3F to 2500F, the actual range is only increaſed from 1½ F to 7 F, ſo that an increaſe of 2497F in the potential random produces no greater an increaſe in the actual range than 5½F, which is not its $\frac{1}{400}$ part; and this will again be greatly diminiſhed on account of the increaſed reſiſtance, which takes place in great velocities. So extraordinary are the effects of this reſiſtance, which we have been hitherto taught to regard as inconſiderable.

"That the juſtneſs of the approximations laid down in the 2d and 3d propoſitions may be eaſier examined; I ſhall conclude theſe computations by inſerting a table of the actual ranges at 45° of a projectile, which is reſiſted in the duplicate proportion of its velocity. This table is computed by methods different from thoſe hitherto deſcribed, and is ſufficiently exact to ſerve as a ſtandard with which the reſult of our other rules may be compared. And ſince whatever errors occur in the application of the preceding propoſitions, they will be moſt ſenſible at 45° of elevation, it follows, that hereby the utmoſt limits of thoſe errors may be aſſigned.

Potential Randoms.	Actual Range at 45°.
,1 F	,0963 F
,25 F	,2282 F
,5 F	,4203 F
,75 F	,5868 F
1,0 F	,7323 F
1,25 F	,860 F
1,5 F	,978 F
1,75 F	1,083 F
2,0 F	1,179 F
2,5 F	1,349 F
3,0 F	1,495 F
3,5 F	1,624 F
4,0 F	1,738 F
4,5 F	1,840 F
5,0 F	1,930 F
5,5 F	2,015 F
6,0 F	2,097 F
6,5 F	2,169 F
7,0 F	2,237 F
7,5 F	2,300 F
8,0 F	2,359 F
8,5 F	2,414 F
9,0 F	2.467 F
9,5 F	2,511 F
10,0 F	2,564 F
11,0 F	2,651 F
13,0 F	2,804 F
15,0 F	2,937 F
20,0 F	3,196 F
25,0 F	3,396 F
30,0 F	3,557 F
40,0 F	3,809 F
50,0 F	3,998 F

40
Of the different parts and proportions of guns.

We have now only to conſider that part of practical gunnery which relates to the proportions of the different parts of cannon, the metal of which they are made, &c.

Formerly the guns were made of a very great length, and were on that account extremely troubleſome and unmanageable. The error here was firſt diſcovered by accident; for ſome cannon, having been caſt by miſtake two feet and an half ſhorter than the common ſtandard, were found to be equally efficacious in ſervice with the common ones, and much more manageable. This ſoon produced very conſiderable alterations in the form of the artillery throughout Europe; but in no country have greater improvements in this reſpect been made than in our own. For a long time braſs, or rather a kind of bell-metal, was thought preferable to caſt iron for making of cannon. The compoſition of this metal is generally kept a ſecret by each particular founder.

41
Compoſition for braſs guns.

The author of the Military Dictionary gives the following proportions as the moſt common, viz. "To 240 lb. of metal fit for caſting they put 68 lb. of copper, 52 lb. of braſs, and 12 lb. of tin. To 4200 lb. of metal fit for caſting the Germans put $3687\frac{33}{41}$ lb. of copper, $204\frac{12}{41}$ lb. of braſs, and $307\frac{36}{41}$ lb. of tin. Others uſe 100 lb. of copper, 6 lb. of braſs, and 9 lb. of tin; while ſome make uſe of 100 lb. of copper, 10 lb. of braſs, and 15 lb. of tin. This compoſition was both found to be very expenſive, and alſo liable to great inconveniencies in the uſing. A few years ago, therefore, a propoſal was made by Mr Muller for uſing iron guns of a lighter conſtruction than the braſs ones, by which he ſuppoſed that a very great ſaving would be made in the expence; and likewiſe, that the guns of the new conſtruction would be more manageable, and even efficacious, than the old ones.

42
Mr Muller's propoſal for reducing the weight of guns.

"The reduction of the expence (ſays Mr Muller) of the very large artillery neceſſary for ſea and land ſervice, is to be conſidered under

der two heads: the one, To diminiſh the weight; and the other, Not to uſe any braſs field-artillery, but only iron, to leſſen the great burden of our ſhips of war, and to carry larger calibers than thoſe of other nations of the ſame rate. If the weights of our guns are diminiſhed, they will require fewer hands to manage them, and of conſequence a ſmaller number will be expoſed to danger at a time: and if we carry larger calibers, our rates will be a match for larger ſhips.

" The advantage of uſing iron guns in the field inſtead of braſs, will be that the expences are leſſened in proportion to the coſt of braſs to that of iron, which is as 8 to 1.

" The only objection againſt iron is, its pretended brittleneſs: but as we abound in iron that is ſtronger and tougher than any braſs, this objection is invalid. This I can aſſert; having ſeen ſome that cannot be broke by any force, and will flatten like hammered iron: if then we uſe ſuch iron, there can be no danger of the guns burſting in the moſt ſevere action.

" Though braſs guns are not liable to burſt, yet they are ſooner rendered unſerviceable in action than iron. For by the ſoftneſs of the metal, the vent widens ſo ſoon, and they are ſo liable to bend at the muzzle, that it would be dangerous to fire them; as we found by experience at Belleiſle, and where we were obliged to take guns from the ſhips to finiſh the ſiege.

" Theſe being undeniable facts, no poſſible reaſon can be aſſigned againſt uſing iron guns in both ſea and land ſervice, and thereby leſſen the expences of artillery ſo conſiderably as will appear by the following tables.

Lengths and Weights of Iron Ship-Guns.

OLD PIECES.

Calib.	Length.		Weight.		
	Ft.	In.			
3	4	6	7	1	7
4	6	0	12	2	13
6	7	0	17	1	14
9	7	0	23	2	2
12	9	0	32	3	3
18	9	0	41	1	8
24	9	0	48	0	0
32	9	6	53	3	23
42	10	0	55	1	12

NEW PIECES.

Calib	Length.		Weight.		
	Ft.	In.			
3	3	6	3	3	0
6	4	4	7	2	0
9	5	0	11	1	0
12	5	6	15	0	0
18	6	4	22	2	0
24	7	0	30	0	0
32	7	6	40	0	0
42	8	4	52	2	0
48	8	6	60	0	0

" Guns of this conſtruction appear ſufficiently ſtrong from the proof of two three-pounders made for Lord Egmont, and they even may be made lighter and of equal ſervice.

Length and Weight of Battering Pieces.

OLD BRASS.

Calib.	Length.		Weight.		
	Ft.	In.			
6	8	0	19	1	0
9	9	0	25	0	0
12	9	0	29	0	0
18	9	6	48	0	0
24	9	6	51	0	0
32	10	0	55	2	0

Total 227.

NEW IRON.

Calib.	Length.		Weight.		
	Ft.	In.			
6	6	1	9	1	0
9	7	0	14	0	0
12	7	8	18	0	0
18	9	0	29	1	0
24	9	8	37	3	0
32	9	0	42	0	0

Total 151.
Diff. 72.

" That theſe guns are ſufficiently ſtrong, is evident from the former trial; beſides, there are ſeveral 32 pounders of the ſame dimenſions and weight now exiſting and ſerviceable, though caſt in king Charles the Second's time.

N. B. Theſe battering pieces may ſerve in garriſons.

" It appears from theſe tables, that no proportion has been obſerved in any guns hitherto made, in reſpect to their length or weight, but merely by gueſs.

Some Examples to ſhew what may be ſaved by this Scheme.

The Royal George carries 100 braſs guns, which weigh together 218.2 tons; the ton coſts 130 pounds, workmanſhip included.

The expence of theſe guns is then	28366 pounds
A ſet of the iron guns of the ſame number and calibers, according to my conſtruction, weighs -	127.8 tons
The ton coſts 16 pounds, and the whole ſet - - -	2044.8 pounds
The Royal George carries then 90.4 tons more than is neceſſary, and the difference between the expence is - -	26321.2 pounds

That is, 12.5 times more than the new iron ſet coſts: or 12 ſhips of the ſame rate may be fitted out at leſs charge.

$$\text{A ſet of the} \begin{Bmatrix}\text{Old}\\ \text{New}\end{Bmatrix} \begin{array}{l}\text{iron guns for a}\\ \text{firſt-rate weighs}\end{array} \begin{Bmatrix}204.4\\ 127.8\end{Bmatrix} \text{tons}$$

The difference between the weight of the old and new is -	76.6 tons
The difference between the expence is then - -	1225.6 pounds
A ſet of braſs battering pieces weighs	11.36 tons
A ton coſts 130 pounds, and the ſet	1476.8 pounds
A ſet of the new weighs -	7.55 tons
The ton coſts 16 pounds, and the ſet	117.8 pounds

That is, the old ſet coſts 11 times, and 632 over, more than the new ſet; or eleven ſets of the new could be made at leſs expence than one of the old.

" This table ſhews what may be ſaved in the navy; and if we add thoſe on board ſloops, the different garriſons, and the field-train, with the great expence of their carriage in the field, it may be found pretty near as much more.

Numb. of Guns.	Weight of Old.		Weight of New.		Differ.		No of Ships.	Total Difference.	
100	4367	3	2556	0	1811	3	5	9058	0
90	3537	3	2001	0	1536	3	9	13827	3
80	3108	3	1827	0	1287	3	7	9014	1
74	1091	0	1840	2	1250	2	32	40016	0
70	2997	0	1796	2	1200	2	10	12005	0
64	2543	3	1305	0	1258	2	23	28485	2
60	2177	3	1185	0	972	3	30	29782	2
50	1881	1	1035	0	846	1	19	16078	3
44	1365	2	705	0	660	2	8	5284	0
40	1234	2	312	2	922	0	9	8298	0
36	963	3	450	0	513	3	7	3596	1
32	956	2	435	0	521	2	28	14602	0
28	593	2	285	0	308	2	23	7095	1
24	531	3	255	0	276	3	12	3321	0
20	421	2	191	1	230	1	15	3453	3

Difference between the weights	-	203918	3	0
Expences of the { Braſs guns of two firſt rates,		203918	15	0
Expences of the { Iron ditto	- -	43109	5	0
We get	L.	257028	0	0

This and other propoſals for reducing the weight and expence of guns have been greatly attended to of late; and the Carron-company in Scotland have not only greatly improved thoſe of the old conſtruction, but a gun of a new conſtruction hath been invented by Mr Charles Gaſcoigne director of that work, which promiſes to be of more effectual ſervice than any hitherto made uſe of.——Fig. 9. repreſents the form and proportions of the guns made at Carron, and which ſerve for thoſe of all ſizes, from ½ pounders and upwards. The proportions are meaſured by the diameters of the caliber, or bore of the gun, divided into 16 equal parts, as repreſented in the figure. The following are the names of the different parts of a cannon.

43 por- ns, &c. the guns de at ron.

A B, the length of the cannon.
A E, the firſt reinforce.
E F, the ſecond reinforce.
F B, the chaſe.
H B, the muzzle.
A o, the caſcabel, or pomiglion.
A C, the breech.
C D, the vent-field.
F I, the chaſe-girdle.
r s, the baſe-ring and ogee.
t, the vent-aſtragal and fillets.
p q, the firſt reinforce-ring and ogee.
v w, the ſecond reinforce ring and ogee.
x, the chaſe-aſtragal and fillets.
z, the muzzle-aſtragal and fillets.
n, the muzzle-mouldings.
m, the ſwelling of the muzzle.
A i, the breech-mouldings.
T T, the trunnions.

The dotted lines along the middle of the piece ſhew the dimenſions of the calibre, and the dotted circle ſhews the ſize of the ball. Fig. 10. ſhews a cohorn made alſo at Carron, and which may be meaſured by the ſame ſcale.

44 Uſe and deſcription of carriages.

As the breech of the cannon receives an equal impulſe with the bullet from the action of the inflamed gunpowder, it thence follows, that, at the moment the bullet flies off, the piece itſelf puſhes backward with very great force. This is called the *recoil* of the cannon; and if the piece is not of a very conſiderable weight, it would fly upwards, or to a ſide, with extreme violence. If again it was firmly faſtened down, ſo that it could not move in the leaſt, it would be very apt to burſt, on account of the extreme violence with which the powder would then act upon it. For this reaſon it hath been found neceſſary to allow the recoil to take place, and conſequently all large pieces of artillery are mounted upon carriages with wheels, which allow them to recoil freely; and thus they may be fired without any danger. There are ſeveral ſorts of carriages for ordnance, viz. baſtard carriages, with low wheels and high wheels; ſea-carriages, made in imitation of thoſe for ſhip-guns; and carriages for field-pieces, of which there are two kinds. The carriages muſt be proportioned to the pieces mounted on them. The ordinary proportion is for the carriage to have once and a half the length of the gun, the wheels to be half the length of the piece in height. Four times the diameter or caliber gives the depth of the planks in the fore end; in the middle, 3½.

45 Deſcription of the Carronade.

Fig. 11. ſhews Mr Gaſcoigne's newly-invented gun called a *carronade;* and which, in June 1779, was by the king and council inſtituted a ſtandard navy-gun, and 10 of them appointed to be added to each ſhip of war, from a firſt-rate to a ſloop. Of this gun the Carron Company have publiſhed the following account.

"The carronade is made ſo ſhort, that it is worked with its carriage in the ſhip's port; the trunnions lying immediately over the ſill of the port: it is correctly bored; and the ſhot, being perfectly round, fills the caliber with ſuch exactneſs, that the leaſt poſſible of the impulſe of the powder eſcapes, upon exploſion, between the cylinder and the ſhot; which laſt alſo is thereby more truly directed in its flight. The bottom of the cylinder is a hemiſphere, to which the end of the cartridge is not liable to ſtick, and in which the ſmalleſt charge of powder envelopes the ſhot, exhauſting nearly the whole of its impelling force upon it: the trunnions are placed ſo as to leſſen the recoil, and that the gun cannot reſt againſt the ſides of the carriage, and is balanced with the utmoſt facility. There are views caſt upon the vent and muzzle, to point the gun quickly to an object at 250 and 500 yards diſtance. There is an handle A fixed upon the pommel-end of the gun, by which it is horizontally ranged and pointed; and there is a ring caſt upon the caſcabel, through which the breechin rope is reeved, the only rope uſed about theſe guns.

"The carronade is mounted upon a carriage B, with a perfectly ſmooth bottom of ſtrong plank, without trucks; inſtead of which there is fixed on the bottom of the carriage, perpendicular from the trunnions, a gudgeon C of proper ſtrength, with an iron waſher D and pin E at the lower end thereof. This gudgeon is let into a correſponding groove F, cut in a ſecond carriage G, called a *ſlide-carriage;* the waſher ſupported by the pin over-reaching the under-edges of the groove H. This ſlide-carriage is made with a ſmooth upper ſurface, upon which the gun-carriage is moved, and by the gudgeon always kept in its right ſtation to the port; the groove in the ſlide-carriage being of a ſufficient length to allow the gun to recoil, and be loaded within board. The ſlide-carriage, the groove included, is equally broad with the fore-part of the gun-carriage, and about four times the length; the fore-part of the ſlide-carriage is fixed by hinge-bolts I, to the quick-work of the ſhip below the port, the end lying over the ſill, cloſe to the outſide plank, and the groove reaching to the fore end; the gudgeon of the gun-carriage, and conſequently the trunnions of the gun, are over the ſill of the port, when the gun is run out; and the port is made of ſuch breadth, with its ſides bevelled off within board, that the gun and carriage may range from bow to quarter. The ſlide-carriage is ſupported from the deck at the hinder end, by a wedge K, or ſtep-ſtool; which being altered at pleaſure, and the fore-end turning upon the hinge-bolts, the carriage can be conſtantly kept upon an horizontal plane, for the more eaſy and quick working of the gun when the ſhip lies along.

"The gun and carriages being in their places, the breechin rope, which muſt be ſtrong and limber, is reeved through the ring on the breech, then led thro' an eye-bolt drove downwards, the eye ſtanding upright upon the upper edge of each cheek of the gun-carriage; from theſe eye-bolts the ends of the breechin rope are ſeized down as uſual to an eye-bolt driven into the quick-work on each ſide, in a line with the lower ſurface of the ſlide-carriage.

"The gun being mounted and ready for action, is loaded with $\frac{1}{12}$th part of the weight of its ball in ſervice charge of powder put into a woollen cartridge, and the end tied up with a worſted yarn, and placed next to the ſhot; and with a ſingle ball, well rammed home upon the powder, without a wadding between them: the gun being then run out in the port, is ranged and elevated with great facility, by means of the handle on the pommel; and, by the views, very quickly pointed.—Upon diſcharge, the gun attempts to kick upwards, which being prevented by the waſher of the gudgeon bearing hard againſt the under part of the ſlide-carriage, the recoil takes place; and the gudgeon ſliding backwards in the groove, (the waſher ſtill bearing againſt an iron plate on the under edge of the groove,) till the gun is brought up by the breechin rope, as much re-action ſucceeds as ſlackens the rope, ſo that the gun and carriage may be inſtantly turned fore and aft by the handle, and loaded again.

"This gun has many ſingular advantages over the others of light conſtruction.—It is ſo extremely light, that the ſmalleſt ſhips can carry almoſt any weight of ſhot, (the 12-pounder weighing under 500 wt. and the other calibers in proportion,) and that without being attended with the inconveniencies imputed generally to light guns, ſince it cannot injure its carriage, or jump out of its ſtation in the port upon recoil; and it will never heat.

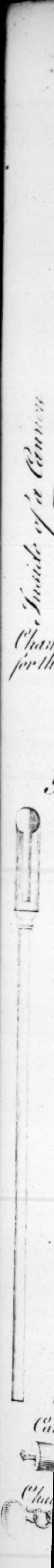
"It can be eaſily managed and worked of all calibers, from the 12-pounders downwards with two hands, and the 18 and 24-pounders with three hands. It may be readily ranged, pointed, and diſcharged, twice in three minutes, which doubles the ſtrength of the ſhip againſt an enemy of equal force. It is wrought upon an horizontal plane to windward or to leeward, how much ſoever the ſhip lies along under a preſſure of ſail; and therefore, beſides being hampered with no tackles or other ropes, except the breechin rope, it may be worked with as much eaſe and expedition in chace or in a gale of wind, as in lying to for action.—It can be ranged from bow to quarter, ſo as to bring a broadſide to bear in a circuit of above 10 points of the compaſs on each ſide.—It is no more expenſive in ammunition than the old guns of two-thirds leſs weight of ſhot; and it requires very few hands above the compliment neceſſary for navigating merchant-ſhips; and increaſes the ſtrength of privateers crews, by expoſing few hands at the guns, and augmenting the number at ſmall arms.

"Though the carronade cannot, ſtrictly ſpeaking, throw its ſhot to an equal diſtance with a longer gun; yet, from the fitneſs of the ſhot to its cylinder, the powers of this gun will greatly ſurpaſs the expectations of ſuch as are not intimately acquainted with the effects of the elaſtic force of fired powder, ſince, with a $\frac{1}{12}$th part of the weight of its ball, at very ſmall elevations, it will range its ſhot to triple the diſtance at which ſhips generally engage, with ſufficient velocity for the greateſt execution, and with all the accuracy in its direction that can be attained from guns of greater lengths.

"There have been two ſeeming diſadvantages imputed to this gun, which it does not merit, viz. the nicety of fitting the ſhot to the bore of the gun, and its incapacity to hold more than two ſhot at one charge. But, as ſeamen have few opportunities of confirming themſelves in juſt opinions by experiments made on ſhore, and cannot, in that caſe, be fully converſant with the ſubject; the following looſe hints may not be inept towards removing theſe objections. 46 Objections to its uſe anſwered.

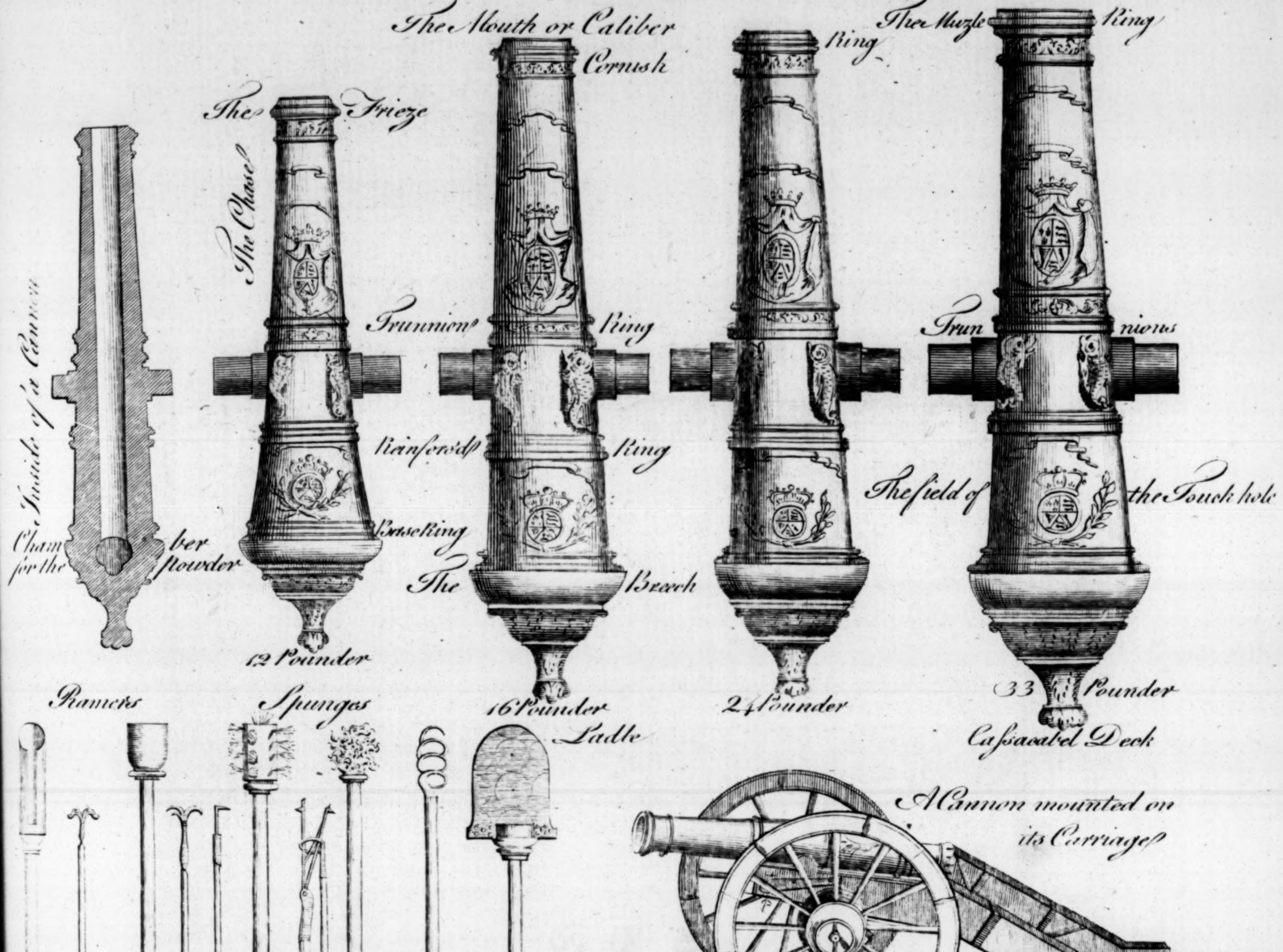
"It is an axiom in projectiles, That a ſhot cannot be impelled from a gun to any diſtance in a direction truly parallel to the axis of the cylinder of the piece, or what is commonly called *point-blank*, ariſing from ſeveral well-known cauſes: for, however juſt may be the cylinder, and however perfect and ſmooth may be the ſphere of its correſponding ſhot, and admitting that the impulſe of the powder acts through the centre of gravity of the ſhot, and alſo that the ſhot conſequently leaves the piece *in a direction parallel to the axis of its cylinder;* yet is the ſhot no ſooner diſcharged, but it becomes more or leſs inflected by its *gravity*, and deflected, according to its velocity, by the *reſiſtance of the air and wind.*

"Theſe irregularities are of little importance in cloſe ſea-fights, and, being the effect of natural cauſes, are common to all. Beſides theſe, the deviation of a ſhot from its true direction, is further augmented by the windage between the cylinder and its ſhot; but the greateſt uncertainty in the flight of a ſhot, making allowance for the action of its gravity, and the air's reſiſtance, ſprings from the defects of the ſhot itſelf. Round-ſhot for ſhip-guns, are ſeldom nicely examined; and, unleſs they are caſt *ſolid and truly globular,* and free



GUNNERY

Plate CXLI.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Spunges
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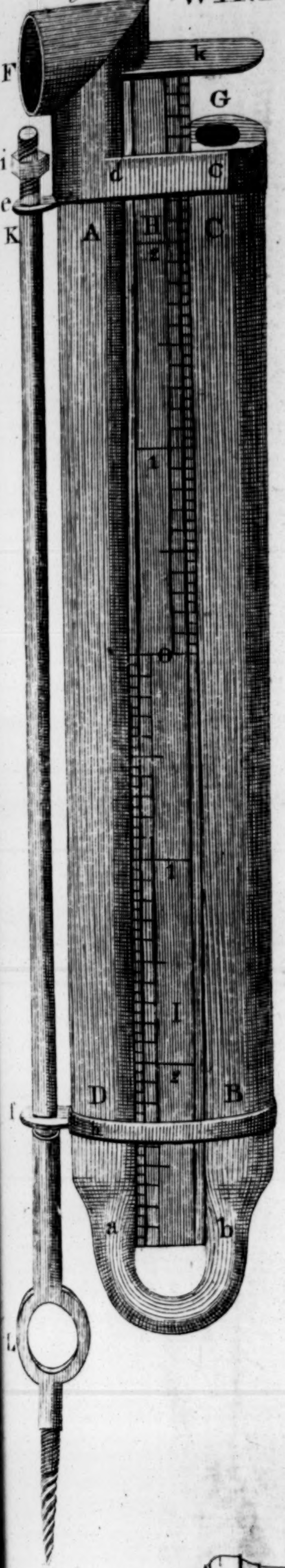
A Cannon mounted on
its Carriage
A Mortar mounted
on
its Carriage
Petard
Cartridge
Chain Shot
Angels
Shot in the form
of Pine Aples
Bomb
inside
Cartouches
A Bell Sculpt.

3 MA 53

WIND-GAGE Plate CXLII. GUNNERY.

Fig. 1.



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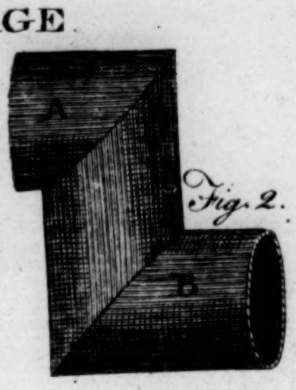
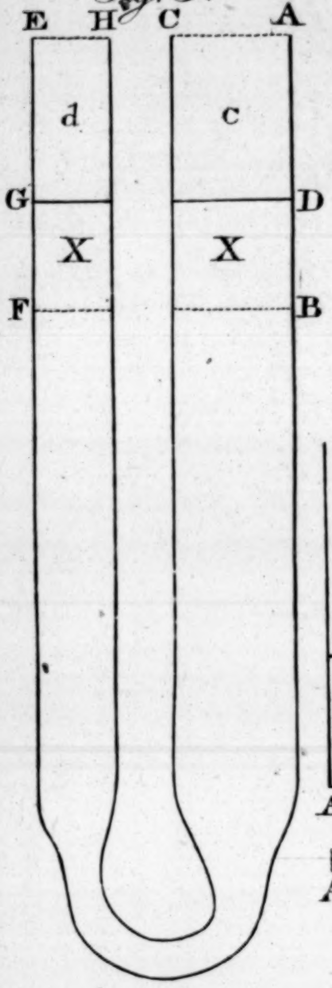


Fig. 3.



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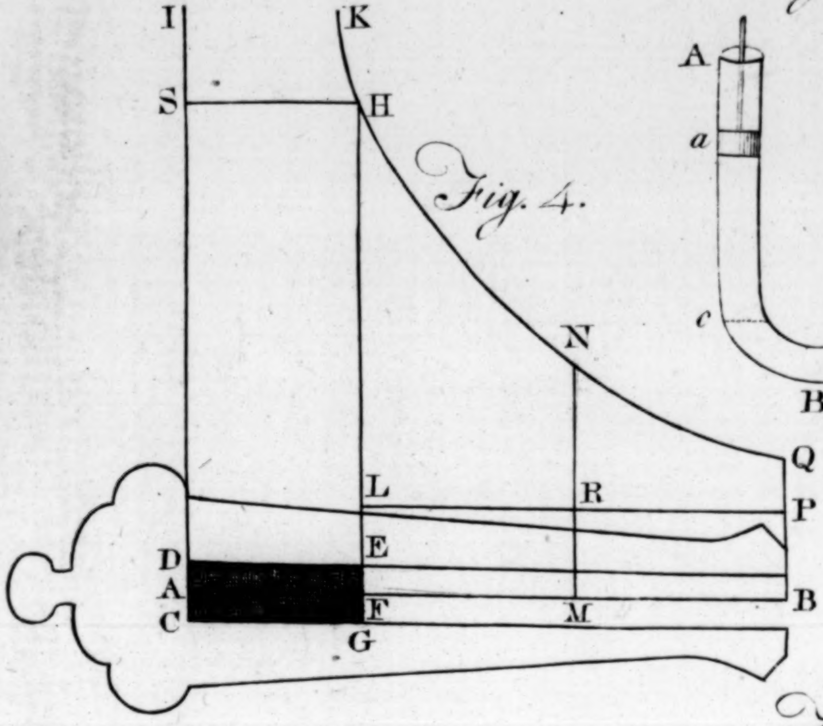

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Fig. 4.
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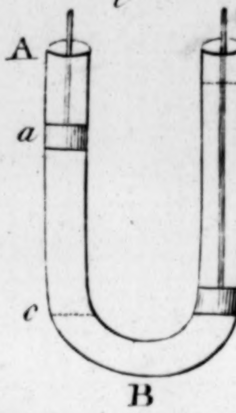
Fig. 8.



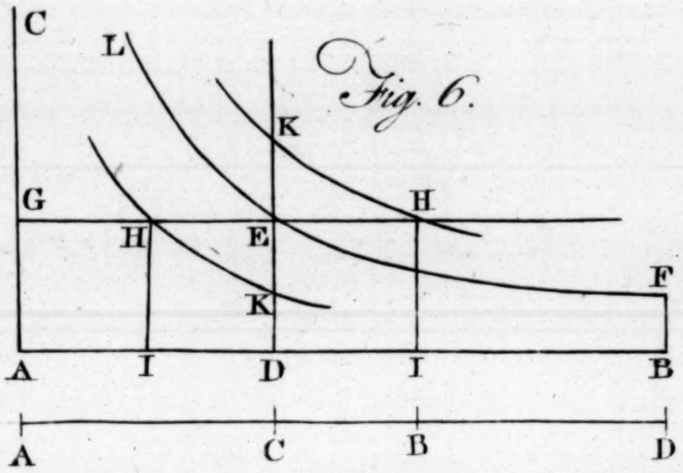


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Fig. 6.
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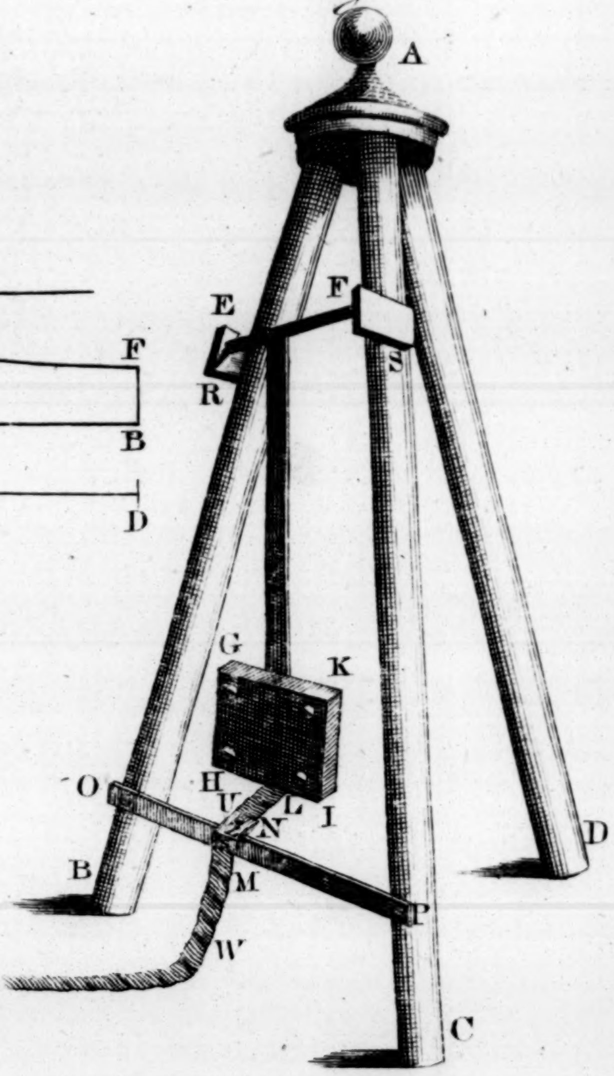
Fig. 5.



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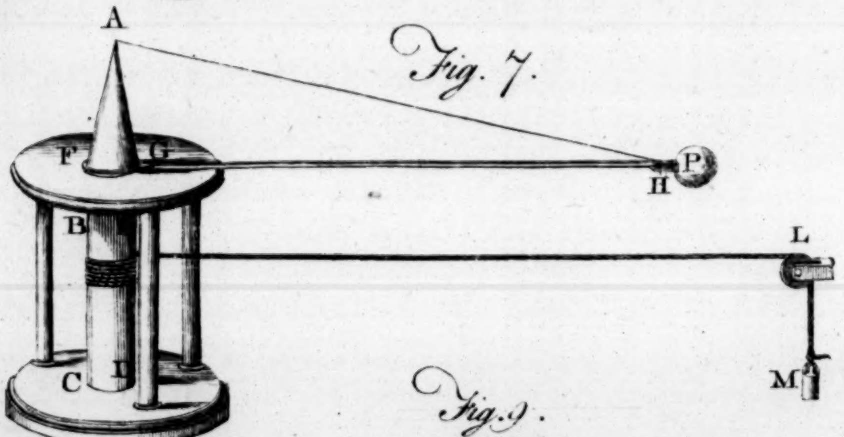

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Fig. 7.
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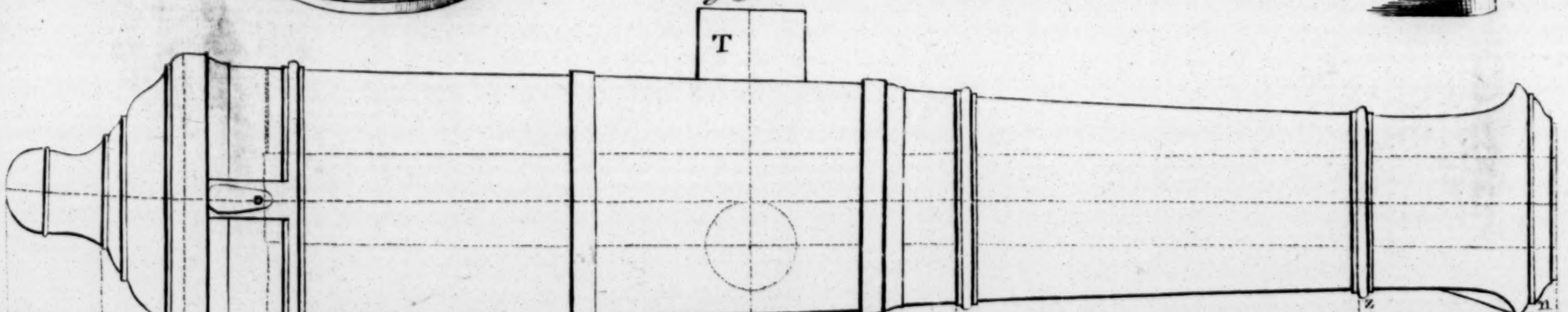
Fig. 9.



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A. Bell Sculp.

3 MA 53

free of all hollows, roughneſs, and other outſide blemiſhes, and well fitted to the gun, it cannot even *be diſcharged in the direction of the axis of the piece;* to the diſappointment of thoſe that uſe ſuch, and to the diſcredit of the gun-founder, however juſtly the piece is viewed, or diſparted; but, being impelled againſt the ſurface of the cylinder, bounds and rebounds from ſide to ſide, acquires a rotatory motion, and when caſt hollow withal, and breaking within the cylinder before diſcharge, (which ſometimes happens, eſpecially with double charges) never fails to injure; and, when often repeated, may, at laſt, burſt the very beſt guns. —Round-ſhot ſhould not be taken on board a ſhip, without being examined as to its ſhape and ſurface, gaged for its ſize to the caliber of the gun, and weighed that it be not above or below the ſtandard more than half an ounce in the pound of its reſpective caliber: good ſhot then, being of the ſame importance to all guns, removes the firſt objection.

“If the direction of the flight of a ſhot to its object is affected by ſo many ſeeming trivial cauſes, how much more uncertain muſt it be, when two or more ſhot are diſcharged together from one gun? for the ſhot next the powder being impelled with more celerity than that immediately before it, ſtrikes againſt it after diſcharge, and ſometimes ſhivers itſelf to pieces, and never fails to change obliquely the direction of both; and this happens with round and double-headed, &c. and all double charges; and which, from their various figures, cannot reach an object at the ſame elevations with the round-ſhot; eſpecially when theſe other ſhots are of greater weight than the round, which is often the caſe. However frightful a broadſide with double charges may appear at ſea, more confuſion is created by them, and more time loſt, *within board*, by the ſtrain and exceſſive recoil, than real damage done *without board* by the additional charge: for, upon a trial on ſhore, where the effect can be traced, it will be found, that, at 100 yards diſtance, more ſhot will take place within a ſmall compaſs by ſingle than by double charges; and the charges will be oftener repeated in a given time, without heating the gun: and theſe facts being eſtabliſhed, remove alſo the ſecond objection.”

The following account of the proof of one of theſe guns will perhaps ſerve to give a more adequate idea of the great uſefulneſs of them, than any deſcription:

“On Monday, Oct. 4, 1779, there was an experiment made at Carron, before the earl of Dunmore, &c. &c. with a 68-pounder Carronade, nearly of the weight of a Britiſh navy 12-pounder gun, and charged with the ſame quantity (viz. 6 ℔.) of powder.—— The carronade was mounted, on its proper carriages, into a port of the dimenſions of a 74 gun ſhip's lower-deck port; was pointed without elevation, at a centre of eight inches diameter, marked on a bulk's head of the thickneſs of two feet five inches ſolid wood, at 163 yards diſtance; behind which, at 168 yards, there was another bulk's head of two feet four inches thick; and behind that again, at 170 yards diſtance, a bank of earth. The ſhot pierced the bulk's heads each time, and was buried from three to four feet into the bank, and the ſplinters were thrown about to a conſiderable diſtance on all ſides.

1ſt	ſhot	ſtruck	1 foot 7 inches below the horizontal line,				and	5 feet	——	from	the mark.
2d	ditto	ditto	2 feet	ditto	——	ditto,	and	2 ditto	——	from	ditto.
3d	d°.	d°.	through the horizontal line			d°.	and	3 d°.	4 inches	from	d°.
4th	d°.	d°.	ditto	——	——	d°.	and	2 d°.	4 ditto	from	d°.
5th	d°.	d°.	ditto	——	——	d°.		2 d°.	10 d°.	from	d°.
6th	d°.	d°	2 inches below	——	——	d°.		——	10 d°.	from	d°.
7th	d°.	d°.	touched the lower part of ditto			d°.		——	7 d°.	from	d°.
8th	d°.	d°.	2 inches below	——	——	d°.		——	10 d°.	from	d°.
9th	d°.	d°.	2 feet below	——	——	d°.		1 foot	9 d°.	from	d°.
10th	d°.	d°.	3 inches below	——	——	d°.		——	3 d°.	from	d°.

“The Carronade was laid each time by the views without an inſtrument; and the ſhot were all to the left of the mark, owing to a ſmall error in diſparting the views; the third, fourth, and fifth ſhot, made one fracture, as did alſo ſixth, ſeventh, and eighth, and the ſixth and eighth ſtruck the ſame ſpot.

“The Carronade was eaſily worked with four men, and may be readily worked and diſcharged on board a ſhip twice a-minute with ſix men.—With ſix pound weight of powder the ſhot was impelled with a velocity of 1400 feet a ſecond.”

7 iption d nce.

WE have already ſeen of how much conſequence rifle-barrels are in order to bring the art of gunnery to perfection; as they enlarge the ſpace in which the ball will fly without any lateral deflection to three or four times its uſual quantity. This improvement, however, till very lately, only took place in muſket-barrels. But in the beginning of the year 1774, Dr Lind, and Captain Alexander Blair of the 69th regiment of foot, invented a ſpecies of rifled field-pieces. They are made of caſt iron; and are not bored like the common pieces, but have the rifles moulded on the core, after which they are cleaned out and finiſhed with proper inſtruments; but for the method of doing this, and of boring the ordinary pieces, ſee the articles Ordnance and Rifle.

Guns of this conſtruction, which are intended for the field, ought never to be made to carry a ball of above one or two pounds weight at moſt; a leaden bullet of that weight being ſufficient to deſtroy either man or horſe.—A pound-gun, of this conſtruction, of good metal, ſuch as is now made by the Carron company, need not to weigh above an hundred pounds weight, and its carriage about another hundred. It can, therefore, be eaſily tranſported from place to place, by a few men; and a couple of good horſes may tranſport ſix of theſe guns and their carriages, if put into a cart.

But, for making experiments, in order to determine the reſiſtance which bodies moving with great velocities meet with from the air, a circumſtance to which theſe guns are particularly well adapted, or for annoying an enemy's ſappers that are carrying on their approaches towards a beſieged place, a larger caliber may be uſed.

The length of the gun being divided into ſeven equal parts, the length of the firſt reinforce AB is two of theſe parts; the ſecond BC, one and $\frac{15}{16}$ of the diameter of the caliber; the chaſe CD, four wanting $\frac{15}{16}$ of the diameter of the caliber.

The diſtance from the hind-part of the baſe-ring A, to the beginning of the bore, is one caliber and $\frac{3}{16}$ of a caliber. The trunnions TT are each a caliber in breadth, and the ſame in length; their centres are placed three-ſevenths of the gun's length from the hind part of the baſe-ring, in ſuch a manner, that the axis of the trunnions paſſes through the centre line of the bore, which prevents the gun from kicking, and breaking its carriage. The length of the caſcable is one caliber and $\frac{13}{16}$ of a caliber.

Fig. 12. The caliber of the gun being divided into 16 equal parts;

The thickneſs of metal at the baſe-ring A from the bore, is	18,5
At the end of the firſt reinforce ring B	17
At the ſame place, for the beginning of the ſecond reinforce	17
At the end of the ſecond reinforce C	15
At the ſame place, for the beginning of the chaſe *c*	13,75
At the end of the chaſe or muzzle, the mouldings *a* D excluded	9
At the ſwelling of the muzzle *b*	12
At the muzzle-fillet *c*	9,5
At the extreme moulding D	8
Baſe-ring	5,5
Ogee next the baſe-ring *d*	5,5
The aſtragal or half-round	4,75
Its fillet	1
Total aſtragal and fillets at the ventfield *e*	4
Firſt reinforce ring B	4,5
Second reinforce ring C	3,5
Its ogee	3
Its aſtragal	1,5
And its fillet	1
The muzzle aſtragal, and fillet *a*	4
Breadth of the fillet at the baſe-ring	1
Diſtance of the fillet at the button from the fillet at the baſe-ring	5
Breadth of the fillet at the button	1
Diameter of the fillet at the button	18
Diſtance of the centre of the button from its fillet	12
Diameter of the button E	18
Diameter of its neck	10,5

The vent ſhould be placed about half an inch from the bottom of the chamber or bore, that the cartridge may be pricked, leſt ſome of the bottoms of the cartridges ſhould be left in when the gun is ſponged, a circumſtance which might retard the firing till the ſhot be again drawn (which is no eaſy matter), and the gun be cleaned out. From ſome experiments of colonel Deſaguliers and Mr Muller, it has been imagined, that the powder never has ſo ſtrong an effect as when it is fired cloſe to the bottom of the bore; yet it is found, by the experiments of Count de la Lippe, to have the greateſt effect when fired near to the middle of the charge. This he proved by firing it with tubes, introduced at a vent bored through the button and breech of the gun, of different lengths, so as to reach the different parts of the powder. In the ſame manner, a muſket or fowling-piece is found to puſh more when the touch-hole is placed at ſome little diſtance from the bottom of the bore; which ariſes from nothing but the powder's acting with more force, by being inflamed to greater advantage; conſequently, in this caſe, the ſame quantity of powder will have a greater effect, than when the touch-hole is placed at the bottom of the bore, which may be of ſome uſe in huſbanding the powder.

The above dimenſions are taken from ſome elegant $\frac{1}{2}$ pound guns, which were made for the prince of Aſturias by the Carron company.

The rifles make one ſpiral turn in the length of the bore; but go no nearer to the breech, in their full ſize, than two calibers; and then terminate with a gentle ſlope in half a caliber more, ſo as not to prevent the cartridge with the powder from being eaſily ſent home to the bottom of the gun, which would otherwiſe conſtantly happen with the flannel cartridges, and even ſometimes with paper ones, if not made to enter very looſely. The ſhape of the rifles is ſemicircular, their breadth being equal to the diameter, which is $\frac{3}{16}$ of a caliber, and their depth equal to the ſemidiameter, or $\frac{15}{16}$ of a caliber.

The bullets, fig. 13. are of lead, having ſix knobs caſt on them to fit the rifles of the gun. Being thns made of ſoft metal, they do not injure the rifles; and may alſo ſave an army the trouble of carrying a great quantity of ſhot about with them, ſince a ſupply of lead may be had in moſt countries from roofs, &c. which can be caſt into balls as occaſion requires. Lead likewiſe being of greater ſpecific gravity than caſt-iron, flies to a much greater diſtance.

Rifled ordnance of any caliber might be made to carry iron ſhot, for battering or for other purpoſes; provided holes, that are a little wider at their bottoms than at their upper parts, be caſt in a zone round the ball, for receiving afterwards leaden knobs to fit the rifles of the cannon; by which means, the iron ſhot will have its intended line of direction preſerved, without injuring the rifles more than if the whole ball was of lead, the rotatory motion round its axis, in the line of its direction, (which corrects the aberration), being communicated to it by the leaden knobs, following the ſpiral turn of the rifles in its progreſs out of the gun. It is particularly to be obſerved, that the balls muſt be made to go eaſily down into the piece, ſo that the cartridge with the powder and the bullet may be both ſent home together, with a ſingle puſh of the hand, without any wadding above either powder or ball; by which means, the gun is quickly loaded, and the ball flies farther than when it is forcibly driven into the gun, as was found from many experiments. The only reaſon why, in common rifled muſkets, the bullets are rammed in forcibly, is this, that the zone of the ball which is contiguous to the inſide of the bore may have the figure of the rifles impreſſed upon it, in ſuch a manner as to become part of a male ſcrew, exactly fitting the indents of the rifle, which is not at all neceſſary in the preſent caſe, the figure of the rifles being originally caſt upon the ball. Theſe knobs retard the flight of the bullet in ſome degree; but this ſmall diſadvantage is fully made up by the caſe with which the gun is loaded, its ſervice being nearly as quick as that of a common field-piece; and the retardation and quantity of the whirling motion which is communicated to the bullet being conſtantly the ſame, it will not in the leaſt affect the experiments made with them, in order to determine the reſiſtance of the air.

48.
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In order to hit the mark with greater certainty than can be done in the common random method, theſe guns are furniſhed with a ſector, the principal parts of which are, 1. The limb, which is divided in ſuch a manner as to ſhew elevations to 15 or 20 degrees. The length of the radius is five inches and an half, and its nonius is ſo divided as to ſhew minutes of a degree. 2. The teleſcope, AB, fig. 14. an achromatic refractor, is ſeven inches in length, (ſuch as is uſed on Hadley's quadrants, that are fitted for taking diſtances of the moon from the ſun or ſtars, in order to obtain the longitude at ſea), having croſs hairs in it. 3. The parallel cylindric bar, CD, is $\frac{4}{16}$ of an inch in diameter, having two rectangular ends EF, each half an inch ſquare and an inch long. On one ſide of the end next the limb of the ſector, is a mark correſponding to a ſimilar one on the hinder cock of the gun, with which it muſt always coincide when placed on the gun. The length of the parallel bar, together with its ends, is 7 inches. This bar is fixed to the ſector by means of two hollow cylinders, G, H, which allow the ſector a motion round the bar. There is a finger-ſcrew, a, upon the hollow cylinder G, which is ſlit, in order to tighten it at pleaſure upon the bar. 4. The circular level I, fig. 14. and 15. for ſetting the plane of the ſector always perpendicular when placed upon the gun, is $\frac{3}{4}$ of an inch in diameter. There is a ſmall ſcrew, d, to adjuſt the level at right angles to the plane of the ſector. 5. The finger ſcrew, b, for fixing the index of the ſector at any particular degree of elevation propoſed.

The line of collimation (that is, the line of viſion cut by the interſecting point of the two croſs-hairs in the teleſcope) muſt be adjuſted truly parallel to the bar of the ſector when at 0 degrees. This is done by placing the ſector ſo that the vertical hair may exactly cover ſome very diſtant perpendicular line. If it again covers it when the ſector is inverted, by turning it half round upon the bar, which has all the while been kept ſteady and firm, that hair is correct; if not, correct half the error by means of the ſmall ſcrews, c d e, fig. 14. and 16. at the eye-end of the teleſcope, and the other half by moving the bar; place it again to cover the perpendicular line, and repeat the above operation till the hair covers it in both poſitions of the ſector. Then turn the ſector, till the horizontal hair cover the ſame perpendicular line; and turning the ſector half round on its bar, correct it, if wrong, in the ſame manner as you did the vertical hair.

N. B. Of the four ſmall ſcrews at the eye-end of the teleſcope, thoſe at the right and left hand move whatever hair is vertical, and thoſe at top or underneath move whatever hair is horizontal.

On the ſide of the gun upon the firſt reinforce, are caſt two knobs, F, fig. 12. and 17. having their middle part diſtant from each other ſix inches, for fixing on the braſs cocks, A, fig. 17. and 18. which ceive the rectangular ends of the parallel cylindric bar of the ſector, when placed on the gun.

The next adjuſtment is to make the parallel bar, and line of collimation of the teleſcope, when ſet at 0 degrees, parallel to the bore of the gun, and conſequently to the direction of the ſhot. The gun being loaded, the cartridge pricked, and the gun primed, place the ſector in the cocks of the gun; and having firſt ſet the ſector to what elevation you judge neceſſary, bring the interſection of the croſs-hairs in the teleſcope, upon the center of the mark, the limb of the ſector being ſet vertical by means of the circular level, and then take off the ſector without moving the gun. Fire the gun; and if the bullet hits any where in the perpendicular line, paſſing through the centre of the mark, the line of collimation of the teleſcope and direction of the ſhot agree. But if it hit to the right of the mark, ſo much do they differ. In order to correct which, bring the gun into the ſame poſition it was in before firing, and ſecure it there. Then file away as much of the forecock, on the ſide next the gun, as will let the interſection of the croſs-hair fall ſomewhere on the line paſſing perpendicularly through the point where the ſhot fell; and it is then adjuſted in that poſition, ſo much being filed off the ſide of the cock at *a*, fig. 17. and 18. as will allow the ſide *b* to be ſcrewed cloſer, that the ends of the parallel bar may have no ſhake in the cocks. To correct it in the other poſition, and ſo to find the true 0 degrees of the gun, that is, to bring the line of collimation of the teleſcope, parallel-bar, and bore of the gun, truly parallel to each other, repeat the above with the trunnions perpendicular to the horizon, the ſector being turned a quarter round upon its bar, ſo as to bring its plane vertical. The deviation of the ſhot found in this way is corrected by deepening one of the cocks, ſo that the vertical hair of the teleſcope may be brought to cover the line paſſing perpendicularly through the point where the bullet hits; the gun being placed in the ſame poſition it was in before it was fired. This adjuſtment being repeated two or three times, and any error that remains being corrected, the gun is fit to be mounted on its carriage for ſervice. It is to be obſerved, that this ſector will fit any gun, if the cocks and rectangular ends, &c. of the parallel bar be of the above dimenſions, and will be equally applicable to all ſuch pieces whoſe cocks have been adjuſted, as if it had been adjuſted ſeparately with each of them. And if the ſector be ſet at any degree of elevation, and the gun moved ſo as to bring the interſection of the croſs-hairs on the object to be fired at (the limb of the ſector being vertical), the bore of the gun will have the ſame elevation above it, in the true direction of the ſhot, whatever poſition the carriage of the gun is ſtanding in. A teleſcope with croſs-hairs, fixed to a common rifled muſket, and adjuſted to the direction of the ſhot, will make any perſon, with a very little practice, hit an object with more preciſion than the moſt experienced markſman.

49
Their carriages.

For garriſon-ſervice, or for batteries, the ſhip or garriſon carriage, with two iron ſtaples on each ſide to put through a couple of poles to carry theſe guns from place to place with more diſpatch, are as proper as any. But, for the field, a carriage like that at fig. 19. where the ſhafts puſh in upon taking out the iron pins a b, and moving the croſs bar A, upon which the breech of the gun reſts, as far down as the ſhafts were puſhed in, is the propereſt, ſince the whole can then be carried like a hand-barrow, over ditches, walls, or rough ground, all which may be eaſily underſtood from the figure.

The principal advantage that will accrue from the uſe of rifled ordnance, is the great certainty with which any object may be hit when fired at with them, ſince the ſhot deviates but little from its intended line of direction, and the gun is capable of being brought to bear upon the object, with great exactneſs, by means of the teleſcope and croſs-hairs.

50 Mortars deſcribed.

THE other pieces of artillery commonly made uſe of are mortars, howitzers, and royals. The mortars are a kind of ſhort cannon of a large bore, with chambers for the powder, and are made of braſs or iron. Their uſe is to throw hollow ſhells filled with powder, which falling on any building, or into the works of a fortification, burſt, and with their fragments deſtroy every thing near them. Carcaſes are alſo thrown out of them; which are a ſort of ſhells with five holes, filled with pitch and other materials, in order to ſet buildings on fire; and ſometimes baſkets full of ſtones, of the ſize of a man's fiſt, are thrown out of them upon an enemy placed in the covert-way in the time of a ſiege. Of late the ingenious General Deſaguliers has contrived to throw bags filled with grape-ſhot, containing in each bag from 400 to 600 ſhot of different dimenſions, out of mortars. The effect of theſe is tremendous to troops forming the line of battle, paſſing a defile, or landing, &c. the ſhot pouring down like a ſhower of hail on a circumference of above 300 feet.

Mortars are chiefly diſtinguiſhed by the dimenſions of their bore; for example, a 13-inch mortar is one the diameter of whoſe bore is 13 inches, &c.—The land-mortars are thoſe uſed in ſieges, and of late in battles. They are mounted on beds, and both mortar and bed are tranſported on block carriages. There is likewiſe a kind of land-mortars mounted on travelling carriages, invented by count Buckeburg, which may be elevated to any degree; whereas all the Engliſh mortars are fixed to an angle of 45°. This cuſtom, however, does not appear to have any foundation in reaſon. In a ſiege, ſhells ſhould never be thrown with an angle of 45 degrees, excepting one caſe only; that is, when the battery is ſo far off, that they cannot otherwiſe reach the works: for when ſhells are thrown out of the trenches into the works of a fortification, or from the town into the trenches, they ſhould have as little elevation as poſſible, in order not to bury themſelves, but to roll along the ground, whereby they do much more damage, and occaſion a much greater conſternation among the troops, than if they ſunk into the ground. On the contrary, when ſhells are thrown upon magazines, or any other buildings, the mortars ſhould be elevated as high as poſſible, that the ſhells may acquire a greater force in their fall, and conſequently do more execution.

There are other kinds of mortars, called *partridge-mortars*, *hand-mortars*, and *firelock-mortars*; which laſt are alſo called *bombards*. The partridge-mortar is a common one, ſurrounded with 13 other little mortars bored round its circumference, in the body of the metal; the middle one is loaded with a ſhell, and the others with grenades. The vent of the large mortar being fired, communicates its fire to the reſt; ſo that both the ſhell and grenades go off at once. Hand-mortars were frequently uſed before the invention of cohorns. They were fixed at the end of a ſtaff four feet and a half long, the other end being ſhod with iron to ſtick in the ground; and while the bombardier with one hand elevated it at pleaſure, he fired it with the other. The firelock-mortars, or bombards, are ſmall mortars fixed to the end of a firelock. They are loaded as all common firelocks are; and the grenade, placed in the mortar at the end of the barrel, is diſcharged by a flint-lock. To prevent the recoil hurting the bombardier, the bombard reſts on a kind of halberd made for that purpoſe.

The chamber in mortars is the place where the powder is lodged. They are of different forms, and made variouſly by different nations; but the cylindric ſeems to be preferable to any other form.

51 Howitzers and royals.

The howitz is a kind of mortar mounted on a field-carriage like a gun: it differs from the common mortars in having the trunnions in the middle, whereas thoſe of the mortar are at the end. The conſtruction of howitzes is as various and uncertain as that of mortars, excepting that the chambers are all cylindric. They are diſtinguiſhed by the diameter of their bore; for inſtance, a 10-inch howitz is that which has a bore of 10 inches diameter, and ſo of others. They were much more lately invented than mortars, and indeed are plainly derived from them.

Royals are a kind of ſmall mortars, which carry a ſhell whoſe diameter is 5.5 inches. They are mounted on beds in the ſame way as other mortars.

52 Parts of a mortar.

Fig. 20. repreſents a mortar; and the names of its parts are as follow.

AB, the whole length of the mortar.
AC, the muzzle.
CD, chace.
DE, reinforce.
EF, breech.
GH, trunnions.
a, vent.
b, dolphins.
c d, vent-aſtragal and fillets.
d e, breech-ring and ogee.
f g, reinforce-ring and ogee.
g h, reinforce-aſtragal and fillets.
i k, muzzle-aſtragal and fillets.
k l, muzzle-ring and ogee.
l m, muzzle mouldings.
n, ſhoulders.

Interior parts.
o, chamber.
p, bore.
q, mouth.
r, vent.

The mortar-beds are formed of very ſolid timber, and placed upon very ſtrong wooden frames, fixed in ſuch a manner, that the bed may turn round. The fore-part of theſe beds is an arc of a circle deſcribed from the centre on which the whole turns.

53 Inſtruments uſed in loading cannon.

There are ſeveral inſtruments employed in the loading of cannon. The names of theſe are as follow:

1. The lantern or ladle, which ſerves to carry the

powder into the piece, and which conſiſts of two parts, viz. of a wooden box, appropriated to the caliber of the piece for which it is intended, and of a caliber and a half in length with its vent; and of a piece of copper nailed to the box, at the height of a half caliber.—This lantern muſt have three calibers and a half in length, and two calibers in breadth, being rounded at the end to load the ordinary pieces.

2. The rammer is a round piece of wood, commonly called a *box*, faſtened to a ſtick 12 foot long, for the pieces from 12 to 33 pounders; and 10 for the 8 and 4 pounders; which ſerve to drive home the powder and ball to the breech.

3. The ſpunge is a long ſtaff or rammer, with a piece of ſheep or lamb-ſkin wound about its end, to ſerve for ſcouring the cannon when diſcharged, before it be charged with freſh powder; to prevent any ſpark of fire from remaining in her, which would endanger the life of him who ſhould load her again.

4. Wad-ſcrew conſiſts of two points of iron turned ſerpent-wiſe, to extract the wad out of the pieces when one wants to unload them, or the dirt which had chanced to enter into it.

5. The botefeux are ſticks two or three feet long, and an inch thick, ſplit at one end, to hold an end of the match twiſted round it, to fire the cannon.

6. The priming-iron is a pointed iron rod, to clear the touch-hole of the pieces of powder or dirt; and alſo to pierce the cartridge, that it may ſooner take fire.

7. The primer, which muſt contain a pound of powder at leaſt, to prime the pieces.

8. The quoin of mire, which are pieces of wood with a notch on the ſide to put the fingers on, to draw them back or puſh them forward when the gunner points his piece. They are placed on the ſole of the carriage.

9. Leaden-plates, which are uſed to cover the touch-hole, when the piece is charged, leſt ſome dirt ſhould enter it and ſtop it.

Before charging the piece, it is well ſpunged, to clean it of all filth and dirt within-ſide; then the proper weight of gunpowder is put in and rammed down; care being taken that the powder be not bruiſed in ramming, which weakens its effect; it is then run over by a little quantity of paper, hay, or the like; and laſtly, the ball is thrown in.

To point, level, or direct the piece, ſo as to play againſt any certain point, is done by the help of a quadrant with a plummet: which quadrant conſiſts of two branches made of braſs or wood; one about a foot long, eight lines broad, and one line in thickneſs; the other four inches long, and the ſame thickneſs and breadth as the former. Between theſe branches is a quadrant, divided into 90 degrees, beginning from the ſhorter branch, and furniſhed with thread and plummet.

The longeſt branch of this inſtrument is placed in the cannon's mouth, and elevated or lowered till the thread cuts the degree neceſſary to hit the propoſed object. Which done, the cannon is primed, and then ſet fire to. The method by the ſector however, propoſed by Dr Lind, is certainly in all caſes to be preferred.

A 24 pounder may very well fire 90 or 100 ſhots, every day in ſummer; and 60 or 75 in winter. In caſe of neceſſity, it may fire more. And ſome French officers of artillery aſſure, that they have cauſed ſuch a piece to fire every day 150 ſhots in a ſiege.—A 16 and a 12 pounder fire a little more, becauſe they are eaſier ſerved. There have even been ſome occaſions, where 200 ſhots have been fired from theſe pieces in the ſpace of nine hours, and 138 in the ſpace of five. In quick firing, tubes are made uſe of. They are made of tin, and their diameter is two tenths of an inch, being juſt ſufficient to enter into the vent of the piece. They are about ſix inches long, with a cap above, and cut ſlanting below, in the form of a pen; the point is ſtrengthened with ſome ſolder, that it may pierce the cartridge without bending. Through this tube is drawn a quick-match, the cap being fitted with mealed powder moiſtened with ſpirits of wine. To prevent the mealed powder from falling out by carriage, a cap of paper or flannel ſteeped in ſpirits of wine is tied over it. To range pieces in a battery, care muſt be taken to reconoitre well the ground where it is to be placed, and the avenues to it. The pieces muſt be armed, each with two lanterns or laddles, a rammer, a ſpunge, and two priming-irons. The battery muſt alſo be provided with carriages, and other implements, neceſſary to remount the pieces which the enemy ſhould chance to diſmount.

To ſerve expeditiouſly and ſafely a piece in a battery, it is neceſſary to have to each a ſack of leather, large enough to contain about 20 pounds of powder to charge the lanterns or ladles, without carrying them to the magazine; and to avoid thereby making thoſe trains of powder in bringing back the lantern from the magazine, and the accidents which frequently happen thereby.

A battery of three pieces muſt have 30 gabions, becauſe ſix are employed on each of the two ſides or epaulments, which make 12, and nine for each of the two merlons.

There ought to be two gunners and ſix ſoldiers to each piece, and four officers of artillery.

The gunner, poſted on the right of the piece, muſt take care to have always a pouch-full of powder, and two priming irons; his office is to prime the piece, and load it with powder. The gunner on the left fetches the powder from the little magazine, and fills the lantern or ladle which his comrade holds; after which, he takes care that the match be very well lighted, and ready to ſet fire to the piece at the firſt command of the officer.

There are three ſoldiers on the right, and three on the left of the piece. The two firſt take care to ram and ſpunge the piece, each on his ſide. The rammer and ſpunge are placed on the left, and the lantern or ladle on the right. After having rammed well the wad put over the powder, and that put over the bullet, they then take each a handſpike, which they paſs between the foremoſt ſpokes of the wheel, the ends whereof will paſs under the head of the carriage, to make the wheel turn round, leaning on the other end of the handſpike, towards the embraſure.

It is the office of the ſecond ſoldier on the right, to provide wad, and to put it into the piece, as well over the powder as over the bullet; and that of his comrade on the left, to provide 50 bullets, and, every time the piece is to be charged, to fetch one of them and put it into the piece after the powder has been rammed.

med. Then they both take each an handſpike, which they paſs under the hind part of the wheel, to puſh it in battery.

The officer of artillery muſt take care to have the piece diligently ſerved.

In the night he muſt employ the gunners and ſoldiers, who ſhall relieve thoſe who have ſerved 24 hours to repair the embraſures.

If there be no water near the battery, care muſt be taken to have a caſk filled with it, in which to dip the ſpunges and cool the pieces every 10 or 12 rounds.

The carriage for a mortar of 12 inches of diameter muſt be 6 foot long, the flaſks 12 inches long and 10 thick. The trunnions are placed in the middle of the carriage.

The carriage of an 18 inch mortar muſt be 4 foot long; and the flaſks 11 inches high, and 6 thick.

To mount the mortars of new invention, they uſe carriages of caſt iron.

55 Method of managing mortars.

In Germany, to mount mortars from 8 to 9 inches, and carry them into the field, and execute them horizontally as a piece of cannon, they make uſe of a piece of wood 8 feet 2 inches long, with a hole in the middle to lodge the body of the mortar and its trunnions as far as their half diameter, and mounted on two wheels four feet high, to which they join a vantrain proportioned to it, and made like thoſe which ſerve to the carriages of cannons.

Having mounted the mortar on its carriage, the next thing is to caliber the bomb, by means of a great caliber, the two branches whereof embrace the whole circumference of the bomb: theſe two branches are brought on a rule where the different calibers are marked, among which that of the bomb is found.

If no defect be found in the bomb, its cavity is filled, by means of a funnel, with whole gunpowder; a little ſpace or liberty is left, that when a fuſee or wooden tube, of the figure of a truncated cone, is driven thro' the aperture, (with a wooden mallet, not an iron one, for fear of accident), and faſtened with a cement made of quick-lime, aſhes, brick-duſt, and ſteel-filings worked together in a glutinous water, or of four parts of pitch, two of colophony, one of turpentine, and one of wax, the powder may not be bruiſed. This tube is filled with a combuſtible matter, made of two ounces of nitre, one of ſulphur, and three or more of gunpowder duſt well rammed. See Fuze.

This fuſee ſet on fire, burns ſlowly till it reaches the gunpowder; which goes off at once, burſting the ſhell to pieces with incredible violence. Special care, however, muſt be taken, that the fuſee be ſo proportioned, as that the gunpowder do not take fire ere the ſhell arrives at the deſtined place; to prevent which, the fuſee is frequently wound round with a wet clammy thread.

Batteries conſiſt,—1. Of an epaulment to ſhelter the mortars from the fire of the enemy. 2. Of platforms on which the mortars are placed. 3. Of ſmall magazines of powder. 4. Of a boyau which leads to the great magazine. 5. Of ways which lead from the battery to the magazine of bombs. 6. Of a great ditch before the epaulment. 7. Of a berm or retraite.

The platforms for mortars of 12 inches muſt have 9 feet in length, and 6 in breadth.—The lambourds for common mortars muſt be four inches thick; thoſe of a concave chamber of 8 lb. of powder, 5 inches; thoſe of 12 lb. 6 inches; thoſe of 18 lb. 7 inches, or thereabouts. Their length is at diſcretion, provided there be enough to make the platforms 9 feet long.—The forepart of the platform will be ſituated at two foot diſtance from the epaulment of the battery.—The bombardiers, to ſhelter themſelves in their battery, and not be ſeen from the town beſieged, raiſe an epaulment of 7 foot or more high, which epaulment has no embraſures.

To ſerve expeditiouſly a mortar in battery, there are required,—five ſtrong handſpikes; a dame or rammer, of the caliber of the conic chamber, to ram the wad and the earth; a wooden knife a foot long, to place the earth round the bomb; an iron ſcraper two feet long, one end whereof muſt be four inches broad and roundwiſe, to clean the bore and the chamber of the mortar, and the other end made in form of a ſpoon to clean the little chamber; a kind of brancard to carry the bomb, a ſhovel, and pick-ax.

The officer who is to mind the ſervice of the mortar, muſt have a quadrant to give the degrees of elevation.

Five bombardiers, or others, are employed in that ſervice; the firſt muſt take care to fetch the powder to charge the chamber of the mortar, putting his priming-iron in the touch-hole before he charges the chamber; and never going to fetch the powder before he has aſked his officer at what quantity of powder he deſigns to charge, becauſe more or leſs powder is wanted according to the diſtance where it is fired; the ſame will take care to ram the wad and earth, which another ſoldier puts in the chamber.

The ſoldier on the right will put again two ſhovels full of earth in the bottom of the bore, which ſhould be likewiſe very well rammed down.

This done, the rammer or dame is returned into its place, againſt the epaulment on the right of the mortar: he takes an handſpike in the ſame place to poſt himſelf behind the carriage of the mortar, in order to help to puſh it into battery: having laid down his handſpike, he takes out his priming-iron, and primes the touch-hole with fine powder.

The ſecond ſoldier on the right and left will have by that time brought the bomb ready loaded, which muſt be received into the mortar by the firſt ſoldier, and placed very ſtrait in the bore or chaſe of the mortar.

The firſt, on the right, will furniſh him with earth to put round the bomb, which he muſt take care to ram cloſe with the knife given him by the ſecond on the left.

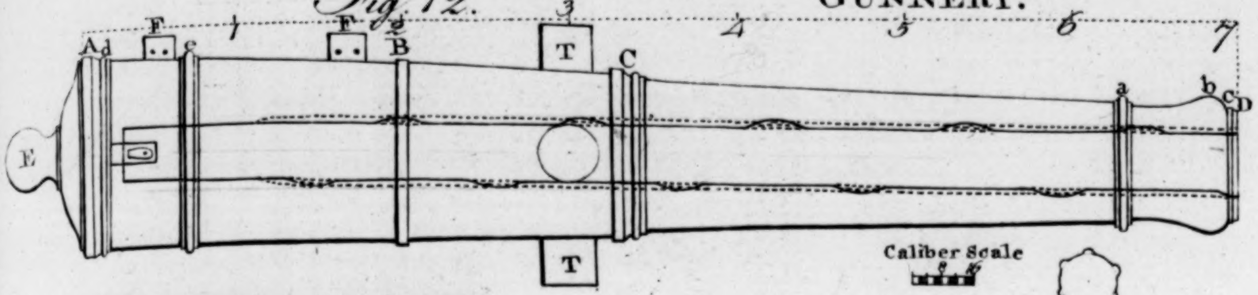
This done, each ſhall take a handſpike, which the two firſt, on the right and left, ſhall put under the pegs of retreat of the forepart, and the two behind under thoſe of the hind-part; and they together puſh the mortar in battery.

Afterwards the officer points or directs the mortar.

During that time, the firſt ſoldier takes care to prime the touch-hole of the mortar, without ramming the powder; and the laſt on the right, muſt have the match ready to ſet fire to the fuſee of the bomb on the right, while the firſt is ready with his on the left,

to

Fig. 12.


A d
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Caliber Scale

Fig. 10.

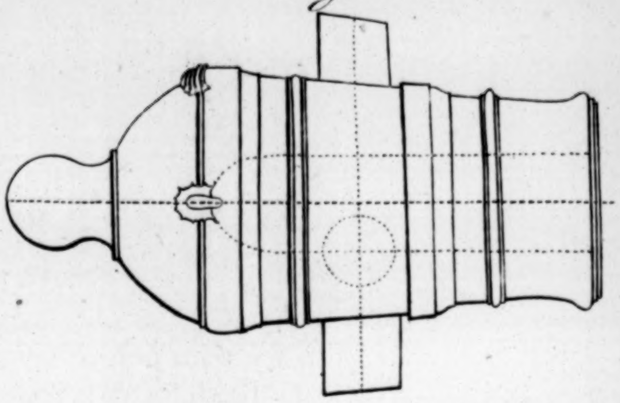

Fig. 13.

Fig. 11.

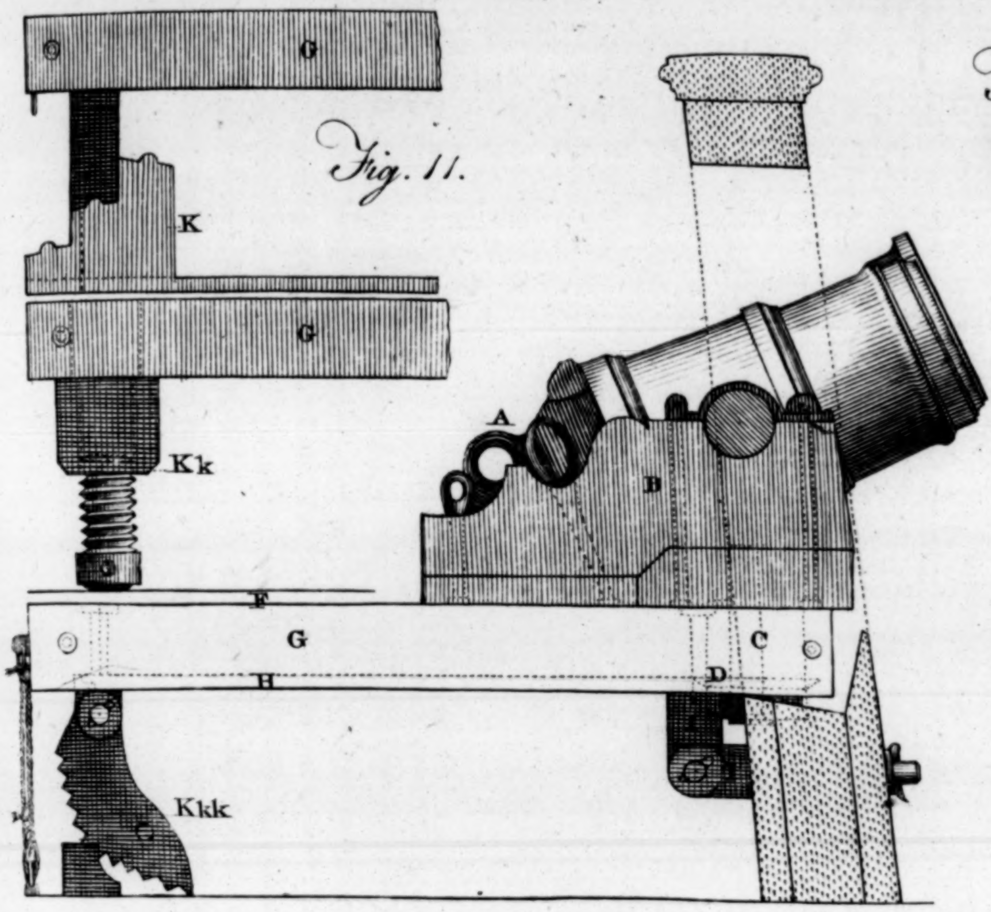
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Fig. 14.

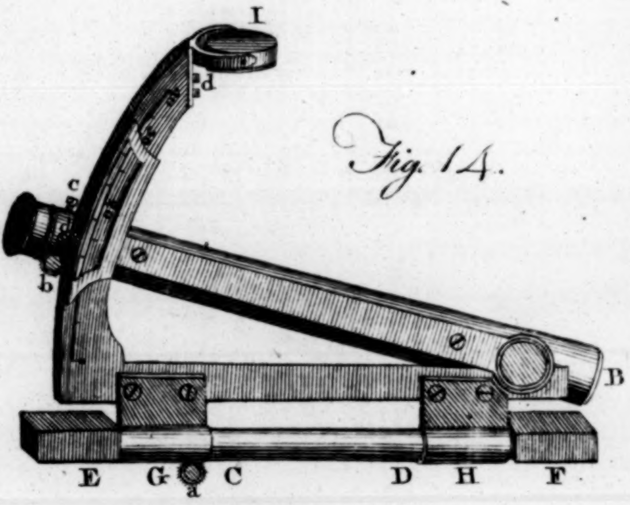
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Fig. 15.

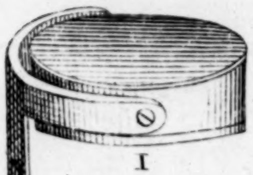


Fig. 16.

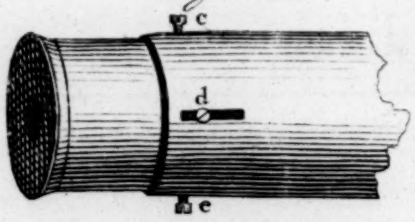


Fig. 18.

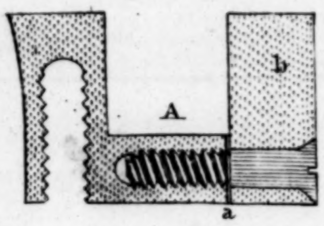


Fig. 17.

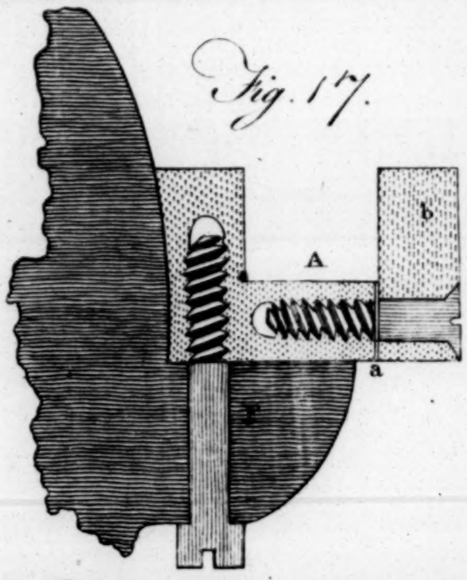


Fig. 19.

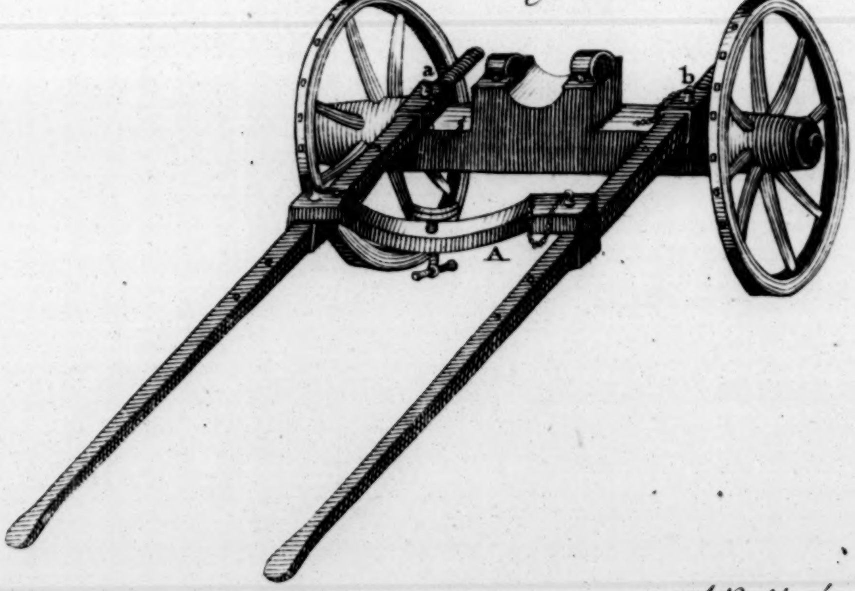
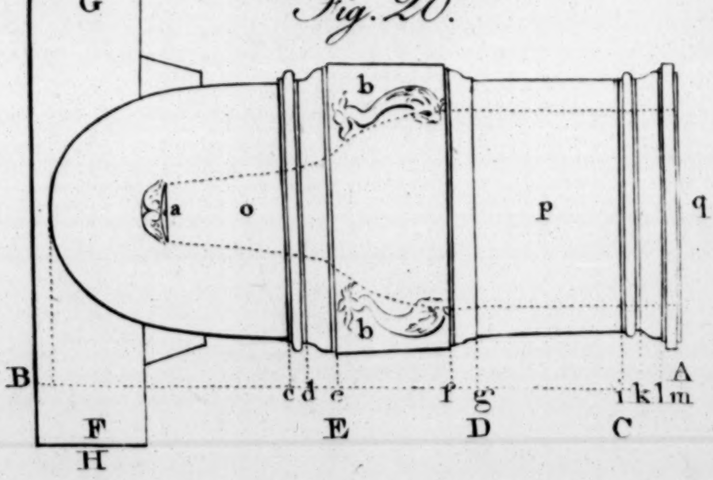


Fig. 20.


G
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A. Bell Sculpt.

3 MA 53

to ſet fire to the touch-hole of the mortar; which he ought not to do till he ſees the fuſee well lighted.

The foremoſt ſoldiers will have their handſpikes ready to raiſe the mortar upright, as ſoon as it has diſcharged; while the hindmoſt on the left ſhall, with the ſcraper, clean the bore and chamber of the mortar.

The magazine of powder for the ſervice of the battery, ſhall be ſituated 15 or 20 paces behind, and covered with boards, and earth over it.—The loaded bombs are on the ſide of the ſaid magazine, at five or ſix paces diſtance.

The officer who commands the ſervice of the mortar, muſt take care to diſcover, as much as poſſible, with the eye, the diſtance of the place where he intends to throw his bomb, giving the mortar the degree of elevation, according to the judgment he has formed of the diſtance. Having thrown the firſt bomb, he muſt diminiſh or increaſe the degrees of elevation, according to the place upon which it ſhall fall. Several make uſe of tables to diſcover the different diſtances according to the differences of the elevations of the mortar, eſpecially the degrees of the quadrant from 1 to 45; but theſe, from the principles already laid down, muſt be fallacious.

57
the pe-
d.

The petard is the next piece of artillery which deſerves our attention, and is a kind of engine of metal, ſomewhat in ſhape of a high-crowned hat, ſerving to break down gates, barricades, draw-bridges, or the like works, which are intended to be ſurprized. It is very ſhort, narrow at the breech, and wide at the muzzle, made of copper mixed with a little braſs, or of lead with tin.

The petards are not always of the ſame height and bigneſs; they are commonly 10 inches high, 7 inches of diameter a-top, and 10 inches at bottom. They weigh commonly 40, 45, and 50 pounds.

The madrier, on which the petard is placed, and where it is tied with iron circles, is of two feet for its greateſt width, and of 18 inches on the ſides, and no thicker than a common madrier. Under the madrier are two iron-bars paſſed croſſwiſe, with a hook, which ſerves to fix the petard.

To charge a petard 15 inches high, and 6 or 7 inches of caliber or diameter at the bore, the inſide muſt be firſt very well cleaned and heated, ſo that the hand may bear the heat; then take the beſt powder that may be found, throw over it ſome ſpirit of wine, and expoſe it to the ſun, or put it in a frying-pan; and when it is well dried, 5 or 6 lb. of this powder is put into the petard, which reaches within three fingers of the mouth: the vacancies are filled with tow, and ſtopped with a wooden tampion; the mouth being ſtrongly bound up with cloth tied very tight with ropes; then it is fixed on the madrier, that has a cavity cut in it to receive the mouth of the petard, and faſtened down with ropes.

Some, inſtead of gun-powder for the charge, uſe one of the following compoſition, viz. gun-powder ſeven pounds, mercury ſublimate one ounce, camphor eight ounces; or gun-powder ſix pounds, mercury ſublimate three ounces, and ſulphur three; or gun-powder ſix, beaten glaſs ½ an ounce, and camphor ¾.

Before any of theſe pieces are appropriated for ſervice, it is neceſſary to have each undergo a particular trial of its ſoundneſs, which is called a *proof*, to be made by or before one authoriſed for the purpoſe, called the *proof-maſter*.

To make a proof of the piece, a proper place is choſen, which is to be terminated by a mount of earth very thick to receive the bullets fired againſt it, that none of them may run through it. The piece is laid on the ground, ſupported only in the middle by a block of wood. It is fired three times: the firſt with powder of the weight of the bullet, and the two others with ¾ of the weight; after which a little more powder is put in to ſinge the piece; and after this, water, which is impreſſed with a ſpunge, putting the finger on the touch-hole, to diſcover if there be any cracks; which done, they are examined with the cat, which is a piece of iron with three graſps, diſpoſed in the form of a triangle, and of the caliber of the piece; then it is viſited with a wax-candle, but it is of very little ſervice in the ſmall pieces, becauſe if they be a little long, the ſmoke extinguiſhes it immediately. See Plate cxli.

58
Of ſmall arms.

Beſides the large pieces already mentioned, invented for the deſtruction of mankind, there are others called *ſmall guns*, viz. muſkets of ramparts, common muſkets, fuſils, carabines, muſketoons, and piſtols.

A muſket, or muſquet, is a fire-arm borne on the ſhoulder, and uſed in war, formerly fired by the application of a lighted match, but at preſent with a flint and lock. The common muſket is of the caliber of 20 leaden balls to the pound, and receives balls from 22 to 24: its length is fixed to 3 feet 8 inches from the muzzle to the touch-pan.

A fuſil, or fire-lock, has the ſame length and caliber; and ſerves at preſent inſtead of a muſket.

A carabine is a ſmall ſort of fire-arm, ſhorter than a fuſil, and carrying a ball of 24 in the pound, borne by the light-horſe, hanging at a belt over the left ſhoulder. This piece is a kind of medium between the piſtol and the muſket; and bears a near affinity to the arquebuſs, only that its bore is ſmaller. It was formerly made with a match-lock, but of late only with a flint-lock.

The muſquetoon is of the ſame length of the carabine, the barrel poliſhed, and clean within. It carries five ounces of iron, or ſeven and a half of lead, with an equal quantity of powder.

The barrel of a piſtol is generally 14 inches long.

GUN-POWDER, a compoſition of ſaltpetre, ſulphur, and charcoal, mixed together, and uſually granulated; which eaſily takes fire, and, when fired, rarifies, or expands with great vehemence, by means of its elaſtic force.

It is to this powder we owe all the action and effect of guns, ordnance, &c. ſo that the modern military art, fortification, &c. in a great meaſure depend thereon.

Invention of GUN-POWDER. See GUN.

Method of making GUN-POWDER. Dr Shaw's receipt for this purpoſe is as follows: Take four ounces of refined ſaltpetre, an ounce of brimſtone, and ſix drams of ſmall-coal: reduce theſe to a fine powder, and continue beating them for ſome time in a ſtone mortar, with a wooden peſtle, wetting the mixture between whiles with water, ſo as to form the whole into an uniform paſte, which is reduced to grains, by paſſing it through a wire-ſieve fit for the purpoſe; and in this form being carefully dried, it becomes the common gun-powder.

For greater quantities, mills are uſually provided; by means of which more work may be performed in one day, than a man can do in a hundred.

The nitre or ſaltpetre is refined thus: Diſſolve four pounds of rough nitre as it comes to us from the Indies, by boiling it in as much water as will commodiouſly ſuffice for that purpoſe: then let it ſhoot for two or three days in a covered veſſel of earth, with ſticks laid acroſs for the cryſtals to adhere to. Theſe cryſtals being taken out, are drained and dried in the open air.

In order to reduce this ſalt to powder, they diſſolve a large quantity of it in as ſmall a proportion of water as poſſible; then keep it conſtantly ſtirring over the fire, till the water exhales, and a white dry powder is left behind.

In order to purify the brimſtone employed, they diſſolve it with a very gentle heat; then ſcum and paſs it through a double ſtrainer. If the brimſtone ſhould happen to take fire in the melting, they have an iron cover that fits on cloſe to the melting veſſel, and damps the flame. The brimſtone is judged to be ſufficiently refined if it melts, without yielding any fetid odour, between two hot iron-plates, into a kind of red ſubſtance.

The coal for the making of gun-powder is either that of willow, or hazel, well charred in the uſual manner, and reduced to powder. And thus the ingredients are prepared for making this commodity: but as theſe ingredients require to be intimately mixed, and as there would be danger of their firing if beat in a dry form, the method is to keep them continually moiſt, either with water, urine, or a ſolution of ſal ammoniac: they continue thus ſtamping them together for twenty-four hours, after which the maſs is fit for corning and drying in the ſun, or otherwiſe, ſo as ſeduloufly to prevent its firing.

Different kinds of Gun-powder. The three ingredients of gun-powder are mixed in various proportions according as the powder is intended for muſkets, great guns, or mortars: though theſe proportions ſeem not to be perfectly adjuſted or ſettled by competent experience.

Semienowitz, for mortars, directs an hundred pounds of ſaltpetre, twenty-five of ſulphur, and as many of charcoal; for great guns, an hundred pounds of ſaltpetre, fifteen pound of ſulphur, and eighteen pound of charcoal; for muſkets and piſtols, an hundred pound of ſaltpetre, eight pound of ſulphur, and ten pound of charcoal. Miethius extols the proportion of one pound of ſaltpetre to three ounces of charcoal, and two or two-and-a-quarter of ſulphur; than which, he affirms, no gun-powder can poſſibly be ſtronger. He adds, that the uſual practice of making the gunpowder weaker for mortars than guns, is without any foundation, and renders the expence needleſſly much greater: for whereas to load a large mortar, twenty-four pound of common powder is required, and conſequently, to load it ten times, two hundred and forty pound, he ſhews, by calculation, that the ſame effect would be had by one hundred and fifty pound of the ſtrong powder.

To increaſe the ſtrength of powder, Dr Shaw thinks it proper to make the grains conſiderably large, and to have it well ſifted from the ſmall duſt. We ſee that gun-powder, reduced to duſt, has little exploſive force; but when the grains are large, the flame of one grain has a ready paſſage to another, ſo that the whole parcel may thus take fire nearly at the ſame time, otherwiſe much force may be loſt, or many of the grains go away as ſhot unfired.

It ſhould alſo ſeem that there are other ways of increaſing the ſtrength of powder, particularly by the mixture of ſalt of tartar; but perhaps, adds the laſt-mentioned author, it were improper to divulge any thing of this kind, as gun-powder ſeems already ſufficiently deſtructive.

Method of Trying and Examining Gun-powder. There are two general methods of examining gun-powder; one with regard to its purity, the other with regard to its ſtrength. Its purity is known by laying two or three little heaps near each other upon white paper, and firing one of them. For if this takes fire readily, and the ſmoke riſes upright, without leaving any droſs or feculent matter behind, and without burning the paper, or firing the other heaps, it is eſteemed a ſign that the ſulphur and nitre were well purified, that the coal was good, and that the three ingredients were thoroughly incorporated together: but if the other heaps alſo take fire at the ſame time, it is preſumed, that either common ſalt was mixed with the nitre, or that the coal was not well ground, or the whole maſs not well beat, and mixed together; and if either the nitre or ſulphur be not well purified, the paper will be black or ſpotted.

In order to try the ſtrength of gun-powder, there are two kinds of inſtruments in uſe; but neither of them appear ſo exact as the common method of trying with what velocity a certain weight of powder will throw a ball from a muſket.

There has been much talk of a white powder, which, if it anſwered the character given it, might be a dangerous compoſition; for they pretend that this white powder will throw a ball as far as the black, yet without making a report: but none of the white powder we have ſeen, ſays Dr Shaw, anſwers to this character; being, as we apprehend, commonly made either with touchwood or camphor, inſtead of coal.

Under the article Gunnery, the phyſical cauſe of the exploſion of powder, and the force wherewith it expands, have been ſo fully conſidered, that it would be ſuperfluous to add any thing here concerning them. Only we may obſerve, that though it is commonly made uſe of for military purpoſes only in ſmall quantities, and confined in certain veſſels; yet when large quantities are fired at once, even when unconfined, in the open air, it is capable of producing terrible deſtruction. The accounts of damage done by the blowing up of magazines, powder-mills, &c. are too numerous and well-known to be here taken notice of. The following is a relation of what even a moderate quantity of powder will accompliſh, when fired in the open air. "The king of Navarre took Monſegur. Captain Milon incloſed 500 pounds of powder in a bag, which he found means to introduce, by a drain from the town, into the ditch between two principal gates; the end of the leader was hid in the graſs. Every thing being ready to play off this machine, the king gave us leave to go and ſee its effects; which was ſurpriſing. For one of the gates was thrown into the middle of the town, and the other into the field fifty paces from the wall: all the vaults were deſtroyed, and a paſſage was made in the wall for three men to enter abreaſt, by which the town was taken."—For further accounts of the force of large quantities of powder, ſee the article Mines.

To recover damaged Gun-powder. The method of the powder-merchants is, to put part of the powder on a ſail-cloth, to which they add an equal weight of what is really good; and with a ſhovel mingle it well together, dry it in the ſun, and barrel it up, keeping it in a dry and proper place. Others again, if it be very bad, reſtore it by moiſtening it with vinegar, water, urine, or brandy: then they beat it fine, ſearce it, and to every pound of powder add an ounce, an ounce and a half, or two ounces, according as it is decayed, of melted ſalt-petre. Afterwards, theſe ingredients are to be moiſtened and mixed well, ſo that nothing can be diſcerned in the compoſition, which may be known by cutting the maſs; and then they granulate it as aforeſaid. In caſe the powder be in a manner quite ſpoiled, the only way is to extract the ſaltpetre with water, according to the uſual manner, by boiling, filtrating, evaporating, and cryſtallizing; and then with freſh ſulphur and charcoal to make it up anew again.

In regard to the medical virtues of gun-powder, Boerhaave informs us, that the flame of it affords a very healthy fume in the height of the plague, becauſe the exploſive acid vapour of nitre and ſulphur corrects the air; and that the ſame vapour, if received in a ſmall cloſe pent-up place, kills inſects.

It is enacted by 5 and 11 of Geo. I. and 5 Geo. II. *c.* 20. that gun-powder be carried to any place in a covered carriage; the barrels being cloſe-jointed; or in caſes and bags of leather, &c. And perſons keeping more than 200 pounds weight of gun-powder at one time, within the cities of London and Weſtminſter, or the ſuburbs, &c. are liable to forfeitures if it be not removed; and juſtices of peace may iſſue warrants to ſearch for, ſeize, and remove the ſame.

Gun-*Shot Wounds.* See Surgery.

GUNTER (Edmund), an excellent Engliſh mathematician and aſtronomer, was born in Hertfordſhire in 1581, and ſtudied at Weſtminſter ſchool; from whence he removed to Oxford, where he took the degree of maſter of arts in 1606, and afterwards entered into holy orders. In 1615, he took the degree of bachelor of divinity: but being peculiary eminent for his knowledge in the mathematics, he had two years before been choſen profeſſor of aſtronomy in Greſham college, London; where he diſtinguiſhed himſelf by his lectures and writings. He invented a ſmall portable quadrant; and alſo the famous line of proportions, which, after the inventor, is called *Gunter's Scale.* He likewiſe publiſhed *Canon Triangulorum;* and a work entitled, *Of the ſector, croſs-ſtaff, and other inſtruments.* This laſt was publiſhed, with an Engliſh tranſlation of his *Canon Triangulorum*, in 4to, by Samuel Foſter, profeſſor of Greſham college. Mr Gunter died at that college in 1626.

Gunter's-*Line*, a logarithmic line, uſually graduated upon ſcales, ſectors, &c.

It is alſo called the *line of lines*, and *line of numbers;* being only the logarithms graduated upon a ruler, which therefore ſerves to ſolve problems inſtrumentally in the ſame manner as logarithms do arithmetically. It is uſually divided into an hundred parts, every tenth whereof is numbered, beginning with 1, and ending with 10: ſo that, if the firſt great diviſion, marked 1, ſtand for one tenth of any integer, the next diviſion, marked 2, will ſtand for two tenths; 3, three tenths, and ſo on; and the intermediate diviſions will, in like manner, repreſent 100dth-parts of the ſame integer. If each of the great diviſions repreſent 10 integers, then will the leſſer diviſions ſtand for integers; and if the greater diviſions be ſuppoſed each 100, the ſubdiviſions will be each 10.

Uſe of Gunter's-*Line.* 1. *To find the product of two numbers.* From 1 extend the compaſſes to the multiplier; and the ſame extent, applied the ſame way from the multiplicand, will reach to the product. Thus if the product of 4 and 8 be required, extend the compaſſes from 1 to 4, and that extent laid from 8 the ſame way will reach to 32, their product. 2. *To divide one number by another.* The extent from the diviſor to unity, will reach from the dividend to the quotient: thus, to divide 36 by 4, extend the compaſſes from 4 to 1, and the ſame extent will reach from 36 to 9, the quotient ſought. 3. *To three given numbers, to find a fourth proportional.* Suppoſe the numbers 6, 8, 9: extend the compaſſes from 6 to 8; and this extent, laid from 9 the ſame way, will reach to 12, the fourth proportional required. 4. *To find a mean proportional between any two given numbers.* Suppoſe 8 and 32: extend the compaſſes from 8, in the left-hand part of the line, to 32 in the right; then biſſecting this diſtance, its half will reach from 8 forward, or from 32 backward, to 16, the mean proportional ſought. 5. *To extract the ſquare-root of any number.* Suppoſe 25; biſſect the diſtance between 1 on the ſcale and the point repreſenting 25: then the half of this diſtance, ſet off from 1, will give the point repreſenting the root 5. In the ſame manner, the cube root, or that of any higher power, may be found by dividing the diſtance on the line between 1 and the given number, into as many equal parts as the index of the power expreſſes; then one of thoſe parts, ſet from 1, will find the point repreſenting the root required.

Gunter's *Quadrant*, one made of wood, braſs, &c. containing a kind of ſtereographic projection of the ſphere, on the plane of the equinoctial; the eye being ſuppoſed placed in one of the poles.

Gunter's *Scale*, called by navigators ſimply the *gunter*, is a large plain ſcale, generally two foot long, and about an inch and a half broad, with artificial lines delineated on it, of great uſe in ſolving queſtions in trigonometry, navigation, &c.

GUN-WALE, or Gunnel, is the uppermoſt wale of a ſhip, or that piece of timber which reaches on either

ther ſide from the quarter-deck to the forecaſtle, being the uppermoſt bend which finiſhes the upper works of the hull, in that part in which are put the ſtanchions which ſupport the waſte-trees.

GURK, an epiſcopal town of Carinthia in Germany, ſeated on the river Gurk, in E. Long. 14. 15. N. Lat. 47. 10.

GURNARD, in ichthyology. See TRIGLA.

GUST, a ſudden and violent ſquall of wind, burſting from the hills upon the ſea, ſo as to endanger the ſhipping near the ſhore. Theſe are peculiar to ſome coaſts, as thoſe of South Barbary and Guinea.

GUSTAVUS I. king of Sweden, ſon of Eric de Vaſa duke of Gripſholm. Chriſtian II. king of Denmark having made himſelf maſter of the kingdom of Sweden, confined Guſtavus at Copenhagen; but he making his eſcape, wandered a long time in the foreſts, till the cruelties of the tyrant having occaſioned a revolution, he was firſt declared governor of Sweden, and in 1513 elected king. This prince introduced Lutheraniſm into his dominions, which in a little time ſpread itſelf all over the kingdom. He died in 1560; having made his kingdom hereditary, which was before elective. See SWEDEN.

GUSTAVUS *Adolphus*, ſurnamed *the Great*, king of Sweden, was born at Stockholm in 1594, and ſucceeded his father Charles in 1611. He eſpouſed the cauſe of the Proteſtants in Germany, who were oppreſſed and almoſt entirely ruined by the emperor Ferdinand. He was a great warrior, and gained many victories, of which an account is given under the article SWEDEN. He was at laſt killed in the battle of Lutzen, where his troops got the victory, and defeated two of the emperor's armies.

GUTTA ROSACEA, in medicine, called alſo ſimply *Roſacea*, from the little red drops or fiery tubercles diſperſed about the face and noſe. See (the *Index* ſubjoined to) MEDICINE.

GUTTA *Serena*, a diſeaſe in which the patient, without any apparent fault in the eye, is deprived of ſight. See (*Index* ſubjoined to) MEDICINE.

GUTTA, in architecture, are ornaments in the form of little cones uſed in the Doric corniche, or on the architrave underneath the triglyphs, repreſenting a ſort of drops or bells.

GUTTURAL, a term applied to letters or ſounds pronounced or formed as it were in the throat.

GUTTY, in heraldry, a term uſed when any thing is charged or ſprinkled with drops. In blazoning, the colour of the drops is to be named; as gutty of ſable, of gules, &c.

GUY (Thomas), an eminent bookſeller, founder of the hoſpital for ſick and lame in Southwark bearing his name, was the ſon of Thomas Guy lighterman and coal-dealer in Horſleydown, Southwark. He was put apprentice, in 1660, to a bookſeller in the porch of Mercer's chapel; and ſet up trade with a ſtock of about 200 l. in the houſe that forms the angle between Cornhill and Lombard-ſtreet. The Engliſh Bibles being at that time very badly printed, Mr Guy engaged with others in a ſcheme for printing them in Holland and importing them; but this being put a ſtop to, he contracted with the univerſity of Oxford for their privilege of printing them, and carried on a great bible-trade for many years to a conſiderable advantage. Thus he began to accumulate money, and his gains reſted in his hands; for being a ſingle man, and very penurious, his expences could not be great when it was his cuſtom to dine on his ſhop-counter with no other table-covering than an old newſpaper: he was moreover as little ſcrupulous about the ſtyle of his apparel. The bulk of his fortune, however, was acquired by purchaſing ſeamens tickets during queen Anne's wars, and by South-Sea-ſtock in the memorable year 1720. To ſhew what great events ſpring from trivial cauſes, it may be obſerved, that the public owe the dedication of the greateſt part of his immenſe fortune to charitable purpoſes, to the indiſcreet officiouſneſs of his maid-ſervant in interfering with the mending of the pavement before the door. Guy had agreed to marry her; and, preparatory to his nuptials, had ordered the pavement before his door, which was in a neglected ſtate, to be mended, as far as to a particular ſtone which he pointed out. The maid, while her maſter was out, innocently looking on the paviours at work, ſaw a broken place that they had not repaired, and mentioned it to them: but they told her that Mr Guy had directed them not to go ſo far. Well, ſays ſhe, do you mend it, tell him I bade you, and I know he will not be angry. It happened, however, that the poor girl preſumed too much on her influence over her careful lover, with whom a few extraordinary ſhillings expence turned the ſcale totally againſt her: the men obeyed, Guy was enraged to find his orders exceeded, his matrimonial ſcheme was renounced, and ſo he built hoſpitals in his old age. In the year 1707 he built and furniſhed three wards on the north-ſide of the outer court of St Thomas's Hoſpital in Southwark, and gave 100 l. to it annually for eleven years preceding the erection of his own hoſpital: and, ſome time before his death, erected the ſtately iron gate, with the large houſes on each ſide, at the expence of about 3000 l. He was 76 years of age when he formed the deſign of building the hoſpital contiguous to that of St Thomas's, which bears his name, and lived to ſee it roofed in; dying in the year 1724. The charge of erecting this vaſt pile amounted to 18,793 l. and he left 219,499 l. to endow it; a much larger ſum than had ever been dedicated to charitable uſes in this kingdom by any one man. He erected an alms-houſe with a library at Tanworth in Staffordſhire (the place of his mother's nativity, and for which he was repreſentative in parliament) for 14 poor men and women; and for their penſions, as well as for the putting out poor children apprentices, bequeathed 125 l. a year. Laſtly, he bequeathed 1000 l. to every one who could prove themſelves in any degree related to him.

GUY, a rope uſed to keep ſteady any weighty body whilſt it is hoiſting or lowering, particularly when the ſhip is ſhaken by a tempeſtuous ſea.

GUY is likewiſe a large ſlack rope, extending from the head of the main-maſt to the head of the foremaſt, and having two or three large blocks faſtened to the middle of it. This is chiefly employed to ſuſtain the tackle uſed to hoiſt in and out the cargo of a merchant ſhip, and is accordingly removed from the maſthead as ſoon as the veſſel is laden or delivered.

GUYON (Johanna Mary Bouriers de la Mothe), a French lady, memorable for her writings, and for her ſufferings in the cauſe of Quietiſm, was deſcended from a

Gymnaſtics ‖ Gymnoſophiſts.

a noble family, and born at Montargis in 1648. She gave ſome extraordinary ſymptoms of illumination from her earlieſt infancy, and tried to take the veil before ſhe was of age to diſpoſe of herſelf; but her parents obliged her to marry a gentleman to whom they had promiſed her. She was a widow at the age of 28; when diſtinguiſhing herſelf in, and making many converts to, the way of contemplation and prayer, known by the name of *quietiſm*, complaints were made of her ſpiritualiſm; and ſhe confined by order of the king, and ſeverely examined for eight months. She was diſcharged; but was afterwards involved in the perſecution of the archbiſhop of Cambray, and thrown into the Baſtile, where ſhe underwent many examinations: but nothing being made out againſt her, ſhe once more obtained her liberty, and lived private to her death in 1717. She ſpent her latter years in myſtical reveries; covering her tables, cielings, and every thing that would receive them, with the ſallies of a viſionary imagination. Her pious verſes were collected after her death, in 5 vols, entitled *Cantiques ſpirituels, ou d'Emblemes ſur l'Amour Divin.* Her publications were, *Le moyen court it tres facile de faire Oraiſons*; and *Le Cantique des Cantiques de Salomon interprete, ſelon le ſens myſtique*; which were condemned by the archbiſhop of Paris.

GYARUS, (anc. geog.), one of the Cyclades, 12 miles in compaſs, lying to the eaſt of Delos. It was a deſart iſland, and alloted for a place of baniſhment by the Romans.

GYBING, the act of ſhifting any boom-ſail from one ſide of the maſt to the other.

In order to underſtand this operation more clearly, it is neceſſary to remark, that by a boom-ſail is meant any ſail whoſe bottom is extended by a boom, the fore-end of which is hooked to its reſpective maſt; ſo as to ſwing occaſionally on either ſide of the veſſel, deſcribing an arch, of which the maſt will be the centre. As the wind or the courſe changes, it alſo becomes frequently neceſſary to change the poſition of the boom, together with its ſail, which is accordingly ſhifted to the other ſide of the veſſel as a door turns upon its hinges. The boom is puſhed out by the effort of the wind upon the ſail, and is reſtrained in a proper ſituation by a ſtrong tackle communicating with the veſſels ſtern, and called the *ſheet*. It is alſo confined on the fore-part by another tackle, called the *guy*.

GYMNASIARCH, in antiquity, the director of the gymnaſium. He had two deputies under him; the one called *xyſtarch*, who preſided over the athletæ, and had the overſight of wreſtling; the other was *gymnaſtes*, who had the direction of all other exerciſes.

GYMNASIUM, in Grecian antiquity, a place fitted for performing exerciſes.—The word is Greek, formed of γυμνὸς, "naked;" by reaſon they anciently put off their clothes, to practiſe with the more freedom.

Gymnaſia, according to Potter, were firſt uſed at Lacedæmon, but were afterwards very common in all parts of Greece; and imitated, very much augmented, and improved, at Rome. They were not ſingle edifices, but a knot of buildings united, being ſufficiently capacious to hold many thouſands of people at once; and having room enough for philoſophers, rhetoricians, and the profeſſors of all other ſciences to read their lectures,—and wreſtlers, dancers, and all others who had a mind, to exerciſe,—at the ſame time, without the leaſt diſturbance or interruption. They conſiſted of a great many parts; the chief of which were the porticoes, eleotheſium, palæſtra, coniſtorium, &c.

Athens had ſeveral gymnaſia, of which the lycæum, academia, and cynoſurges, were thoſe of moſt note.

The lycæum was ſeated on the banks of the river Iliſſus; and received its name from Apollo, to whom it was dedicated. This was the place where Ariſtotle taught philoſophy, walking there every day till the hour of anointing: whence he and his followers were named *Peripatetics*.

The academy was part of the Ceramicus without the city, where Plato lectured.

The cynoſurges was alloted for the populace.

GYMNASTICS, the art of performing the ſeveral bodily exerciſes, as wreſtling, running, fencing, dancing, &c.

That part of medicine which regulates the exerciſes of the body, whether for preſerving or reſtoring health, is alſo termed *gymnaſtic*.

GYMNOPYRIS, in natural hiſtory, a name given by Dr Hill to the pyritæ of a ſimple internal ſtructure, and not covered with a cruſt. See PYRITES.

Of theſe there are only two ſpecies. 1. A green variouſly ſhaped kind. 2. A botryoide kind.

The firſt ſpecies is the moſt common of all the pyritæ, and appears under a great diverſity of ſhapes. It is very hard and heavy, very readily gives fire with ſteel, but will not at all ferment with aquafortis. The ſecond ſpecies is very elegant and beautiful, and its uſual colour is a very agreeable pale green; but what moſt diſtinguiſhes it from all other pyritæ is, that its ſurface is always beautifully elevated into tubercles of various ſizes, reſembling a cluſter of grapes.

GYMNOSOPHISTS, a ſect of philoſophers who clothed themſelves no farther than modeſty required. There were ſome of theſe ſages in Africa; but the moſt celebrated clan of them was in India. The African gymnoſophiſts dwelt upon a mountain in Ethiopia, near the Nile, without the accommodation either of houſe or cell. They did not form themſelves into ſocieties like thoſe of India; but each had his private receſs, where he ſtudied, and performed his devotions by himſelf. If any perſon had killed another by chance, he applied to theſe ſages for abſolution, and ſubmitted to whatever penances they enjoined. They obſerved an extraordinary frugality, and lived only upon the fruits of the earth. Lucan aſcribes to theſe gymnoſophiſts ſeveral new diſcoveries in aſtronomy.

As to the Indian gymnoſophiſts, they dwelt in the woods, where they lived upon the wild products of the earth, and never drank wine nor married. Some of them practiſed phyſic, and travelled from one place to another; theſe were particularly famous for their remedies againſt barrenneſs. Some of them, likewiſe, pretended to practiſe magic, and to foretel future events.

In general, the gymnoſophiſts were wiſe and learned men: their maxims and diſcourſes, recorded by hiſtorians, do not in the leaſt ſavour of a barbarous education; but are plainly the reſult of great ſenſe and deep thought. They kept up the dignity of their character to ſo high a degree, that it was never their cuſtom to wait upon any body, not even upon princes themſelves; for which reaſon Alexander, who would not condeſcend to viſit them in perſon, ſent ſome of his courtiers to them in order to ſatisfy his curioſity. Their way of educating their diſciples is very remarkable: every day, at dinner, they examined them how they had ſpent the morning; and every one was obliged to ſhew, that he had diſcharged ſome good office, practiſed ſome virtue, or improved in ſome part of learning: if nothing of this appeared, he was ſent back without his dinner. They held a tranſmigration of ſouls; and it is probable that Pythagoras borrowed his doctrine from them.

GYMNOSPERMIA, in botany, from γυμνος, *naked*, and σπερμα, *ſeed*; the firſt order in Linnæus's claſs of didynamia. It comprehends thoſe plants of that claſs which have naked ſeeds. The ſeeds are conſtantly four in number, except in one genus, viz. phryma, which is monoſpermous. See Botany, p. 1292.

GYMNOTUS, in ichthyology, a genus of fiſhes belonging to the order of apodes. They have two tentacula at the upper lip; the eyes are covered with the common ſkin; there are five rays in the membrane of the gills; the body is compreſſed, and carinated on the belly with a fin. There are five ſpecies; the moſt remarkable of which is the electricus. This ſpecies is peculiar to Surinam; and is found in the rocky parts of the river, at a great diſtance from the ſea. The moſt accurate deſcription we have of this fiſh is in the Phil. Tranſ. for 1775, where Alex. Garden, M. D. gives an account of three of them brought to Charleſtown in South-Carolina. The largeſt was about three feet eight inches in length, and might have been from 10 to 14 inches in circumference about the thickeſt part of its body. The head was large, broad, flat, and ſmooth; impreſſed here and there with holes, as if perforated with a blunt needle, eſpecially towards the ſides, where they were more regularly ranged in a line on each ſide. There were two noſtrils on each ſide; the firſt large, tubular, and elevated above the ſurface; the others ſmall, and level with the ſkin. The eyes were ſmall, flattiſh, and of a bluiſh colour, placed about three quarters of an inch behind the noſtrils. The whole body, from about four inches below the head, was clearly diſtinguiſhed into four longitudinal parts or diviſions. The upper part or back was of a dark colour, and ſeparated from the other parts on each ſide by the *lateral lines*. Theſe lines took their riſe at the baſe of the head, juſt above the pectoral fins, and run down the ſides, gradually converging as the fiſh grew ſmaller to the tail. The ſecond diviſion was of a lighter and clearer colour than the firſt, inclining to blue. It ſeemed to ſwell out on each ſide; but towards the under part it is again contracted and ſharpened into the third part or *carina*. This part is eaſily diſtinguiſhed from the other two by its thinneſs, its apparent laxneſs, and by the reticulated ſkin of a more grey and light colour, with which it is covered. The carina begins about ſix or ſeven inches below the baſe of the head; and, gradually deepening or widening as it goes along, reaches down to the tail, where it is thinneſt. The fourth part is a long, deep, ſoft and wavy fin, which takes its riſe about three or four inches at moſt below the head; and thus runs down the ſharp edge of the carina to the extremity of the tail. The ſituation of the anus was very ſingular; being an inch more forward than the pectoral fins. Externally it ſeemed to be a pretty large *rima;* but the formed excrements were only the ſize of a quill of a common dunghill-fowl. There were two pectoral fins ſituated juſt behind the head, ſcarcely an inch in length; of a very thin, delicate conſiſtence, and orbicular ſhape. They ſeemed to be chiefly uſeful in ſupporting and raiſing the head of the fiſh when he came up to breathe; which he was obliged to do every four or five minutes. Acroſs the body were a number of ſmall bands, annular diviſions, or rather *rugæ* of the ſkin. By means of theſe the fiſh ſeemed to partake of the vermicular nature, had the power of lengthening or ſhortening its body like a worm, and could ſwim backwards as well as forwards, which is another property of the vermicular tribe. Every now and then it laid itſelf on one ſide in the water, as if to reſt.

This fiſh hath the aſtoniſhing property of giving the electric ſhock to any perſon, or number of perſons, either by the immediate touch with the hand, or by the mediation of any metallic conductor; and the perſon who kept them, told Dr Garden, that they had this property much ſtronger when firſt catched than afterwards: "The perſon (ſays he) who is to receive the ſhock, muſt take the fiſh with both hands, at ſome conſiderable diſtance aſunder, ſo as to form the communication, otherwiſe he will not receive it: at leaſt I never ſaw any one ſhocked from taking hold of it with one hand only; though ſome have aſſured me, that they were ſhocked by laying one hand on it. I myſelf have taken hold of the largeſt with one hand often, without ever receiving a ſhock; but I never touched it with both hands, at a little diſtance aſunder, without feeling a ſmart ſhock. I have often remarked, that when it is taken hold of with one hand, and the other is put into the water over its body, without touching it, the perſon received a ſmart ſhock; and I have obſerved the ſame effect follow, when a number joined hands, and the perſon at one extremity of the circle took hold of or touched the fiſh, and the perſon at the other extremity put his hand into the water, over the body of the fiſh. The ſhock was communicated through the whole circle, as ſmartly as if both the extreme perſons had touched the fiſh. In this it ſeems to differ widely from the *torpedo* *, or elſe we are much miſinformed of the manner in which the benumbing effect of that fiſh is communicated. The ſhock with our Surinam fiſh gives, ſeems to be wholly electrical; and all the phenomena or properties of it exactly reſemble thoſe of the electric *aura* of our atmoſphere when collected, as far as they are diſcoverable from the ſeveral trials made on this fiſh. This ſtroke is communicated by the ſame conductors, and intercepted by the interpoſition of the ſame original electrics, or electrics *per ſe* as they uſed to be called. The keeper of this fiſh informs me, that he catched them in Surinam river, a great way up, beyond where the ſalt-water reaches; and that they are eaten, and by ſome people eſteemed a great delicacy. They live on fiſh, worms, or any animal-food if it is cut ſmall ſo that they can ſwallow it. When ſmall fiſhes are thrown into the water, they firſt give them a ſhock, which kills or ſo ſtupifies them, that they can ſwallow them eaſily, and without any trouble. If one of theſe ſmall fiſhes, after it is ſhocked, and to all appearance dead, be taken out of the veſſel where the electrical fiſh is, and put into freſh water, it will ſoon revive again. If a larger fiſh than they can ſwallow be thrown into the water, at a time that they are hungry, they give him ſome ſmart ſhocks, till he is apparently dead, and then they try to ſwallow or ſuck him in; but, after ſeveral attempts, finding he is too large, they quit him. Upon the moſt careful inſpection of ſuch fiſh, I could never ſee any mark of teeth, or the leaſt wound or ſcratch on them. When the electrical fiſh are hungry, they are pretty keen after their food; but they are ſoon ſatisfied, not being able to contain much at one time. An electrical fiſh of three feet and upwards in length cannot ſwallow a ſmall fiſh above three or at moſt three inches and a half long. I am told, that ſome of theſe have been ſeen in Surinam river upwards of 22 feet long, whoſe ſtroke or ſhock proved inſtant death to any perſon that unluckily received it."

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* See T *pedo.*

Several other accounts of this fiſh have been publiſhed by different perſons, but none of them ſo full and diſtinct as the above. They all agree that the electric virtue of the fiſh is very ſtrong. Mr Fermin in his natural hiſtory of Surinam, publiſhed in 1765, tells us, that one cannot touch it with the hands, or even with a ſtick, without feeling a horrible numbneſs in the arms up to the ſhoulders; and he farther relates, that, making 14 perſons graſp each other by the hands, while he graſped the hand of the laſt with one of his, and with the other touched the eel with a ſtick, the whole number felt ſo violent a ſhock, that he could not prevail on them to repeat the experiment. V. Vanderlott, in two letters from Rio Eſſequebo dated in 1761, makes two ſpecies, the black and the reddiſh; though he acknowledges, that, excepting the difference of colour and degree of ſtrength, they are not materially different. In moſt experiments with theſe animals, he remarked a ſurpriſing reſemblance between them and an electrical apparatus: nay, he obſerved, that the ſhock could be given to the finger of a perſon held at ſome diſtance from the bubble of air formed by the fiſh when he comes to the ſurface of the water to breathe; and he concluded, that at ſuch times the electrical matter was diſcharged from its lungs. He mentions another characterizing circumſtance, which is, that though metals in general were conductors of its electric property, yet ſome were found to be ſenſibly better than others for that purpoſe. Of this property Dr Prieſtley takes notice, and ſays that a gold ring is preferable to any thing elſe. The ſame is likewiſe obſerved by Linnæus. Dr Prieſtley adds, that the ſenſation is ſtrongeſt when the fiſh is in motion, and is tranſmitted to a great diſtance; ſo that if perſons in a ſhip happen to dip their fingers or feet in the ſea, when the fiſh is ſwimming at the diſtance of 15 feet from them, they are affected by it. He alſo tells us, that the gymnotus itſelf, notwithſtanding all its electric powers, is killed by the lobſter.

GYNÆCEUM, among the ancients, the apartment of the women, a ſeparate room in the inner part of the houſe, when they employed themſelves in ſpinning, weaving, and needle-work.

GYNÆCOCRACY, denotes the government of women, or a ſtate where women are capable of the ſupreme command. Such are Britain and Spain.

GYNANDRIA, (from γυνη, a "woman;" and ανηρ, a "man.") The name of the 20th claſs in Linnæus's ſexual ſyſtem, conſiſting of plants with hermaphrodite flowers, in which the ſtamina are placed upon the ſtyle, or, to ſpeak more properly, upon a pillar-ſhaped receptacle, reſembling a ſtyle, which riſes in the middle of the flower, and bears both the ſtamina and pointal; that is, both the ſuppoſed organs of generation. See BOTANY, p. 1292.

The flowers of this claſs, ſays Linnæus, have a monſtrous appearance, ariſing, as he imagines, from the ſingular and unuſual ſituation of the parts of fructification.

GYPSIES, or EGYPTIANS, in our ſtatutes, a kind of impoſtors and jugglers, who diſguiſing themſelves in uncouth habits, ſmearing their faces and bodies, and framing to themſelves a canting language, wander up and down, and, under pretence of telling fortunes, curing diſeaſes, &c. abuſe the common people, trick them of their money, and ſteal all that they can come at. There are ſeveral ſtatutes made again them.

Egyptians coming into England are to depart the realm in fifteen days, or be impriſoned, by 22 Hen. VIII. cap. 10. And by 1 & 2 P. & M. cap. 4. any perſon importing them into this kingdom, ſhall forfeit forty pounds; and if they remain here above one month, or if any perſon, fourteen years old, conſort with them, they are guilty of felony, without benefit of clergy; 5 Eliz. cap. 20. And we are informed by Sir M. Hale, that at one Suffolk aſſizes, no leſs than thirteen Gypſies were executed upon theſe ſtatutes, a few years before the Reſtoration. See alſo 39 Eliz. cap. 4. § 2. 17 & Geo II. cap. 5. § 2.

The origin of this tribe of vagabonds is ſomewhat obſcure; at leaſt, the reaſon of the denomination is ſo. It is certain, the ancient Egyptians had the character of great cheats, and were famous for the ſubtilty of their impoſtures; whence the name might afterwards paſs proverbially into other languages, as it is pretty certain it did into the Greek and Latin: or elſe, the ancient Egyptians, being much verſed in aſtronomy, which in thoſe days was little elſe but aſtrology, the name was on that ſcore aſſumed by theſe tellers of good fortone.

Be this as it will, there is ſcarce any country of Europe but has its Egyptians, though not all of them under that denomination: the Latins call them *Ægyptii*; the Italians, *Cingani* and *Cingari*; the Germans, *Zigeuner*; the French, *Bohemiens*; others, *Saracens*; and others, *Tartars*, &c.

Munſter, *Geogr. lib. iii. cap.* 5. relates, that they made their firſt appearance in Germany in 1417, exceedingly tawny and ſun-burnt, and in pitiful array, though they affected quality, and travelled with a train of hunting-dogs after them, like nobles. The above date ſhould probably have been 1517, as Munſter himſelf owns he never ſaw any till 1524. He adds, that they had paſſports from king Sigiſmund of Bohemia, and other princes. Ten years afterwards, they came into France, and thence paſſed into England. Several

ral hiſtorians inform us, that when ſultan Selim conquered Egypt in the year 1517, ſeveral of the natives refuſed to ſubmit to the Turkiſh yoke; but, being at length ſubdued and baniſhed, they agreed to diſperſe in ſmall parties over the world, where their ſuppoſed ſkill in the black art gave them an univerſal reception in that age of ſuperſtition and credulity. In a few years, the number of their proſelytes multiplied, and they became formidable to moſt of the ſtates of Europe. Paſquier, in his *Recherch. lib. iv. chap.* 19. relates a leſs probable origin of the Gypſies, thus: On the 17th of April 1427, there came to Paris twelve penitents, or perſons, as they ſaid, adjudged to penance, viz. one duke, one count, and ten cavaliers or perſons on horſeback: they took on themſelves the character of *Chriſtians of the Lower Egypt*, expelled by the Saracens; who, having made application to the Pope, and confeſſed their ſins, received for penance, that they ſhould travel through the world for ſeven years, without ever lying on a bed. Their train conſiſted of 120 perſons, men, women, and children; which were all that were left of 1200, who came together out of Egypt. They had lodgings aſſigned them in the chapel, and people went in crowds to ſee them. Their ears were perforated, and ſilver-buckles hung to them; their hair was exceedingly black, and frizzled; their women were ugly, thieviſh, and pretenders to telling of fortunes. The biſhop ſoon afterwards obliged them to retire, and excommunicated ſuch as had ſhewn them their hands.

By an ordonnance of the eſtates of Orleans in the year 1560, it was enjoined all theſe impoſtors, under the name of *Bohemians* and *Egyptians*, to quit the kingdom, on penalty of the galleys. Upon this they diſperſed into leſſer companies, and ſpread themſelves over Europe. The firſt time we hear of them in England, was in the year 1530, when they were deſcribed by the ſtatute already cited, 22 Hen. VIII. cap. 10. They were expelled from Spain in 1591.

Ralph. Volaterranus, making mention of them, affirms, that they firſt proceeded or ſtrolled from among the Uxii, a people of Perſis or Perſia.

GYPSUM, or PLASTER-STONE, in natural hiſtory, a genus of foſſils, naturally and eſſentially ſimple, not inflammable nor ſoluble in water, and compoſed of flat ſmall particles, which form bright, gloſſy, and in ſome degree tranſparent maſſes, not flexible or elaſtic, not giving fire with ſteel, nor fermenting with or being ſoluble in acid menſtrua, and very eaſily calcined in the fire.

Of theſe gypſums, ſome are harder, others ſofter, and are of ſeveral colours, as white, grey, red, green, &c. ſometimes diſtinct, and ſometimes variouſly blended together.

The origin of all theſe gypſums is from the vitriolic acid and calcareous earth. See CHEMISTRY, n° 127. They are much uſed for ſtuccoing rooms, and for caſting buſts and ſtatues; for which laſt purpoſe they are excellently adapted by the property they have of expanding when they *ſet*, or become ſolid, after being mixed with water. See PLASTER.

Gypſum by itſelf is very difficult of fuſion: yet if a piece of forged iron is ſurrounded with gypſum in a crucible, and urged with a vehement heat, that metal, though otherwiſe unfuſible, will be melted, and retain its malleability, though ſome ſay it aſſumes the nature of caſt iron. Another very remarkable property of gypſum is, that when mixed with chalk, clay, limeſtone, and ſome other unfuſible earths, they melt, in a heat not very great, into a yellowiſh glaſs. It is impoſſible, however, either to reduce this glaſs to a ſufficient degree of fineneſs and tranſparency by itſelf, or by means of it to give a good yellow colour to other glaſs.

GYR-FALCO, in zoology, the name of a large and fierce ſpecies of falcon called in Engliſh the *jer-falcon*. See FALCO.

It is a very bold and daring bird, attacking all other fowl without reſerve, particularly the heron and ſtork kinds. The other falcons are all afraid of this.

GYSHORN, a town of Germany in the duchy of Lunenburg, ſiturted on the river Aller, in E. Long. 10. 45. N. Lat. 52. 50.

H.

H, The eighth letter and ſixth conſonant in our alphabet; though ſome grammarians will have it to be only an aſpiration, or breathing. But nothing can be more ridiculous than to diſpute its being a diſtinct ſound, and formed in a particular manner by the organs of ſpeech, at leaſt in our language: witneſs the words *eat* and *heat*, *arm* and *harm*, *ear* and *hear*, *at* and *hat*, &c. as pronounced with or without the *h*.

It is pronounced by a ſtrong exſpiration of the breath between the lips, cloſing, as it were, by a gentle motion of the lower jaw to the upper, and the tongue nearly approaching the palate.

There ſeems to be no doubt, but that our *h*, which is the ſame with that of the Romans, derived its figure from that of the Hebrew ה. And, indeed, the Phœnicians, moſt ancient Greeks and Romans, uſed the ſame figure with our H, which in the ſeries of all theſe alphabets keeps its primitive place, being the eighth letter.

H, uſed as a numeral, denotes 200; and with a daſh over it, $\bar{H}$, 200,000.

As an abbreviation, H was uſed by the ancients to denote *homo*, *hæres*, *hora*, &c. Thus H. B. ſtood for *hæres bonorum*; and H. S. corruptly for L L S. ſeſterce; and H. A. for Hadrianus.

HAAG, or HAG, a town of the duchy of Bavaria in Germany, ſeated on a hill on the weſt ſide of the river Inn, in E. Long. 12. 23. N. Lat. 48. 16.

HABAKKUK, one of the twelve leſſer prophets, whoſe prophecies are taken into the canon of the Old

Teſtament. The name is wrote in the Hebrew with ח *hheth*; and ſignifies "a wreſtler." There is no preciſe time mentioned in ſcripture when this Habakkuk lived; but from his predicting the ruin of the Jews by the Chaldeans, it may be concluded, that he propheſied before Zedekiah, or about the time of Manaſſeh. He is reported to have been the author of ſeveral prophecies which are not extant: but thoſe that are indiſputably his, are contained in three chapters. In theſe the prophet complains very pathetically of the diſorders which he obſerved in the kingdom of Judæa. God reveals to him, that he would ſhortly puniſh them in a very terrible manner by the arms of the Chaldæans. He foretels the conqueſts of Nebuchadnezzar, his metamorphoſis, and death. He foretels, that the vaſt deſigns of Jehoiakim would be fruſtrated. He ſpeaks againſt a prince (probably the king of Tyre) who built with blood and iniquity; and he accuſes another king (perhaps the king of Egypt) of having intoxicated his friend, in order to diſcover his nakedneſs. The third chapter is a ſong or prayer to God, whoſe majeſty he deſcribes with the utmoſt grandeur and ſublimity of expreſſion.

HABAT, a province of Aſia, in Barbary, and in the kingdom of Fez. It is ſurrounded by the Mediterranean, the Straits of Gibraltar, and the Atlantic Ocean. The principal towns are Arzilla, Tetuan, and Ceuta; which laſt is in poſſeſſion of the Spaniards.

HABDALA, a ceremony of the Jews obſerved on the evening of the ſabbath, when every one of the family is come home. At that time they light a taper or lamp, with two wicks at leaſt. The maſter of the family then takes a cup, with ſome wine, mixed with fragrant ſpices, and having repeated a paſſage or two of ſcripture, as for example, "I will take the cup of ſalvation," &c. Pſal. cxvi. and "The Jews had light and gladneſs," &c. Eſth. viii. he bleſſes the wine and ſpices. Afterwards he bleſſes the light of the fire; and then caſts his eyes on his hands and nails, as remembering that he is going to work. The whole is intended to ſignify, that the ſabbath is over, and is from that moment divided from the day of labour which follows. For this reaſon the ceremony is called *Habdala*, which ſignifies "diſtinction." After the ceremony is over, and the company breaks up, they wiſh one another, not "a good night," but "a good week."

HABEAS CORPUS, in law, is the great remedy in caſes of *Falſe* IMPRISONMENT. The incapacity of the three other remedies referred to under that article, to give complete relief in every caſe, hath almoſt entirely antiquated them, and hath cauſed a general recourſe to be had, in behalf of perſons aggrieved by illegal impriſonment, to the preſent writ, the moſt celebrated in the Engliſh law. Of this there are various kinds made uſe of by the courts at Weſtminſter, for removing priſoners from one court into another for the more eaſy adminiſtration of juſtice. Such is the *habeas corpus ad reſpondendum*, when a man hath a cauſe of action againſt one who is confined by the proceſs of ſome inferior court; in order to remove the priſoner, and charge him with this new action in the court above. Such is that *ad ſatisfaciendum*, when a priſoner hath had judgment againſt him in an action, and the plaintiff is deſirous to bring him up to ſome ſuperior court to charge him with proceſs of execution.

Habeas corpus.

Such alſo are thoſe *ad proſequendum, teſtificandum, deliberandum*, &c.; which iſſue when it is neceſſary to remove a priſoner, in order to proſecute or bear teſtimony in any court, or to be tried in the proper juriſdiction wherein the fact was committed. Such is, laſtly, the common writ *ad faciendum et recipiendum*, which iſſues out of any of the courts of Weſtminſter-hall, when a perſon is ſued in ſome inferior juriſdiction, and is deſirous to remove the action into the ſuperior court; commanding the inferior judges to produce the body of the defendant, together with the day and cauſe of his caption and detainer (whence the writ is frequently denominated an *habeas corpus cum cauſa*) to *do and receive* whatſoever the king's court ſhall conſider in that behalf. This is a writ grantable of common right, without any motion in court; and it inſtantly ſuperſedes all proceedings in the court below. But, in order to prevent the ſurreptitious diſcharge of priſoners, it is ordered by ſtatute 1 & 2 P. & M. c. 13. that no *habeas corpus* ſhall iſſue to remove any priſoner out of any gaol, unleſs ſigned by ſome judge of the court out of which it is awarded. And, to avoid vexatious delays by removal of frivolous cauſes, it is enacted by ſtatute 21 Jac. I. c. 23. that, where the judge of an inferior court of record is a barriſter of three years ſtanding, no cauſe ſhall be removed from thence by *habeas corpus* or other writ, after iſſue or demurrer deliberately joined: that no cauſe, if once remanded to the inferior court by writ of *procedendo* or otherwiſe, ſhall ever afterwards be again removed: and that no cauſe ſhall be removed at all, if the debt or damages laid in the declaration do not amount to the ſum of five pounds. But an *expedient* having been found out to elude the latter branch of the ſtatute, by procuring a nominal plaintiff to bring another action for five pounds or upwards, (and then by the courſe of the court the *habeas corpus* removed both actions together), it is therefore enacted by ſtatute 12 Geo. I. c. 29. that the inferior court may proceed in ſuch actions as are under the value of five pounds, notwithſtanding other actions may be brought againſt the ſame defendant to a greater amount.

Blackſtone's Commentaries.

But the great and efficacious writ, in all manner of illegal confinement, is that of *habeas corpus ad ſubjiciendum*; directed to the perſon detaining another, and commanding him to produce the body of the priſoner, with the day and cauſe of his caption and detention, *ad faciendum, ſubjiciendum, et recipiendum*, to do, ſubmit to, and receive whatſoever the judge or court awarding ſuch writ ſhall conſider in that behalf. This is a high prerogative writ, and therefore by the common law iſſuing out of the court of king's bench not only in term-time, but alſo during the vacation, by a *fiat* from the chief juſtice, or any other of the judges, and running into all parts of the king's dominions: for the king is at all times entitled to have an account, why the liberty of any of his ſubjects is reſtrained, wherever that reſtraint may be inflicted. If it iſſues in vacation, it is uſually returnable before the judge himſelf who awarded it, and he proceeds by himſelf thereon; unleſs the term ſhould intervene, and then it may be returned in court. Indeed, if the party were privileged in the courts of common pleas and exchequer, as being an officer or ſuitor of the court, an *ha-*

beas corpus ad ſubjiciendum might alſo have been awarded from thence; and, if the cauſe of impriſonment were palpably illegal, they might have diſcharged him: but, if he were committed for any criminal matter, they could only have remanded him, or taken bail for his appearance in the court of king's bench; which occaſioned the common pleas to diſcountenance ſuch applications. It hath alſo been ſaid, and by very reſpectable authorities, that the like *habeas corpus* may iſſue out of the court of chancery in vacation: but, upon the famous application to lord Nottingham by Jenks, notwithſtanding the moſt diligent ſearches, no precedent could be found where the chancellor had iſſued ſuch a writ in vacation, and therefore his lordſhip refuſed it.

In the court of King's-bench it was, and is ſtill, neceſſary to apply for it by motion to the court, as in the caſe of all other prerogative writs (*certiorari*, prohibition, *mandamus*, &c.) which do not iſſue as of mere courſe, without ſhewing ſome probable cauſe why the extraordinary power of the crown is called in to the party's aſſiſtance. For, as was argued by lord chief juſtice Vaughan, "it is granted on motion, becauſe it cannot be had of courſe; and there is therefore no *neceſſity* to grant it: for the court ought to be ſatisfied that the party hath a probable cauſe to be delivered." And this ſeems the more reaſonable, becauſe (when once granted) the perſon to whom it is directed can return no ſatisfactory excuſe for not bringing up the body of the priſoner. So that, if it iſſued of mere courſe, without ſhewing to the court or judge ſome reaſonable ground for awarding it, a traitor or felon under ſentence of death, a ſoldier or mariner in the king's ſervice, a wife, a child, a relation, or a domeſtic, confined for inſanity or other prudential reaſons, might obtain a temporary enlargement by ſuing out an *habeas corpus*, though ſure to be remanded as ſoon as brought up to the court. And therefore Sir Edward Coke, when chief juſtice, did not ſcruple, in 13 Jac. I. to deny a *habeas corpus* to one confined by the court of admiralty for piracy; there appearing, upon his own ſhewing, ſufficient grounds to confine him. On the other hand, if a probable ground be ſhewn, that the party is impriſoned without juſt cauſe, and therefore hath a right to be delivered, the writ of *habeas corpus* is then a writ of right, which "may not be denied, but ought to be granted to every man that is committed, or detained in priſon, or otherwiſe reſtrained, though it be by the command of the king, the privy-council, or any other."

In the articles Liberty and Rights, we expatiated at large on the perſonal liberty of the ſubject. This was ſhewn to be a natural inherent right, which could not be ſurrendered or forfeited unleſs by the commiſſion of ſome great and atrocious crime, and which ought not to be abridged in any caſe without the ſpecial permiſſion of law. A doctrine coeval with the firſt rudiments of our conſtitution; and handed down to us from the Anglo-Saxons, notwithſtanding all their ſtruggles with the Danes, and the violence of the Norman conqueſt: aſſerted afterwards and confirmed by the conqueror himſelf and his deſcendants: and though ſometimes a little impaired by the ferocity of the times, and the occaſional deſpotiſm of jealous or uſurping princes, yet eſtabliſhed on the firmeſt baſis by the proviſions of *magna charta*, and a long ſucceſſion of ſtatutes enacted under Edward III. To aſſert an abſolute exemption from impriſonment in all caſes, is inconſiſtent with every idea of law and political ſociety; and in the end would deſtroy all civil liberty, by rendering its protection impoſſible: but the glory of the Engliſh law conſiſts in clearly defining the times, the cauſes, and the extent, when, wherefore, and to what degree, the impriſonment of the ſubject may be lawful. This it is, which induces the abſolute neceſſity of expreſſing upon every commitment the reaſon for which it is made; that the court, upon an *habeas corpus*, may examine into its validity; and according to the circumſtances of the caſe may diſcharge, admit to bail, or remand the priſoner.

Blackſtone's Commentaries.

And yet, early in the reign of Charles I. the court of king's-bench, relying on ſome arbitrary precedents (and thoſe perhaps miſunderſtood), determined* that they could not upon an *habeas corpus* either bail or deliver a priſoner, though committed without any cauſe aſſigned, in caſe he was committed by the ſpecial command of the king, or by the lords of the privy-council. This drew on a parliamentary inquiry, and produced the *petition of right*, 3 Car. I. which recites this illegal judgment, and enacts that no freeman hereafter ſhall be ſo impriſoned or detained. But when, in the following year, Mr Selden and others were committed by the lords of the council, in purſuance of his majeſty's ſpecial command, under a general charge of "notable contempts and ſtirring up ſedition againſt the king and government," the judges delayed for two terms (including alſo the long vacation) to deliver an opinion how far ſuch a charge was bailable. And, when at length they agreed that it was, they however annexed a condition of finding ſureties for the good behaviour, which ſtill protracted their impriſonment; the chief juſtice Sir Nicholas Hyde, at the ſame time declaring†, that "if they were again remanded for that cauſe, perhaps the court would not afterwards grant a *habeas corpus*, being already made acquainted with the cauſe of the impriſonment." But this was heard with indignation and aſtoniſhment by every lawyer preſent; according to Mr Selden's own account of the matter, whoſe reſentment was not cooled at the diſtance of four and twenty years.

Theſe pitiful evaſions gave riſe to the ſtatute 16 Car. I. c. 10. §. 8. whereby it is enacted, that if any perſon be committed by the king himſelf in perſon, or by his privy council, or by any of the members thereof, he ſhall have granted unto him, without any delay upon any pretence whatſoever, a writ of *habeas corpus*, upon demand or motion made to the court of king's bench or common-pleas; who ſhall therupon, within three court-days after the return is made, examine and determine the legality of ſuch commitment, and do what to juſtice ſhall appertain, in delivering, bailing, or remanding ſuch priſoner. Yet ſtill in the caſe of Jenks, before alluded to, who in 1676 was committed by the king in council for a turbulent ſpeech at Guildhall, new ſhifts and devices were made uſe of to prevent his enlargement by law; the chief juſtice (as well as the chancellor) declining to award a writ of *habeas corpus ad ſubjiciendum* in vacation, though

* *State Trials*, viii. 136.

† *Ibid.* 24

though at laſt he thought proper to award the uſual writs *ad deliberandum*, &c. whereby the priſoner was diſcharged at the Old Bailey. Other abuſes had alſo crept into daily practice, which had in ſome meaſure defeated the benefit of this great conſtitutional remedy. The party impriſoning was at liberty to delay his obedience to the firſt writ, and might wait till a ſecond and a third, called an *alias* and a *pluries*, were iſſued, before he produced the party: and many other vexatious ſhifts were practiſed to detain ſtate-priſoners in cuſtody. But whoever will attentively conſider the Engliſh hiſtory may obſerve, that the flagrant abuſe of any power, by the crown or its miniſters, has always been productive of a ſtruggle; which either diſcovers the exerciſe of that power to be contrary to law, or (if legal) reſtrains it for the future. This was the caſe in the preſent inſtance. The oppreſſion of an obſcure individual gave birth to the famous *habeas corpus* act, 31 Car. II. c. 2. which is frequently conſidered as another *magna carta* of the kingdom; and by conſequence has alſo in ſubſequent times reduced the method of proceeding on theſe writs (though not within the reach of that ſtatute, but iſſuing merely at the common law) to the true ſtandard of law and liberty.

The ſtatute itſelf enacts, 1. That the writ ſhall be returned and the priſoner brought up, within a limited time according to the diſtance, not exceeding in any caſe twenty days. 2. That ſuch writs ſhall be endorſed, as granted in purſuance of this act, and ſigned by the perſon awarding them. 3. That on complaint and requeſt in writing by or on behalf of any perſon committed and charged with any crime (unleſs committed for treaſon or felony expreſſed in the warrant, or for ſuſpicion of the ſame, or as acceſſory thereto before the fact, or convicted or charged in execution by legal proceſs) the lord chancellor or any of the twelve judges, in vacation, upon viewing a copy of the warrant, or affidavit that a copy is denied, ſhall (unleſs the party has neglected for two terms to apply to any court for his enlargement) award a *habeas corpus* for ſuch priſoner, returnable immediately before himſelf or any other of the judges; and upon the return made ſhall diſcharge the party, if bailable, upon giving ſecurity to appear and anſwer to the accuſation in the proper court of judicature. 4. That officers and keepers neglecting to make due returns, or not delivering to the priſoner or his agent within ſix hours after demand a copy of the warrant of commitment, or ſhifting the cuſtody of a priſoner from one to another without ſufficient reaſon or authority (ſpecified in the act) ſhall for the firſt offence forfeit 100 l. and for the ſecond offence 200 l. to the party grieved, and be diſabled to hold his office. 5. That no perſon, once delivered by *habeas corpus*, ſhall be recommitted for the ſame offence, on penalty of 500 l. 6. That every perſon committed for treaſon or felony ſhall, if he requires it the firſt week of the next term or the firſt day of the next ſeſſion of *oyer* and *terminer*, be indicted in that term or ſeſſion, or elſe admitted to bail; unleſs the king's witneſſes cannot be produced at that time: and if acquitted, or if not indicted and tried in the ſecond term or ſeſſion, he ſhall be diſcharged from his impriſonment for ſuch imputed offence: but that no perſon, after the aſſiſes ſhall be opened for the county in which he is detained, ſhall be removed by *habeas corpus*, till after the aſſiſes are ended; but ſhall be left to the juſtice of the judges of aſſiſe. 7. That any ſuch priſoner may move for and obtain his *habeas corpus*, as well out of the chancery or exchequer, as out of the king's bench or common pleas; and the lord chancellor or judges denying the ſame, on ſight of the warrant or oath that the ſame is refuſed, forfeit ſeverally to the party grieved the ſum of 500 l. 8. That the writ of *habeas corpus* ſhall run into the counties palatine, cinque ports, and other privileged places, and the iſlands of Jerſey and Guernſey. 9. That no inhabitant of England (except perſons contracting, or convicts praying, to be tranſported; or having committed ſome capital offence in the place to which they are ſent) ſhall be ſent priſoner to Scotland, Ireland, Jerſey, Guernſey, or any places beyond the ſeas, within or without the king's dominions: on pain that the party committing, his adviſers, aiders, and aſſiſtants, ſhall forfeit to the party grieved a ſum not leſs than 500 l. to be recovered with treble coſts; ſhall be diſabled to bear any office of truſt or profit; ſhall incur the penalties of *præmunire*; and ſhall be incapable of the king's pardon.

This is the ſubſtance of that great and important ſtatute: which extends (we may obſerve) only to the caſe of commitments for ſuch criminal charge as can produce no inconvenience to public juſtice by a temporary enlargement of the priſoner: all other caſes of unjuſt impriſonment being left to the *habeas corpus* at common law. But even upon writs at the common law it is now expected by the court, agreeable to ancient precedents and the ſpirit of the act of parliament, that the writ ſhould be immediately obeyed, without waiting for any *alies* or *pluries*; otherwiſe an attachment will iſſue. By which admirable regulations, judicial as well as parliamentary, the remedy is now complete for removing the injury of unjuſt and illegal confinement. A remedy the more neceſſary, becauſe the oppreſſion does not always ariſe from the ill-nature, but ſometimes from the mere inattention, of government. For it frequently happens in foreign countries, (and has happened in England during the temporary ſuſpenſions of the ſtatute), that perſons apprehended upon ſuſpicion have ſuffered a long impriſonment, merely becauſe they were forgotten.

HABICOT (Nicholas), a celebrated ſurgeon, born at Bonny in Gatinois, acquired great reputation by his ſkill in his profeſſion, and by his works; and died in 1624. He wrote a treatiſe on the plague, and ſeveral other curious works.

HABINGTON (William), an Engliſh poet and hiſtorian, was the ſon of Thomas Habington, Eſq. He was born in 1605, at Hendlip in Worceſterſhire; and was educated at St Omers and at Paris. He died in 1654, and left ſeveral manuſcripts in the hands of his ſon. His printed works are, 1. Poems under the title of *Caſtura*. 2. The queen of Arragon, a tragi-comedy. 3. Obſervations upon Hiſtory. 4. The hiſtory of Edward IV. king of England, written and publiſhed at the deſire of Charles I. This work is compoſed in a very florid ſtyle.

HABIT, in philoſophy, an aptitude or diſpoſition either of mind or body, acquired by a frequent repetition of the ſame act. See Custom *and Habit.*

Habit is alſo uſed for a dreſs or garb, or the compoſition of garments, wherewith a perſon is covered; in which ſenſe we ſay, the habit of an eccleſiaſtic, of a religious, &c. a military habit, &c.

HABITE *and* Repute, in Scots law, the common opinion of the people, among whom a perſon lives, with reſpect to any circumſtance relating to him.

HABITUDE, among ſchoolmen, the reſpect or relation one thing bears to another. See Relation.

HABSBURG, or Hapsburg, an ancient caſtle of Swiſſerland, in the canton of Bern. It is the place where the ancient counts of Hapſburg reſided, and is ſeated near the lake of Lucern, and to the eaſt of the town of that name. E. Long. 8. 10. N. Lat. 47. 22.

HACHA, a ſea-port town of South America, in Terra Firma, ſeated at the mouth of a river of the ſame name. Here the Spaniſh galleons touch at their arrival in South America, from whence expreſſes are ſent to all the ſettlements to give them notice of it. W. Long. 72. 0. N. Lat. 11. 30.

HACKET (John), biſhop of Litchfield and Coventry, was born in 1592. In 1623, he was made chaplain to James I. and prebendary of Lincoln: and ſoon after obtained the rectory of St Andrew's Holborn, with that of Cheam in Surrey; his patron telling him, he intended Holborn for wealth, and Cheam for health. In 1642 he was preſented to a prebendary and reſidentiary; but was deprived of the enjoyment of them, as well as of St Andrew's, by the enſuing troubles. He then lived retired at Cheam with little diſturbance, until he recovered his preferments by the reſtoration of Charles II. by whom he was preferred to the ſee of Litchfield and Coventry in 1661. Finding the beautiful cathedral of Litchfield almoſt battered to the ground, he in eight years finiſhed a complete church ſuperior to the former, at his own expence of 20,000 l. excepting 1000 l. he had from the dean and chapter, with what he could procure from private benefactors. He laid out 1000 l. on a prebendal houſe, his palaces at Litchfield and Eccleſhall having been demoliſhed during the civil wars: and beſide theſe acts of munificence, left ſeveral other benefactions at his death in 1670. He publiſhed before he entered into orders, a comedy entitled *Loyola,* which was twice acted before king James I. After his death there appeared a "Century of his ſermons on ſeveral remarkable ſubjects," in folio; and "The life of archbiſhop Williams," in folio, which was abridged in 1700 by Ambroſe Philips.

HACKNEY-coaches, thoſe expoſed to hire in the ſtreets of London, and ſome other great cities, at rates fixed by authority. See Coach.—Theſe firſt began to ply in the ſtreets of London, or rather waited at inns, in the year 1625, and were only 20 in number; but in 1635 they were ſo much increaſed, that king Charles iſſued out an order of council for reſtraining them. In 1637, he allowed 50 hackney-coachmen, each of whom might keep 12 horſes. In 1652, their number was limited to 200; and in 1654, it was extended to 300. In 1661, 400 were licenſed, at 5 l. annually for each. In 1694, 700 were allowed, and taxed by the 5 and 6 of W. & M. at 4 l. *per annum* each. By 9 Anne cap. 23. 800 coaches were allowed in London and Weſtminſter; but by 8 Geo. III. cap. 24. the number is increaſed to 1000, which are to be licenſed by commiſſioners, and to pay a duty of 5 ſh. *per* week to the king. On Sundays there were formerly only 175 hackney-coaches to ply, which were to be appointed by commiſſioners; but their number is now unlimited.

The fare of hackney coachmen in London, or within ten miles of the city, is 12 ſhillings and ſixpence per day, allowing 12 hours per day. By the hour it is 1s. 6d. for the firſt, and 1s. for every hour after; and none are obliged to pay above 1s. for any diſtance not exceeding a mile and a half; or above 1s. 6d. for any diſtance not exceeding two miles. Where hackney coachmen refuſe to go at, or exact more than, their limited hire, they are ſubject to a forfeit not under 10s. nor exceeding 3l. and which the commiſſioners have power to determine. Every hackney-coach muſt be provided with cheque ſtrings, and every coachman plying without them incurs a penalty of 5s.—Drivers of hackney-coaches are to give way to perſons of quality and gentlemens coaches, under the penalty of 5 l.

The duty ariſing from licences to hackney-coaches and chairs in London, forms a branch of the king's extraordinary and perpetual revenue *. This revenue is governed by commiſſioners of its own, and is in truth a benefit to the ſubject; as the expence of it is felt by no individual, and its neceſſary regulations have eſtabliſhed a competent juriſdiction, whereby a very refractory race of men may be kept in ſome tolerable order.

HADDINGTON, a borough-town of Scotland, in Eaſt Lothian, which ſends one member to parliament. It is ſurrounded with many ſeats of nobility and gentry. It is about 17 miles E. of Edinburgh. W. Long. 2. 25. N. Lat. 55. 50.

HADDOCK, the Engliſh name of a ſpecies of Gadus.

HADDON (Dr Walter), a great reſtorer of the learned languages in England, was born in 1516. He diſtinguiſhed himſelf particularly by writing Latin in a fine ſtyle, which he acquired by a conſtant ſtudy of Cicero. He was a ſtrenuous promoter of the reformation under king Edward; and was therefore thought a proper perſon to ſucceed biſhop Gardiner in the maſterſhip of Trinity-hall, Cambridge, on his deprivation. He lay concealed during the reign of queen Mary; but acquired the favour of Elizabeth, who conſtituted him one of the maſters of the court of requeſts, and ſent him one of the three agents to Bruges in 1566, to reſtore commerce between England and the Netherlands. He was alſo engaged with Sir John Cheke in drawing up in Latin that uſeful code of eccleſiaſtical law, publiſhed in 1571 by the learned John Fox, under the title of *Reformatio legum eccleſiaſticarum;* his other works are collected and publiſhed under the title of *Lucubrations.* He died in 1572.

HADERSLEBEN, a ſea-port town of Denmark, in the duchy of Sleſwick, with a ſtrong citadel, built upon a ſmall iſland. It is ſeated on a bay of the Baltic Sea, and has a well-frequented harbour. E. Lon. 9. 35. N. Lat. 55. 24.

HADLEY,

* See
nue.

HADLEY, a town in Suffolk, ſeated in a bottom on the river Preſton. It conſiſts of about 600 houſes; with a very handſome church, a chapel of eaſe, and a Preſbyterian meeting-houſe. The ſtreets are pretty broad, but not paved. Large quantities of yarn are ſpun here for the Norwich manufacture; and this town had once a conſiderable woollen manufacture, which is now decayed. E. Lon. 1. 0. N. Lat. 52. 7.

HADRIAN. See ADRIAN.

HÆMAGOGOS, among phyſicians, a compound medicine, conſiſting of fetid and aromatic ſimples mixed with black hellebore, and preſcribed in order to promote the menſtrua and hæmorrhoidal fluxes; as alſo to bring away the lochia.

HÆMANTHUS, the BLOOD-FLOWER; a genus of the monogynia order, belonging to the hexandria claſs of plants.

Species. 1. The coccineus, with plain tongue-ſhaped leaves, riſes about a foot high, with a ſtalk ſupporting a cluſter of bright red tubulous flowers. It hath a large bulbous root, from which in the autumn comes out two broad flat leaves of a fleſhy conſiſtence, ſhaped like a tongue, which turn backward on each ſide, and ſpread on the ground, ſo that they have a ſtrange appearance all the winter. In the ſpring theſe decay; ſo that from May to the beginning of Auguſt they are deſtitute of leaves. The flowers are produced in the autumn juſt before the leaves come out. 2. The carinatus with keel-ſhaped leaves, has a taller ſtalk and paler flowers than the former; its leaves are not flat, but hollowed like the keel of a boat. 3. The puniceus, with large ſpear-ſhaped waved leaves, grows about a foot high, and hath flowers of a yellowiſh red colour. Theſe are ſucceeded by berries, which are of a beautiful red colour when ripe.

Culture. All theſe plants are natives of the Cape of Good Hope, and do not propagate very faſt in Europe, their roots ſeldom putting forth many off-ſets. The beſt method of managing them is to have a bed of good earth in a bricked pit, where they may be covered with glaſſes, and in hard froſts with mats and ſtraw. The earth in the frame ſhould be two feet deep, and the frame ſhould riſe two feet above the ſurface, to allow height for the flower-ſtems to grow. The roots ſhould be planted nine or ten inches aſunder; and in winter, if they are protected from froſt, and not ſuffered to have too much wet, but in mild weather expoſed to the air, they will flower every year, and the flowers will be much ſtronger than with any other management. The third ſort requires to be conſtantly kept in a dry ſtove.

HÆMATITES, or BLOOD-STONE, a hard mineral ſubſtance, red, black, or purple, but the powder of which is always red. It is found in maſſes ſometimes ſpherical, ſemi-ſpherical, pyramidal, or cellular, that is like a honeycomb. It contains a large quantity of iron. Forty pounds of this metal have been extracted from a quintal of the ſtone; but the iron is of ſuch a bad quality, that this ore is not commonly ſmelted. The great hardneſs of hæmatites renders it fit for burniſhing and poliſhing metals.

HÆMATOPUS, the SEA-PYE, in ornithology, a genus belonging to the order of grallæ. The beak is compreſſed, with an equal wedge-ſhaped point; the noſtrils are linear; and the feet have three toes without nails. There is but one ſpecies, viz. the aſtralegus, a native of Europe and America. It feeds upon ſhell-fiſh near the ſea-ſhore.

HÆMATOXYLUM, LOGWOOD, or *Campeachy Wood*; a genus of the monogynia order, belonging to the decandria claſs of plants.

Species. Of this genus there is only one ſpecies, viz. the campechianum, which grows naturally in the bay of Campeachy at Honduras, and other parts of the Spaniſh Weſt-Indies *, where it riſes from 16 to 24 feet high. The ſtems are generally crooked, and very deformed; and ſeldom thicker than a man's thigh. The branches which come out on each ſide are crooked, irregular, and armed with ſtrong thorns, garniſhed with winged leaves, compoſed of three pair of obſcure lobes indented at the top. The flowers come in a racemus from the wings of the leaves ſtanding erect, and are of a pale yellowiſh colour, with a purple empalement. They are ſucceeded by flat oblong pods, each containing two or three kidney-ſeeds.

Culture. The ſeeds, which are frequently brought from America, will readily grow if ſown upon a good hot-bed in this country, and will thrive very well if kept conſtantly in a good degree of heat in the back-ſtove.

Uſes. The logwood is uſed in great quantities for dying purple, but eſpecially black colours. All the colours, however, which can be prepared from it, are of a fading nature, and cannot by any art be made equally durable with thoſe prepared from ſome other materials. Of all the colours prepared from logwood, the black is the moſt durable. Dr Lewis recommends it as an ingredient in making ink. "In dyeing cloth, (ſays he,) vitriol and galls, in whatever proportions they are uſed, produce only browns of different ſhades: I have often been ſurpriſed that with theſe capital materials of the black dye I never could obtain any true blackneſs in white cloth, and attributed the failure to ſome unheeded miſmanagement in the proceſs, till I found it to be a known fact among the dyers. Logwood is the material which adds blackneſs to the vitriol and gall-brown; and this black dye, though not of the moſt durable kind, is the moſt common. On blue cloth a good black may be dyed by vitriol and galls alone; but even here, an addition of Logwood contributes not a little to improve the colour."——Mr Delaval, however, in his Eſſay on Colours, informs us, that with an infuſion of galls and iron-filings, he not only made an exceeding black and durable ink, but alſo dyed linen cloth of a very deep black. See COLOUR-*Making*, n° 12, 13, 14.; DYEING, n° 17.; and INK. Logwood is alſo found to have a conſiderable aſtringent virtue as a medicine, and an extract of it is ſometimes given with great ſucceſs in diarrhœas.

HÆMOPTYSIS, HÆMAPTYSIS, or *Hæmoptöe*; a ſpitting of blood. See (*Index* ſubjoined to) MEDICINE.

HÆMORRHOIDAL, an appellation given by anatomiſts to the arteries and veins going to the inteſtinum rectum.

HÆMORRHOIDS, or PILES, an hæmorrhage, or iſſue of blood from the hæmorrhoidal veſſels. (See (*Index* ſubjoined to) MEDICINE.

HAERLEM. See HARLEM.

HAG, in zoology. See MYXINE.

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* See *Campeachy*.

HAGAI, a canonical book of the Old Teſtament, ſo called from the prophet of that name, who, in all probability was born at Babylon, from whence he returned with Zerubbabel.

This prophet, by the command of God, exhorted the Jews, after their return from the captivity, to finiſh the rebuilding of the temple, which they had intermitted for 14 years. His remonſtrances had the deſired effect; and to encourage them to proceed in the work, he aſſured them from God, that the glory of this latter houſe ſhould be greater than the glory of the former: which was accordingly fulfilled, when Chriſt honoured it with his preſence; for, with reſpect to the building, this latter temple was nothing in compariſon with the former.

HAGEDORN (Frederick de), a celebrated German poet, was born at Hamburg, where his father was reſident for the king of Denmark, in 1708. He finiſhed his ſtudies at Jena; and, in 1728, publiſhed a number of poetical pieces in Germany, which were well received. He afterwards came to England, where he obtained the friendſhip of many of the learned; and, at his return, was made ſecretary to the Engliſh Hamburgh company, a lucrative employment that left him ſufficient time for cultivating the muſes. In 1738, he publiſhed his Fables and Tales, the firſt collection of the kind of which Germany can boaſt. He afterwards publiſhed other pieces of poetry of different kinds, as Moral Poems, Epigrams, and five books of Songs: which of all his poetical pieces are moſt eſteemed. He died in 1754.

HAGENAU, a town of Germany, and capital of a bailiwick of the ſame name, which was formerly imperial, but now belongs to the French. It was taken by them in 1673; the Imperialiſts retook it in 1702; after which it was ſeveral times taken and retaken by both parties; but at laſt the French got poſſeſſion of it in 1706. It is divided by the river Motter into two parts; and is ſeated near a foreſt of its own name, in E. Long. 7. 53. N. Lat. 48. 49.

HAGIOGRAPHA, or "holy writings;" a name given to a particular diviſion of the Old Teſtament, as containing hymns to God, and moral precepts for the conduct of life. The books diſtinguiſhed by this term were the Pſalms, Proverbs, Eccleſiaſtes, and the Song of Solomon.

HAGUE, a town of the United Provinces, in Holland, ſituated in E. Long. 4. 10. N. Lat. 48. 49. —In Latin it is called *Haga Comitis;* in French, *La Haye;* in Dutch *der Haag*, or *'S-Graavenhage*, i. e. the Earl's Grove or Wood, from the wood near which it is built, and in which the earls of Holland had a country-houſe. Though it ſends no deputies to the ſtates, it is one of the moſt conſiderable towns in Holland, pleaſantly ſituated, and exceeding beautiful. It may indeed compare with almoſt any city in Europe, though geographers account it but a village. The inhabitants alſo breathe a better air than thoſe of the other cities, as it ſtands on a dry ſoil, ſomewhat higher than the reſt of the country. It has no gates or walls, but is ſurrounded by a moat over which there are many draw-bridges. Two hours are required to walk round it, and it contains about 40,000 or 50,000 ſouls. It is a place of much ſplendor and buſineſs, being the ſeat of the high colleges of the republic and province of Holland, and the reſidence of the ſtadtholder and foreign ambaſſadors; and there are a great many fine ſtreets and ſquares in it. In the inner court all the high colleges and courts of juſtice hold their aſſemblies: there alſo the foot-guards do duty, as the horſe-guards in the outer, when the ſtates are ſitting. De Plaats is an open airy place, in form of a triangle, adorned with neat and beautiful buildings: the Vyverberg is an eminence, laid out into ſeveral fine ſhady walks, with the Vyver, a large baſon of water, at the bottom: the Voorhout is the moſt celebrated part of the Hague, and conſiſts of the mall, and three ways for coaches on each ſide, planted with trees, being much the ſame as St James's park at London: the palace of Opdam, or Waſſenaar, is built in a very elegant taſte: the prince and princeſs grafts are fine ſtreets: the plain, in Dutch *Het Pleyn*, is a beautiful grove, laid out in ſeveral croſs walks, and ſurrounded with ſtately houſes. The Jewiſh ſynagogue is well worth being ſeen by a curious traveller; and alſo the palaces of the prince of Orange, the hotel of Spain, the new Woorhout, the mauſoleum of the baron of Opdam in the great church, and the ſeveral hoſpitals. The environs of the Hague are exceedingly pleaſant. Among other agreeable objects are the wood, with the palace of Orange at the extremity of it, called the *houſe in the wood;* the village of Scheveling; and the ſand-hills along the north-ſea; with the village of Voorburg, and the charming ſeats and fine gardens round it. Two miles from the Hague is Ryſwick, a village; and, a quarter of a mile from that, a noble palace belonging to the prince of Orange, famous for the treaty of peace concluded there in 1697. Looſduynen, where Margaret, counteſs of Henneburg, and daughter of Florence IV. count of Holland and Zealand, is ſaid to have been delivered of 365 children at a birth, in 1276, is about five miles from the Hague. Five miles beyond Looſduynen, and not far from the beautiful village of Graveſande, is Honſlardyck, another palace belonging to the prince of Orange, and one of the fineſt ſtructures in the Low-Countries.

HAHN (Simon Frederick), a celebrated German hiſtorian. At ten years of age he was not only far advanced in the Latin, but underſtood ſeveral living languages. Four years after, he pronounced a ſpeech on the origin of the cloyſter at Bergen, the place of his birth, which was printed with ſome other pieces; and in 1708 he publiſhed a *Continuation of Meibomius's Chronicle of Bergen*. After having for ſeveral years given public lectures at Hall, he became, at the age of 24, profeſſor of hiſtory at Helmſtadt; and was at length counſellor, hiſtoriographer, and librarian, to the king of Great Britain, elector of Hanover. He died in 1729, aged 37.—Beſides the above, and ſome other works, he wrote, 1. The firſt volume of the *Hiſtory of the Empire*. 2. *Collectio monumentorum veterum et recentium ineditorum*, 2 vols 8vo.

HAIL, in natural hiſtory, a meteor generally defined frozen rain, but differing from it in that the hailſtones are not formed of ſingle pieces of ice, but of many little ſpherules agglutinated together. Neither are theſe ſpherules all of the ſame conſiſtence; ſome of them being hard and ſolid like perfect ice; others ſoft, and moſtly like ſnow hardened by a ſevere froſt. Sometimes

times the hailſtone hath a kind of core of this ſoft matter; but more frequently the core is ſolid and hard, while the outſide is formed of a ſofter matter. Hailſtones aſſume various figures, being ſometimes round, at other times pyramidal, crenated, angular, thin, and flat, and ſometimes ſtellated, with ſix radii like the ſmall cryſtals of ſnow.

Natural hiſtorians furniſh us with various accounts of ſurpriſing ſhowers of hail, in which the hailſtones were of extraordinary magnitude. Mezeray, ſpeaking of the war of Louis XII. in Italy, in the year 1510, relates, that there was for ſome time an horrible darkneſs, thicker than that of night; after which the clouds broke into thunder and lightning, and there fell a ſhower of hailſtones, or rather (as he calls them) pebble-ſtones, which deſtroyed all the fiſh, birds, and beaſts of the country.—It was attended with a ſtrong ſmell of ſulphur; and the ſtones were of a bluiſh colour, ſome of them weighing an hundred pounds. *Hiſt. de France*, Tom. II. p. 339.

At Liſle in Flanders, in 1686, fell hailſtones of a very large ſize; ſome of which contained in the middle a dark brown matter, which, thrown on the fire, gave a very great report. *Philoſoph. Tranſact.* N° 203.

Dr Halley and others alſo relate, that in Cheſhire, Lancaſhire, &c. April 29, 1697, a thick black cloud, coming from Carnarvonſhire, diſpoſed the vapours to congeal in ſuch a manner, that for about the breadth of two miles, which was the limit of the cloud, in its progreſs for the ſpace of 60 miles, it did inconceivable damage; not only killing all ſorts of fowls and other ſmall animals, but ſplitting trees, knocking down horſes and men, and even ploughing up the earth; ſo that the hailſtones buried themſelves under ground an inch, or an inch and a half deep. The hailſtones, many of which weighed five ounces, and ſome half a pound, and being five or ſix inches about, were of various figures; ſome round, others half round; ſome ſmooth, others emboſſed and crenated: the icy ſubſtance of them was very tranſparent and hard, but there was a ſnowy kernel in the middle of them.

In Hertfordſhire, May 4. the ſame year, after a ſevere ſtorm of thunder and lightning, a ſhower of hail ſucceeded, which far exceeded the former: ſome perſons were killed by it, their bodies beat all black and blue; vaſt oaks were ſplit, and fields of rye cut down as with a ſcythe. The ſtones meaſured from 10 to 13 or 14 inches about. Their figures were various, ſome oval, others picked, ſome flat. *Philoſoph. Tranſ.* N° 229.

It is remarkable, that, far as we know, hail is a meteor which never produces any beneficial effect. The rain and dew invigorate and give life to the whole vegetable tribe; the froſt, by expanding the water contained in the earth, pulveriſes and renders the ſoil fertile; ſnow covers and preſerves the tender vegetables from being deſtroyed by too ſevere a froſt. But hail does none of all theſe. In winter, it lies not ſufficiently cloſe to cover vegetables from the nipping froſts; and in ſpring and ſummer it not only has a chilling and blaſting effect from its coldneſs, but often does great damage to the more tender plants by the weight of the ſtones, and in great hail-ſtorms the damage done in this manner is prodigious.

Hail is one of the natural phenomena for which it is almoſt impoſſible to account in any ſatisfactory manner. It is certain, that on the tops of mountains hailſtones, as well as drops of rain, are very ſmall, and continually increaſe in bulk till they reach the lower grounds. It would ſeem, therefore, that during their paſſage through the air, they attract the congealed vapour which increaſes them in ſize. But here we are at a loſs how they come to be ſolid hard bodies, and not always ſoft, and compoſed of many ſmall ſtars like ſnow. The flakes of ſnow, no doubt, increaſe in ſize as they deſcend, as well as the drops of rain or hail-ſtones; but why ſhould the one be in ſoft cryſtals, and the other in large hard lumps, ſeeing both are produced from congealed vapour? Some modern philoſophers aſcribe the formation of hail to electricity. Signior Beccaria ſuppoſes hail to be formed in the higher regions of the air, where the cold is intenſe, and where the electric matter is very copious. In theſe circumſtances, a great number of particles of water are brought near together, where they are frozen, and in their deſcent collect other particles, ſo that the denſity of the ſubſtance of the hailſtone grows leſs and leſs from the centre; this being formed firſt in the higher regions, and the ſurface being collected in the lower. Agreeable to this, it is obſerved, that, in mountains, hail-ſtones, as well as drops of rain, are very ſmall, there being but little ſpace through which they can fall and increaſe their bulk. Drops of rain and hail alſo agree in this, that the more intenſe the electricity that forms them, the larger they are. Motion is known to promote freezing, and ſo the rapid motion of the electrified clouds may produce that effect. A more intenſe electricity alſo, he thinks, unites the particles of hail more cloſely than the more moderate electricity does thoſe of ſnow. In like manner we ſee thunder-clouds more denſe than thoſe that merely bring rain; and the drops of rain are larger in proportion, though they fall not from ſo great a height.

HAILING, the ſalutation or accoſting of a ſhip at a diſtance, either at ſea, or in a harbour. The uſual expreſſion is, "Hoa, the ſhip ahoay!" To which ſhe anſwers, "Holloa! Whence came ye? Where are ye bound? Good voyage! What cheer? All well! How fare ye?" &c.

HAILLAN (Bernard de Girard, lord of), a celebrated French hiſtorian. After having made ſome figure in the literary world, and as a tranſlator, he applied himſelf to hiſtory with ſuch ſucceſs, that in 1571, Charles IX. made him hiſtoriographer of France. His hiſtory of France extends from Pharamon to the death of Charles VII. and is the firſt complete hiſtory of that kingdom compoſed in the French tongue. He was honoured by Henry III. with ſeveral marks of favour; and propoſed to continue his hiſtory to the reign of Henry IV. but did not perform his promiſe. He died at Paris in 1610.

HAIMSUCKEN, ſee HAMESECKEN.

HAINAN, a conſiderable iſland of Aſia, ſituated in between 18° and 20° N. Lat. It belongs to China; and lies to the north of the Gulf of Cochin China, and about twelve miles ſouth from the province of Canton. It is about 400 miles in circumference. The ſoil of the northern parts is level, but the ſouthern and eaſtern ones are mountainous; among which ſome of the valleys produce two crops of rice every year. The inhabitants are generally ſhort, deformed ſavages, of a reddiſh colour. In the interior parts of the iſland they have not ſubmitted to the Chineſe; but they are great cowards, and 50 Chineſe will put 100 of them to flight. There are mines of gold and lapis lazuli, which laſt is carried to Canton to paint the porcelain. This iſland produces the ſame fruits as China, beſides ſugar, tobacco, cotton, and indigo.

HAINAULT, a province of the Netherlands, belonging partly to France and partly to the houſe of Auſtria. It is bounded to the ſouth by Champagne and Picardy, to the north by Flanders, to the eaſt by the duchy of Brabant, the county of Namur, and the biſhopric of Liege; and to the weſt by Artois and Flanders. Its extent from north to ſouth is about 45 miles, and about 48 from eaſt to weſt. The air is pleaſant and temperate, and the ſoil fruitful: it abounds in rich paſtures, corn-fields, woods, and foreſts, coal, iron, lead, beautiful marble, ſlate, and other uſeful ſtones: it is well watered by rivers and lakes, and breeds abundance of black cattle, and ſheep, whoſe wool is very fine. Its principal rivers are the Schelde, the Selle, and the Dender. This province is reckoned to contain 24 walled towns, 950 villages, one duchy, and ſeveral principalities, earldoms, peerdoms, and baronies. The abbeys in it are 27. For ſpiritual matters, the greater part of it is ſubject to the archbiſhop of Cambray, and the reſt to the biſhops of Liege and Arras. The ſtates of the province conſiſt of the clergy, nobility, and commoners. The clergy are the abbots, deputies of the chapters, and rural deans; but the chapters of St Waudru and St. Germain, in Mons, ſend no deputies, as they contribute nothing to the public taxes. The nobility conſiſt of the earls and barons, and all thoſe who, by their birth, have a right to a ſeat in the aſſembly of the ſtates. The commoners are compoſed of the deputies of the towns. The clergy in this county are uncommonly rich. The ſtates meet only when they are ſummoned by the ſovereign; but there is a ſtanding committee at Mons, which meets weekly. This county had counts of its own, till the year 1436; when Philip the Good, duke of Burgundy, arrived to the poſſeſſion of it, upon the death of Jaqueline, the heireſs, without iſſue. The French acquired that part of it which they poſſeſs, partly by the peace of the Pyrenees, and partly by thoſe of Nimeguen and Reſwyck. The arms of this county are quartered, and contain four lions, in a field *or*. For the government of it, there is a ſovereign-council, at the head of which is the high-bailiff, who has very great authority: he repreſents the ſovereign, is governor of Mons, and captain-general of the province.

HAIR, ſmall filaments, iſſuing out of the pores of the ſkins of animals; and ſerving moſt of them as a tegument or covering*.—In lieu of hair, the nakedneſs of ſome animals is covered with feathers, wool, ſkins, &c.

Hair is found on all parts of the human body, except the ſoles of the feet and the palms of the hands.—But it grows longeſt on the head, chin, breaſt, in the arm-pits, and about the privities.

The ancients held the hair a ſort of excrement, fed only with excrementitious matters, and no proper part of a living body.—They ſuppoſed it generated of the fuliginous parts of the blood, exhaled by the heat of the body to the ſurface, and there condenſed in paſſing through the pores.—Their chief reaſons were, that the hair being cut, will grow again apace, even in extreme old age, and when life is very low: that in hectic and conſumptive people, where the reſt of the body is continually emaciating and attenuating, the hair ſhall thrive: nay, and that it will grow again in dead carcaſes.—They added, that hair does not feed and grow, like the other parts, by introſuſception, *i. e.* by a juice circulating within it; but, like the nails, by juxtapoſition, each part next the root thruſting forward that immediately before it.

But the moderns are agreed, that every hair does properly and truly live, and receive nutriment to fill and diſtend it like the other parts: which they argue hence, that the roots do not turn grey in aged perſons ſooner than the extremities, but the whole changes colour at once, and the like is obſerved in boys, &c.; which ſhews that there is a direct communication, and that all the parts are affected alike.

It may be obſerved, however, that, in propriety, the life and growth of hairs is of a different kind from that of the reſt of the body; and is not immediately derived therefrom, or reciprocated therewith.—It is rather of the nature of vegetation. They grow as plants do out of the earth; or as ſome plants ſhoot from the parts of others; from which though they draw their nouriſhment, yet each has, as it were, its ſeveral life and a diſtinct œconomy.---They derive their food from ſome juices in the body, but not from the nutritious juices of the body; whence they may live, tho' the body be ſtarved.—Wulferus, in the *Philoſophical Collections*, gives an account of a woman buried at Norimberg, whoſe grave being opened 43 years after her death, there was hair found iſſuiug forth plentifully through the clefts of the coffin; inſomuch, that there was reaſon to imagine the coffin had ſome time been covered all over with hair.—The cover being removed, the whole corps appeared in its perfect ſhape; but, from the crown of the head to the ſole of the foot, covered over with a thick-ſet hair, long and curled.—The ſexton going to handle the upper part of the head with his fingers, the whole ſtructure fell at once, leaving nothing in his hand but an handful of hair: there was neither ſkull nor any other bone left; yet the hair was ſolid and ſtrong enough.—Mr Arnold, in the ſame collection, gives a relation of a man hanged for theft, who, in a little time, while he yet hung upon the gallows, had his body ſtrangely covered over with hair.—Some moderns, however, deny the authenticity of theſe and other ſimilar inſtances.

The hairs ordinarily appear round or cylindrical; but the microſcope alſo diſcovers triangular and ſquare ones; which diverſity of figure ariſes from that of the pores, to which the hairs always accommodate themſelves. Their length depends on the quantity of the proper humour to feed them, and their colour on the quality of that humour: whence, at different ſtages of life, the colour uſually differs. Their extremities ſplit into two or three branches, eſpecially when kept dry, or ſuffered to grow too long; ſo that what appears only a ſingle hair to the naked eye, ſeems a bruſh to the microſcope.

The hair of a mouſe, viewed by Mr Derham with a microſcope, ſeemed to be one ſingle tranſparent tube; with a pith made up of fibrous ſubſtances, running in dark lines, in ſome hairs tranſverſely, in others ſpirally. The darker medullary parts or lines, he obſerves, were no other than ſmall fibres convolved round, and lying cloſer together than in the other parts of the hair. They run from the bottom to the top of the hair; and, he imagines, may ſerve to make a gentle evacuation of ſome humour out of the body. Hence the hair of hairy animals, this author ſuggeſts, may not only ſerve as a fence againſt cold, &c. but as an organ of inſenſible perſpiration.

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* See *Anatomy*, nº 81.

Though the external ſurface of the body is the natural place for hairs, we have many well-atteſted inſtances of their being found alſo on the internal ſurface. Amatus Luſitanus mentions a perſon who had hair upon his tongue. Pliny and Valerius Maximus concur in their teſtimonies, that the heart of Ariſtomenes the Meſſenian was hairy. Cælius Rhodiginus relates the ſame of Hermogenes the rhetorician; and Plutarch, of Leonidas the Spartan.——Hairs are ſaid to have been frequently found in the breaſts of women, and to have occaſioned the diſtemper called *trichiaſis;* but ſome authors are of opinion, that theſe are ſmall worms and not hairs. There have been, however, various and indiſputable obſervations of hairs found in the kidneys, and voided by urine.

Hippocrates is of opinion, that the glandular parts are the moſt ſubject to hair; but bundles of hair have been found in the muſcular parts of beef, and in ſuch parts of the human body as are equally firm with that. —Hair has been often found in abſceſſes and impoſthumations. Schultetus, opening the abdomen of a woman, found 12 pints of water, and a large lock or bundle of hair ſwimming looſe in it. But of all the internal parts, there is none ſo much ſubject to an unnatural growth of hair as the ovaries of females, and that as well of the human ſpecies as of other animals. Of this Dr Tyſon relates three remarkable inſtances; two of theſe were young women, and the other was a bitch. The animal had been much emaciated in its hinder parts; the hair was about an inch and an half long: but the moſt remarkable particular was, that hair was alſo found lying looſe in the cavities of the veins. We have ſeveral inſtances of mankind being affected in the ſame manner. Cardan relates, that he found hair in the blood of a Spaniard; and Slonatius in that of a gentlewoman of Cracovia; and Schultetus declares from his own obſervation, that thoſe people who are afflicted with the plica polonica, have very often hair in their blood.

Diſeaſes of the HAIR. Almoſt the only diſeaſe of the hair, beſides the remarkable one called *plica polonica*, is its falling off, or *baldneſs*. For this many remedies have been recommended, but ſcarce any of them can be depended upon. The juice of burdock, and the lixivial ſalts of vine-aſhes, are ſaid to be efficacious; alſo the powder of hermodactyls, and the decoction of boxwood. A remarkable inſtance of the efficacy of this laſt is given under the article BUXUS.—Some authors give inſtances of the hair changing its colour in a ſhort time, thro' grief, or by reaſon of a fright, &c.

Human-HAIR makes a conſiderable article of trade; the goodneſs of it conſiſts in its being neither too coarſe nor too ſlender. Hair that does not curl or buckle naturally, is made to do ſo by firſt boiling, and then baking it. Having ſorted it, they next roll it carefully upon pipes hollowed in the middle; theſe they put into a pot or cauldron, and let them boil about two hours; then taking them out, they are dried and covered with papers; and, laſtly, ſent to the paſtry-cook, who bakes them in an oven, till the cruſt with which they are covered is about three fourths baked.

The hair of ſeveral other animals, as the beaver, hare, coney, &c. is alſo uſed in commerce, and eſpecially in the manufacture of hats. See HAT.

Staining of HAIR. Hair may be changed from a ed, grey, or other diſagreeable colour, to a brown or deep black, by a ſolution of ſilver. The liquors ſold under the name of *hair-waters*, are at bottom no more than ſolutions of ſilver in aqua-fortis, largely diluted with water, with the addition perhaps of other ingredients, which contribute nothing to their efficacy. The ſolution ſhould be fully ſaturated with the ſilver, that there may be no more acid in it than is neceſſary for holding the metal diſſolved; and beſides dilution with water, a little ſpirit of wine may be added for the further dulcification of the acid. It muſt be obſerved, that, for diluting the ſolution, diſtilled water, or pure rain-water, muſt be uſed; the common ſpring-waters turning it milky, and precipitating a part of the diſſolved ſilver. It is to be obſerved alſo, that if the liquor touches the ſkin, it has the ſame effect on it as on the matter to be ſtained, changing the part moiſtened with it to an indelible black.—Hair may alſo be dyed of any colour in the ſame manner as wool *.

HAIR *as an Enſign of Dignity, or of Religion.* It was eſteemed a notable honour among the ancient Gauls to have long hair, and hence came the appellation *Gallia comata.* For this reaſon Julius Cæſar, upon ſubduing the Gauls, made them cut off their hair as a token of ſubmiſſion.—It was with a view to this, that ſuch as afterwards quitted the world to go and live in cloiſters, procured their hair to be ſhaven off; to ſhew that they bid adieu to all earthly ornaments, and made a vow of perpetual ſubjection to their ſuperiors.

Greg. of Tours aſſures us, that in the royal family of France, it was a long time the peculiar mark and privilege of kings and princes of the blood to wear long hair, artfully dreſſed and curled: every body elſe was obliged to be polled, or cut round, in ſign of inferiority and obedience. Some writers aſſure us, that there were different cuts for all the different qualities and conditions; from the prince who wore it at full length, to the ſlave or villain who was quite cropt. —To cut off the hair of a ſon of France, under the firſt race of kings, was to declare him excluded from the right of ſucceeding to the crown, and reduced to the condition of a ſubject.

In the eighth century, it was the cuſtom of people of quality to have their childrens hair cut the firſt time by perſons they had a particular honour and eſteem for; who, in virtue of this ceremony, were reputed a ſort of ſpiritual parents or godfathers thereof: Tho' this practice appears to have been more ancient; inaſmuch as we read, that Conſtantine ſent the pope the hair of his ſon Heraclius, as a token that he deſired him to be his adoptive father.

The parade of long hair became ſtill more and more

* See Dyeing.

obnoxious in the progreſs of Chriſtianity, as ſomething utterly inconſiſtent with the profeſſion of perſons who bore the croſs. Hence numerous injunctions and canons to the contrary.—Pope Anicetus is commonly ſuppoſed to have been the firſt who forbade the clergy to wear long hair: but the prohibition is of an older ſtanding in the churches of the eaſt; and the letter wherein that decree is wrote, is of a much later date than that pope.—The clerical tonſure is related by Iſidore Hiſpalenſis, as of apoſtolical inſtitution.

Long hair was anciently held ſo odious, that there is a canon ſtill extant of the year 1096, importing, that ſuch as wore long hair, ſhould be excluded coming into church while living, and not be prayed for when dead.

We have a furious declamation of Luitprand againſt the emperor Phocas, for wearing long hair, after the manner of the other emperors of the eaſt, all except Theophilus, who being bald, enjoined all his ſubjects to ſhave their heads.

The French hiſtorians and antiquaries have been very exact in recording the head of hair of their ſeveral kings. Charlemagne wore it very ſhort, his ſon ſhorter; Charles the bald had none at all. Under Hugh Capet it began to appear again; this the eccleſiaſtics took in dudgeon, and excommunicated all who let their hair grow. Peter Lombard expoſtulated the matter ſo warmly with Charles the Young, that he cut off his hair; and his ſucceſſors for ſome generations wore it very ſhort.—A profeſſor of Utrecht, in 1650, wrote expreſsly on the queſtion, Whether it be lawful for men to wear long hair? and concluded for the negative.—Another divine, named Reves, who had wrote for the affirmative, replied to him.

The Greeks, and after their example, the Romans, wore falſe hair. See PERUKE.

HAIR, in farriery, is generally called the *coat*; and, with regard to horſes, deſerves particular conſideration.

The hair growing on the fetlock, ſerves as a defence to the prominent part of it, in travelling in ſtony ways, or in froſty weather: if the hair of a horſe's neck, and the parts moſt uncovered, be cloſe, ſmooth and ſleek, it is an indication of his being in health and good caſe. In order to make the hair of an horſe ſoft and ſleek, he muſt be kept warm at heart, for the leaſt inward cold will cauſe the hair to ſtare; alſo ſweat him often, for that will looſen and raiſe the duſt and filth that renders his coat foul; and when he is in the heat of a ſweat, ſcrape off all the white foam, ſweat, and filth, that is raiſed up, with an old ſword-blade; and alſo when he is blooded, if you rub him all over with his own blood, repeating it two or three days, and curry and dreſs him well, it will make his coat ſhine as if covered with a fine varniſh.

Hair falling from the main or tail, is cauſed either by his having taken ſome heat, which has engendered a dry mange; or from ſome ſurfeit which cauſes the evil humours to reſort to thoſe parts. To cure this, anoint the horſe's mane and creſt with black ſoap; make a ſtrong lee of aſhes, and waſh it all over with it. But if a canker ſhould grow on a horſe's tail, which will eat away both fleſh and bone; then put ſome oil of vitriol to it, and it will conſume it: and if you find that the vitriol corrodes too much, you need only to wet it with cold water, and it will put a ſtop to it.

If you would take away hair from any part of a horſe's body, boil half a pound of lime in a quart of water, till a fourth part is conſumed, to which add an ounce of orpiment; make this into a plaſter, and lay it on.

HAIR, or *Down*, of Plants; a general term expreſſive of all the hairy and glandular appearances on the ſurface of plants, to which they are ſuppoſed by naturaliſts to ſerve the double purpoſe of defenſive weapons and veſſels of ſecretion.

Theſe hairs are minute threads of greater or leſs length and ſolidity; ſome of them viſible to the naked eye; whilſt others are rendered viſible only by the help of glaſſes. Examined by a microſcope, almoſt all the parts of plants, particularly the young ſtalks or ſtems, appear covered with hairs.

Hairs on the ſurface of plants preſent themſelves under various forms: in the leguminous plants, they are generally cylindric; in the mallow tribe, terminated in a point; in agrimony, ſhaped like a fiſh-hook; in nettle, awl-ſhaped and jointed; and in ſome compound flowers with hollow or funnel-ſhaped florets, they are terminated in two crooked points.

Probable as ſome experiments have rendered it, that the hairs on the ſurface of plants contribute to ſome organical ſecretion, their principal uſe ſeems to be to preſerve the parts in which they are lodged from the bad effects of violent frictions, from winds, from extremes of heat and cold, and ſuch like external injuries.

M. Guettard, who has eſtabliſhed a botanical method from the form, ſituation, and other circumſtances of the hairy and glandular appearances on the ſurface of plants, has demonſtrated, that theſe appearances are generally conſtant and uniform in all the plants of the ſame genus. The ſame uniformity ſeems to characteriſe all the different genera of the ſame natural order.

The different ſorts of hairs which form the down upon the ſurface of plants were imperfectly diſtinguiſhed by Grew in 1682, and by Malphigi in 1686. Mr Guettard juſt mentioned, was the firſt who examined the ſubject both as a botaniſt and a philoſopher: his obſervations were publiſhed in 1747.

HAKLUYT (Richard), a naval hiſtorian, is ſuppoſed to have been born in London about the year 1553, and deſcended of a genteel family in Herefordſhire, as the name frequently occurs in the liſt of high ſheriffs for that county, in former reigns. He was educated at Weſtminſter ſchool; and thence, in 1570, removed to Chriſt-church, Oxford; where he applied himſelf particularly to the ſtudy of coſmography, and read public lectures in that ſcience.

Sir Edward Stafford being ſent ambaſſador to France in 1583, Mr Hakluyt was one of his attendants, probably in the capacity of chaplain. He was at this time maſter of arts, and profeſſor of divinity. In 1585 he obtained the royal mandate for the next vacant prebend of Briſtol, to which preferment he ſucceeded during his reſidence at Paris. Conſtantly attentive to his favourite coſmographical inquiries, in ſearching the French libraries, he found a valuable hiſtory of Florida, which had been diſcovered about 20 years before, by Captain Loudonniere, and others: this he cauſed to be publiſhed, at his own expence, in the French language, and ſoon after reviſed and republiſhed Peter Martyr's book *De orbe novo*. After five years reſidence in France, Mr Hakluyt returned to England in company with lady Sheffield, ſiſter to the lord admiral Howard. In the year 1589 he publiſhed his Collection of Voyages in one folio volume, which in 1598 was republiſhed in three. In 1605, our author was made prebendary of Weſtminſter; which, with the rectory of Wetheringſet in the county of Suffolk, ſeems to have been the ſummit of his preferment. He died in 1616, and was buried in Weſtminſter abbey, bequeathing to his ſon Edmund his manor of Bridge-Place, and ſeveral houſes in Tothil-ſtreet, Weſtminſter. He was an indefatigable and faithful hiſtorian. His works are, 1. A collection of voyages and diſcoveries, a ſmall volume. 2. Hiſtory of Florida, abovementioned. 3. The principal navigations, voyages, and diſcoveries of the Engliſh nation, made by ſea or over land to the moſt and fartheſt diſtant quarters of the earth, at any time within the compaſs of theſe 1500 years, in 3 vols folio. 4. The diſcoveries of the world, from the firſt original to the year 1555, written in the Portugal tongue by Ant. Galvano; corrected, much amended, and tranſlated into Engliſh, by Richard Hakluyt. 5. Virginia richly valued, by the deſcription of the main land of Florida, her next neighbour, &c. written by a Portugal gentleman of Elvas, and tranſlated by Richard Hakluyt. Beſides theſe, he left ſeveral manuſcripts, which were printed in Purchas's collection.

HALBERSTADT, a ſmall principality of Germany, bounded on the north-eaſt by the duchy of Magdeburg, on the ſouth by the principality of Anhalt, on the weſt by the dioceſe of Hildſheim, on the eaſt by part of the electorate of Saxony, and on the north by Brunſwic Wolfenbuttle. It is near 40 miles in length and 30 in breadth. The ſoil in general is fertile in corn and flax; and there are ſome woods, though in general fuel is ſcarce. There are three large towns in it which ſend repreſentatives to the diet, together with ten ſmall ones, and 91 county-towns and villages. The number of the inhabitants is computed at about 200,000: the greateſt part of them are Lutherans; but there are alſo Calviniſts, Jews, and Roman Catholics. The manufactures are chiefly woollen (for the country produces a great number of ſheep); the exports are grain, and a kind of beer called *broihan*. The annual revenue ariſing from this principality, and the incorporated counties and lordſhips, is ſaid to amount to 500,000 rix-dollars. Till the treaty of Weſtphalia in 1648, this country was a dioceſe, but was then transferred to the electoral houſe of Brandenburg as a temporal principality. It is entitled to a vote both in the diet of the empire, and that of the circle. The principal places are Halberſtadt, Groningen, Oſcherſleben, Oſterwick, &c.

HALBERSTADT, a city of Germany, in the circle of Lower Saxony, ſeated near the river Hothein. It is a neat uniform place; and has ſome good churches and other handſome buildings, of which the cathedral is the chief. There is an inn in this place, which is looked upon to be the largeſt and to have the beſt accommodations of any in Europe. Before the Reformation, it was a biſhop's ſee. E. Long. 11. 29. N. Lat. 52. 6.

HALBERT, or HALBARD, in the art of war, a well-known weapon carried by the ſergeants of foot and dragoons. It is a ſort of ſpear, the ſhaft of which is about five feet long, and made of aſh or other wood. Its head is armed with a ſteel point, not unlike the point of a two-edged ſword. But, beſides this ſharp point which is in a line with the ſhaft, there is a croſs piece of ſteel, flat and pointed at both ends; but generally with a cutting edge at one extremity, and a bent ſharp point at the other; ſo that it ſerves equally to cut down, or to puſh withal. It is alſo uſeful in determining the ground between the ranks, and adjuſting the files of a battalion. The word is formed of the German *hal* “hall,” and *bard* “an hatchet.” Voſſius derives it from the German *hellebaert*, of *hel*, “clarus, ſplendens,” and *baert*, “ax.”

The halbert was anciently a common weapon in the army; where there were companies of halbardeers. It is ſaid to have been uſed by the Amazons, and afterwards by the Rhætians and Vindelicians about the year 570.

It was called the *Daniſh ax*, becauſe the Danes bore an halbert on the left ſhoulder. From the Danes it was derived to the Scots; from the Scots to the Engliſh Saxons; and from them to the French.

HALCYON, in ornithology, a name given by the ancients to the alcedo or king's-fiſher. See ALCEDO.

HALCYON-*Days*, in antiquity, a name given to ſeven days before and as many after the winter-ſolſtice; by reaſon the halcyon, invited by the calmneſs of the weather, laid its eggs in neſts built in the rocks, cloſe by the brink of the ſea, at this ſeaſon.

HALDE (John Baptiſt du), a learned French Jeſuit born at Paris in 1674. He was extremely well verſed in Aſiatic geography; and we have of his compilation a work intitled *Grand deſcription de la Chine & de la Tartarie*, from original memoirs of the Jeſuitical miſſionaries, in 4 vols, folio. He was alſo concerned in a collection of letters begun by father Gobien, called *Des lettres edifiantes*, in 18 vols; and publiſhed ſome Latin poems and orations. He died in 1743.

HALE, in the ſea-language, ſignifies *pull*; as, To hale up, is to pull up; to hale in or out, is to pull in or out. To over-hale a rope, is to hale it too ſtiff, or to hale it the contrary way.

Keel-HALE. See DUCKING.

HALE (Sir Matthew,) lord chief juſtice of the king's-bench in the reign of Charles II. was the ſon of Robert Hale, eſq; a barriſter of Lincoln's Inn, and was born in 1609. He was educated at Oxford, where he made a conſiderable progreſs in learning; but was afterwards diverted from his ſtudies by the levities of youth. From theſe he was reformed by Mr John Glanvill, ſerjeant at law; and applying to the ſtudy of the law, entered into Lincoln's-Inn. Noy, the attorney-general, took early notice of him, and directed him in his ſtudies. Mr Selden alſo took much notice of him; and it was this acquaintance that firſt ſet Mr Hale on a more enlarged purſuit of learning, which he had before confined to his own profeſſion. During the civil wars, he behaved ſo well as to gain the eſteem of both parties. He was employed in his practice by all the king's party; and was appointed by the parliament one of the commiſſioners to treat with the king. The murder of king Charles gave him very ſenſible regret. However, he took the engagement; and was appointed, with ſeveral others, to conſider of the reformation of the law. In 1653 he was by writ made ſergeant at law, and ſoon after appointed one of the juſtices of the Common Pleas. Upon the death of Oliver Cromwell he refuſed to accept of the new commiſſion offered him by Richard his ſucceſſor. He was returned one of the knights of Glouceſterſhire in the parliament which called home Charles II. Soon after, he was made lord chief baron of the exchequer; but declined the honour of knighthood, till lord chancellor Hyde, ſending for him upon buſineſs when the king was at his houſe, told his Majeſty, that “there was his modeſt chief baron;” upon which he was unexpectedly knighted. He was one of the principal judges that ſat in Clifford's Inn about ſettling the difference between landlord and tenant, after the fire of London, in which he behaved to the ſatisfaction of all parties concerned, and alſo in his poſt of chief baron acted with inflexible integrity. One of the firſt peers went once to his chamber, and told him, “That having a ſuit in law to be tried before him, he was then to acquaint him with it, that he might the better underſtand it when it ſhould come to be tried in court.” Upon which the lord chief baron interrupted him, and ſaid, “He did not deal fairly to come to his chambers about ſuch affairs; for he never received information of ſuch cauſes but in open court, where both parties were to be heard alike.” Upon which his Grace (for it was a duke) went away not a little diſſatisfied, and complained of it to the king as a rudeneſs that was not to be endured: but his Majeſty bid him content himſelf that he was uſed no worſe; and ſaid, “That he verily believed, he would have uſed him no better, if he had gone to ſolicit him in any of his own cauſes.” Another remarkable incident happened in one of his circuits. A gentleman who had a trial at the aſſizes had ſent him a buck for his table. When judge Hale therefore heard his name, he aſked “if he was not the ſame perſon who had ſent him the veniſon?” and finding that he was the ſame, told him, that “he could not ſuffer the trial to go on till he had paid him for his buck.” The gentleman anſwered, that “he never ſold his veniſon; and that he had done nothing to him, which he did not do to every judge who had gone that circuit:” which was confirmed by ſeveral gentlemen preſent The lord chief-baron, however, would not ſuffer the trial to proceed till he had paid for the preſent: upon which the gentleman withdrew the record. In ſhort, he was, in 1671, advanced to be lord chief juſtice of the king's bench; but about four years after this promotion, his health declining, he reſigned his poſt in February 1675-6, and died in December following. This excellent man, who was an ornament to the bench, to his country, and to human nature, wrote, 1. An eſſay on the gravitation and non-gravitation of fluid bodies. 2. Obſervations touching the Torricellian experiment. 3. Contemplations, moral and divine. 4. The life of Pomponius Atticus, with political and moral reflections. 5. Obſervations on the principles of natural motion. 6. The primitive origination of mankind. He alſo left a great number of manuſcripts, in Latin and Engliſh, upon various ſubjects; among which are, his “Pleas of the Crown,” ſince publiſhed by Mr Emyln in two volumes folio; and his “Original inſtitution, power, and juriſdiction of Parliaments.”

Hales (Stephen), D. D. a celebrated divine and philoſopher, was born in 1677. He was the ſixth ſon of Thomas Hales, Eſq; the eldeſt ſon of Sir Robert Hales created a baronet by king Charles II. and Mary the heireſs of Richard Langley of Abbots-Wood in Hertfordſhire. In 1696, he was entered a penſioner at Bennet-College, Cambridge; and was admitted a fellow in 1703, and became bachelor of divinity in 1711. He ſoon diſcovered a genius for natural philoſophy. Botany was his firſt ſtudy; and he uſed frequently to make excurſions among Gogmagog hills, in company with Dr Stukely, with a view of proſecuting that ſtudy. In theſe expeditions he likewiſe collected foſſils and inſects, having contrived a curious inſtrument for catching ſuch of the latter as have wings. In company with this friend he alſo applied himſelf to the ſtudy of anatomy, and invented a curious method of obtaining a repreſentation of the lungs in lead. They next applied themſelves to the ſtudy of chemiſtry; in which, however, they did not make any remarkable diſcoveries.

In the ſtudy of aſtronomy Mr Hales was equally aſſiduous. Having made himſelf acquainted with the Newtonian ſyſtem, he contrived a machine for ſhewing the phenomena on much the ſame principles with that afterwards made by Mr Rowley, and, from the name of his patron, called an *Orrery*.

About the year 1710, he was preſented to the perpetual cure of Teddington near Twickenham, in Middleſex; and afterwards accepted of the living of Porlock in Somerſetſhire, which vacated his fellowſhip in the college, and which he exchanged for the living of Faringdon in Hampſhire.

Soon after, he married Mary, the daughter and heireſs of Dr Newce, who was rector of Haliſham in Suſſex, but reſided at Much-Haddam in Hertfordſhire.

On the 13th of March 1718, he was elected member of the Royal Society; and on the 5th of March, in the year following, he exhibited an account of ſome experiments he had lately made on the effect of the ſun's warmth in raiſing the ſap in trees. This procured him the thanks of the ſociety, who alſo requeſted him to proſecute the ſubject. With this requeſt he complied with great pleaſure; and on the 14th of June 1725, exhibited a treatiſe in which he gave an account of his progreſs. This treatiſe being highly applauded by the ſociety, he farther enlarged and improved it; and in April 1727 he publiſhed it under the title of *Vegetable Statics*. This work he dedicated to his late majeſty king George the ſecond, who was then prince of Wales; and he was, the ſame year, choſen one of the council of the Royal Society, Sir Hans Sloan being at the ſame annual election choſen their preſident. The book being well received, a ſecond edition of it was publiſhed in 1731; in a preface to this edition Mr Hales promiſed a ſequel to the work, which he publiſhed in 1733, under the title of *Statical eſſays*, &c.

In 1732, he was appointed one of the truſtees for eſtabliſhing a new colony in Georgia. On the 5th of July 1733, the univerſity of Oxford honoured him with a diploma for the degree of doctor in divinity; a mark of diſtinction the more honourable, as it is not uſual for one univerſity to confer academical honours on thoſe who were educated at another.

In 1734, when the health and morals of the lower and middling claſs of people were ſubverted by the exceſſive drinking of gin, he publiſhed, though without his name, "A friendly admonition to the drinkers of brandy and other ſpirituous liquors;" which was twice re-printed. The latter end of the ſame year he publiſhed a ſermon which he preached at St Bride's before the reſt of the truſtees for eſtabliſhing a new colony in Georgia. His text was, *Bear ye one another's burthens, and ſo fulfil the law of Chriſt;* Galatians vi. 2.

In 1739, he printed a volume in 8vo, intitled, *Philoſophical experiments on ſea-water, corn, fleſh, and other ſubſtances:* this work, which contained many uſeful inſtructions for voyagers, was dedicated to the lords of the admiralty. The ſame year he exhibited to the Royal Society an account of ſome farther experiments towards the diſcovery of medicines for diſſolving the ſtone in the kidneys and bladder, and preſerving meat in long voyages; for which he received the gold medal of Sir Godfrey Copley's donation. The year following he publiſhed ſome account of "Experiments and obſervations on Mrs Stephens's medicines for diſſolving the ſtone, in which their diſſolvent power is inquired into and demonſtrated."

In 1741, he read before the Royal Society an account of an inſtrument which he invented, and called a *ventilator*, for conveying freſh air into mines, hoſpitals, priſons, and the cloſe parts of ſhips: he had communicated it to his particular friends ſome months before; and it is very remarkable that a machine of the ſame kind, for the ſame purpoſe, was in the ſpring of the ſame year invented by one Martin Triewald, an officer in the ſervice of the king of Sweden, called *captain of mechanics*, for which the king and ſenate granted him a privilege in October following, and ordered every ſhip of war in the ſervice of that ſtate to be furniſhed with one of them; a model alſo of this machine was ſent into France, and all the ſhips in the French navy were alſo ordered to have a ventilator of the ſame ſort.

It happened alſo, that about the ſame time one Sutton, who kept a coffee houſe in Alderſgate-ſtreet, invented a ventilator of another conſtruction to draw off the foul air out of ſhips, by means of the cook-room fire: but poor Sutton had not intereſt enough to make mankind accept the benefit he offered them; though its ſuperiority to Dr Hales's contrivance was evident, and among others Dr Mead and the late ingenious Mr Benjamin Robins gave their teſtimony in its favour. See AIR-*Pipes*.

The public, however, is not leſs indebted to the ingenuity and benevolence of Dr Hales, whoſe ventilators came more eaſily into uſe for many purpoſes of the greateſt importance to life, particularly for keeping corn ſweet, by blowing through it freſh ſhowers of air; a practice very ſoon adopted by France, a large granary having been made, under the direction of Duhamel, for the preſervation of corn in this manner, with a view to make it a general practice.

In 1743, Dr Hales read before the Royal Society a deſcription of a method of conveying liquors into the *abdomen* during the operation of tapping, and it was afterwards printed in their Tranſactions. In 1745, he publiſhed ſome experiments and obſervations on tar-water, which he had been induced to make by the publication of a work called *Siris*, in which the late learned and moſt excellent Dr Berkeley, biſhop of Cloyne, had recommended tar-water as an univerſal medicine: on this occaſion ſeveral letters paſſed between them on the ſubject, particularly with reſpect to the uſe of tar-water in the diſeaſe of the horned cattle.

In the ſame year he communicated to the public, by a letter to the editor of the Gentleman's Magazine, a deſcription of a *back-heaver*, which will winnow and clean corn much ſooner and better than can be done by the common method. He alſo, at the ſame time, and by the ſame channel, communicated to the public a cheap and eaſy way to preſerve corn ſweet in ſacks; an invention of great benefit to farmers, eſpecially to poor leaſers, who want to keep ſmall quantities of corn for ſome time, but have no proper granary or repoſitory for that purpoſe. He alſo the ſame year took the ſame method to publiſh directions how to keep corn ſweet in heaps without turning it, and to ſweeten it when muſty. He publiſhed a long paper, containing an account of ſeveral methods to preſerve corn by ventilators; with a particular deſcription of ſeveral ſorts of ventilators, illuſtrated by a cut, ſo that the whole mechaniſm of them may be eaſily known, and the machine conſtructed by a common carpenter. He publiſhed alſo in the ſame volume, but without his name, a detection of the fallacious boaſts concerning the efficacy of the liquid ſhell in diſſolving the ſtone in the bladder. In 1746 he communicated to the Royal Society a propoſal for bringing ſmall paſſable ſtones ſoon, and with eaſe, out of the bladder; and this was alſo printed in their Tranſactions. In the Gentleman's Magazine for July 1747, he publiſhed an account of a very conſiderable improvement of his back-heaver, by which it became capable of clearing corn of the very ſmall grain, ſeeds, blacks, ſmut-balls, &c. to ſuch perfection as to make it fit for ſeed-corn. In 1748 he communicated to the Royal Society a propoſal for checking, in ſome degree, the progreſs of fires, occaſioned by the great fire which happened that year in Cornhill: And the ſubſtance of this propoſal was printed in their Tranſactions. In the ſame year he alſo communicated to the Society two memoirs, which are printed in their Tranſactions; one on the great benefit of ventilators, and the other on ſome experiments in electricity.

In 1749 his ventilators were fixed in the Savoy priſon, by order of the right hon. Henry Fox, eſq; then ſecretary at war, afterwards lord Holland; and the benefit was ſo great, that though 50 or 100 in a year often died of the gaol-diſtemper before, yet from the year 1749 to the year 1752 incluſive, no more than four perſons died, though in the year 1750 the number of priſoners was 240; and of thoſe four, one died of the ſmall-pox, and another of intemperance.

In the year 1750 he publiſhed ſome conſiderations on the cauſes of earthquakes; occaſioned by the ſlight ſhocks felt that year in London. The ſubſtance of this work was alſo printed in the Philoſophical Tranſactions. The ſame year he exhibited an examination of the ſtrength of ſeveral purging waters, eſpecially of the water of *Jeſſop's well*, which is printed in the Philoſophical Tranſactions.

He had now been ſeveral years honoured with the eſteem and friendſhip of his royal highneſs Frederick prince of Wales; who frequently viſited him at Teddington, from his neighbouring palace at Kew, and took a pleaſure in ſurpriſing him in the midſt of thoſe curious reſearches into the various parts of nature which almoſt inceſſantly employed him. Upon the prince's death, which happened this year, and the ſettlement of the houſehold of the princeſs dowager, he was, without his ſolicitation, or even knowledge, appointed clerk of the cloſet, or almoner to her royal highneſs.

In 1751 he was choſen by the college of phyſicians to preach the annual ſermon called *Crowne's lecture:* Dr William Crowne having left a legacy for a ſermon to be annually preached on "the wiſdom and goodneſs of God diſplayed in the formation of man." Dr Hales's text was, *With the ancient is wiſdom, and in length of days underſtanding*, Job xii. 12. This ſermon, as uſual, was publiſhed at the requeſt of the college.

In the latter end of the year 1752, his ventilators, worked by a windmill, were fixed in Newgate, with branching trunks to 24 wards; and it appeared that the diſproportion of thoſe that died in the gaol before and after this eſtabliſhment was as 16 to 7. He publiſhed alſo a farther account of their ſucceſs, and ſome obſervations on the great danger ariſing from foul air, exemplified by a narrative of ſeveral perſons ſeized with the gaol fever by working in Newgate.

On the death of Sir Hans Sloane, which happened in the year 1753, he was elected a member of the Academy of Sciences at Paris in his room. The ſame year he publiſhed in the Gentleman's Magazine ſome farther conſiderations about means to draw the foul air out of the ſick rooms of occaſional army-hoſpitals, and private houſes in town. He alſo publiſhed many other curious particulars relative to the uſe and ſucceſs of ventilators. The ſame year a deſcription of a ſea-gage, which the doctor invented to meaſure unfathomable depths, was communicated to the public in the ſame miſcellany: this paper was drawn up about the year 1732 or 1733, by the doctor, for the late Colin Campbell, eſq; who employed the ingenious Mr Hawkſbee to make the machine it deſcribes, which was tried in various depths, and anſwered with great exactneſs, yet was at laſt loſt near Bermuda.

In 1754, he communicated to the Royal Society ſome experiments for keeping water and fiſh ſweet with lime-water, an account of which was publiſhed in the Phil. Tranſ. He alſo continued to enrich their memoirs with many uſeful articles from this time till his death, particularly a method of forwarding the diſtillation of freſh from ſalt water by blowing ſhowers of freſh air up through the latter during the operation.

In 1757 he communicated to the editor of the Gentleman's Magazine, an eaſy method of purifying the air, and regulating its heat in melon-frames and green-houſes, alſo further improvements in his method of diſtilling ſea-water.

His reputation and the intereſt of his family and friends might eaſily have procured him farther preferment: but of farther preferment he was not deſirous; for being nominated by his late majeſty to a canonry of Windſor, he engaged the princeſs to requeſt his majeſty to recall his nomination. That a man ſo devoted to philoſophical ſtudies and employments, and ſo conſcientious in the diſcharge of his duty, ſhould not deſire any preferment which would reduce him to the dilemma either of neglecting his duty, or foregoing his amuſement, is not ſtrange: but that he would refuſe an honourable and profitable appointment, for which no duty was to be done that would interrupt his habits of life, can ſcarce be imputed to his temperance and humility without impeaching his benevolence; for if he had no will of any thing more for himſelf, a liberal mind would ſurely have been highly gratified by the diſtribution of ſo conſiderable a ſum as a canonry of Windſor would have put into his power, in the reward of induſtry, the alleviation of diſtreſs, and the ſupport of helpleſs indigence. He was, however, remarkable for ſocial virtue and ſweetneſs of temper; his life was not only blameleſs, but exemplary in a high degree; he was happy in himſelf, and beneficial to others, as appears by this account of his attainments and purſuits; the conſtant ſerenity and cheerfulneſs of his mind, and the temperance and regularity of his life, concurred, with a good conſtitution, to preſerve him in health and vigour to the uncommon age of fourſcore and four years.

He died at Teddington in 1761; and was buried, purſuant to his own directions, under the tower of the pariſh-church, which he built at his own expence not long before his death.—Her royal highneſs the princeſs of Wales erected a monument to his memory in Weſtminſter abbey.

HALESWORTH, a town of Suffolk in England, ſeated on a neck of land between two branches of the river Blith. It is a well frequented thriving place, and has a trade in linen-yarn and ſail-cloth. It has one large church, and about 600 good houſes; but the ſtreets are neither wide nor paved. About the town is raiſed a great deal of hemp. E. Long. 1. 40. N. Lat. 52. 30.

HALF-BLOOD, in law, is where a man marries a ſecond wife, the firſt being dead, and by the firſt venter has a ſon, and by his ſecond venter has likewiſe a ſon; the two brothers, in this caſe, are but of half-blood. See CONSANGUINITY and DESCENT.

HALF-*Merk*; a noble, or 6s. 8d.

HALF-*Moon*, in fortification; an outwork compoſed of two faces, forming a ſaliant angle, whoſe gorge is in form of a creſcent or half-moon, whence the name.

HALI-BEIGH, firſt dragoman or interpreter at the Grand Signior's court in the 17th century, was born of Chriſtian parents in Poland; but having been taken by the Tartars when he was young, they ſold him to the Turks, who brought him up in their religion in the ſeraglio. His name, in his native country, was Bobowſki. He learnt many languages, and Sir Paul Ricaut owns he was indebted to him for ſeveral things which he relates in his *Preſent ſtate of the Ottoman empire.* He held a great correſpondence with the Engliſh, who perſuaded him to tranſlate ſome books into the Turkiſh language;

and he had a mind to return into the boſom of the Chriſtian church, but died before he could accompliſh the deſign. Dr Hyde publiſhed his book *Of the liturgy of the Turks, their pilgrimages to Mecca, their circumciſion and viſiting of the ſick.* He tranſlated the catechiſm of the church of England, and the bible, into the Turkiſh language. The MS. is lodged in the library of Leyden. He wrote likewiſe a Turkiſh grammar and dictionary.

HALIÆTUS, in ornithology. See Falco.

HALIFAX, the capital of the province of Nova Scotia in America, ſituated in W. Long. 64. 30. N. Lat. 44. 45. It was founded in 1749, in order to ſecure the Britiſh ſettlements there from the attempts of the French and Indians. It was divided into 35 ſquares, each containing 16 lots of 40 by 60 feet; one eſtabliſhed church, and one meeting-houſe, and a ſmall number of houſes out of the regular ſtreets, which are 65 feet broad. The town was ſurrounded by pickettings, and guarded by forts on the outſide; but, ſince the commencement of the American troubles, it has been very ſtrongly fortified. Along the river Chebucto, to the ſouthward of the town, are buildings and fiſh-flakes for at leaſt two miles, and to the northward on the river for about one mile. The plan, however, has been greatly improved by the earl of Halifax, who was the original contriver. The proclamation iſſued for this ſettlement, offered 50 acres of land to every ſoldier and ſailor who would ſettle in that part of America, without paying any rent or doing any ſervice for ten years, and no more than one ſhilling *per annum* for each 50 acres ever afterwards: to every ſoldier and ſailor who had a wife and children, ten acres more were added for every individual of his family, and for every increaſe that ſhould afterwards happen in the ſame proportion. To each ſubaltern officer, 80 acres, and 15 for each of his family; 200 acres to each enſign; 300 to each lieutenant; 400 to each captain; 600 to every officer in rank above a captain, and 30 for each of his family. The government alſo engaged to tranſport and maintain the new ſettlers for one year at its own expence, and to furniſh them with ſuch arms, proviſions, utenſils, implements, &c. as ſhould be neceſſary to put them in a way to cultivate their lands, to build habitations, and to commence a fiſhery. The ſame conditions were likewiſe offered to all carpenters and other handicraftſmen; and ſurgeons were offered the ſame conditions with the enſigns.—This proclamation was publiſhed in March, and by the month of May 3700 perſons had offered themſelves. They accordingly embarked, and eſtabliſhed themſelves in the bay of Chebucto; calling their city *Halifax*, from the title of their patron. Before the end of October the ſame year, 350 comfortable wooden houſes were built, and as many more during the winter.—The ſame year in which the ſettlers embarked, the government granted them 40,000l. for their expences. In 1750, they granted 57,582l. 17s. 3¼d. for the ſame purpoſe; in 1751, 53,927l. 14s. 4d.; in 1752, 61,492l. 19s. 4¼; in 1753, 94,615l. 12s. 4d.; in 1754, 58,447l. 2s.; and in 1755, 49,418l. 7s. 8d.

Halifax, earl of. See Saville.

Halifax, a town in the weſt riding of Yorkſhire in England, ſeated on the river Calder, in W. Long. 2. 0. N. Lat. 53. 45. It has the title of an earldom, and is very eminent for the clothier trade. The pariſh is ſaid to be the moſt populous, if not the moſt extenſive, in England: for it is above 30 miles in circumference; and, beſides the mother-church at Halifax, and 16 meeting-houſes, has 12 chapels, two of which are parochial. What is a little ſingular, all the meeting-houſes here, except the quakers, have bells and burying grounds. The woollens principally manufactured here, are kerſeys and ſhalloons. Of the former it is affirmed, that one dealer hath ſent by commiſſion 60,000 pounds worth in a year to Holland and Hamburgh; and of the latter, it is ſaid, 100,000 pieces are made in this pariſh yearly. The inhabitants here, and in the neighbouring towns, are ſo entirely employed in theſe manufactures, that agriculture is but little minded. Moſt of their proviſions of all ſorts are brought from the north and eaſt ridings, and from Lancaſhire, Cheſhire, Nottinghamſhire, and Warwickſhire. The markets are very much crowded for the buying and ſelling proviſions and manufactures. The cloths, at the firſt erecting of the woollen manufactures in theſe parts, having been frequently ſtolen off the tenters in the night, a law was made, by which the magiſtrates of Halifax were empowered to paſs ſentence on and execute all offenders, if they were taken in the fact, or owned it, or if the ſtolen cloth was found upon them, provided alſo the crime was committed, and the criminal apprehended, within the liberties of the foreſt of Hardwick. Thoſe found guilty were executed in the following manner: an axe was drawn by a pulley to the top of a wooden engine, and faſtened by a pin, which being pulled out, the axe fell down in an inſtant, and did its work. If they had ſtole an ox, horſe, or any other beaſt, it was led with them to the ſcaffold, and there faſtened by a cord to the pin, that held up the axe; and when the ſignal was given by the jurors, who were the firſt burghers within the ſeveral towns of the foreſt, the beaſt was driven away, and the pin plucked out, upon which the axe fell and did its office. This ſevere and ſummary courſe of juſtice, gave occaſion to a litany, which is ſtill much more frequent in the mouths of the beggars and vagrants of theſe parts, than is the common prayer, viz.

"From Hell, Hull, and Hallifax, good Lord deliver us:"

though neither the engine, nor manner of proceeding againſt them, are now in uſe.

HALIOTIS, the ear-shell, a genus of inſects belonging to the order of vermes teſtacea. This is an animal of the ſnail-kind, with an open ſhell reſembling an ear. There are ſeven ſpecies, diſtinguiſhed by the figure of their ſhells. See Plate CLVIII.

HALITZ, a town of Poland, and capital of a territory of the ſame name, in Red Ruſſia, with a caſtle. It is ſeated on the river Neiſter. E. Long. 26. 0. N. Lat. 49. 20.

HALL, in architecture, a large room at the entrance of a fine houſe and palace. Vitruvius mentions three kinds of halls; the tetraſtyle, with four columns, ſupporting the platfond or ceiling; the Corinthian, with columns all round let into the wall, and vaulted over; and the Egyptian, which had a periſtyle of inſulated Corinthian columns, bearing a ſecond order with a ceiling.

The hall is properly the fineſt as well as firſt member of an apartment; and in the houſes of miniſters of ſtate, magiſtrates, &c. is the place where they diſpatch buſineſs, and give audience. In very magnificent buildings, where the hall is larger and loftier than ordinary, and placed in the middle of the houſe, it is called a *ſaloon*.

The length of a hall ſhould be at leaſt twice and a quarter its breadth; and in great buildings, three times its breadth. As to the height of halls, it may be two thirds of the breadth; and, if made with an arched ceiling, it will be much handſomer, and leſs liable to accidents by fire. In this caſe, its height is found by dividing its breadth into ſix parts, five of which will be the height from the floor to the under ſide of the key of the arch.

Hall (Joſeph), an eminent prelate of the church of England, was born in 1574, and educated at Cambridge. He became profeſſor of Rhetoric in that univerſity, and then ſucceſſively was made rector of Halſted in Suffolk, preſented to the living of Waltham in Eſſex, made prebendary of Wolverhampton, dean of Worceſter, biſhop of Exeter, and laſtly of Norwich.

His works teſtify his zeal againſt Popery, and are much eſteemed. He lamented the diviſions of the Proteſtants, and wrote ſomething concerning the means of putting an end to them. July 1616, he attended the embaſſy of lord Doncaſter into France, and upon his return was appointed by his majeſty to be one of the divines who ſhould attend him into Scotland. In 1618 he was ſent to the ſynod of Dort with other divines, and pitched upon to preach a Latin ſermon before that aſſembly. But being obliged to return from thence before the ſynod broke up, on account of his health, he was by the ſtates preſented with a gold medal. He wrote, 1. Miſcellaneous epiſtles. 2. *Mundus alter et idem*. 3. A juſt cenſure of travellers. 4. The Chriſtian Seneca. 5. Satires, in ſix books. 6. A century of meditations; and many other works, which, beſides the above ſatires, make in all five volumes in folio and quarto. He died in 1656.

Hall (John), a poet of diſtinguiſhed learning, was born at Durham, and educated at Cambridge, where he was eſteemed the brighteſt genius in that univerſity. In 1646, when he was but 19 years of age, he publiſhed his *Horæ Vacivæ*, or Eſſays; and the ſame year came out his poems. He tranſlated from the Greek "Hierocles upon the golden verſes of Pythagoras;" before which is an account of the ingenious tranſlator and his works, by John Davies of Kidwelly. He died in 1656, aged 29.

HALLAGE, a fee or toll paid for cloth brought to be ſold in Blackwell-hall, London.

HALLAMASS. See All-Saints.

HALLAND, a country of Sweden, in the iſland of Schonen, lying along the ſea-coaſt, at the entrance of the Baltic Sea, and oppoſite to Jutland. It is 60 miles along the coaſt, but is not above 12 in breadth. Halmſtadt is the capital town.

HALLATON, a town of Leiceſterſhire, in England. It is ſeated on a rich ſoil, 12 miles ſouth-eaſt of Leiceſter, in E. Lon. 0. 50. N. Lat. 52. 35.

HALLE, a little diſmantled town of the Auſtrian Netherlands, in Hainault. The church of Notre Dame contains an image of the Virgin Mary, held in great veneration. E. Lon. 3. 15. N. Lat 50. 44.

Halle, a handſome and conſiderable town of Germany, in the circle of Upper Saxony, and in the duchy of Magdeburg, with a famous univerſity and ſalt-works. It belongs to the king of Pruſſia; and is ſeated in a pleaſant plain on the river Sale, in E. Lon. 12. 33. N. Lat. 51. 36.

Halle, a free and imperial town of Germany, in Suabia, famous for its ſalt-pits. It is ſeated on the river Kocher, among rocks and mountains, in E. Lon. 10. 50. N. Lat. 49. 6.

HALLEIN, a town of Germany, in the circle of Bavaria, and archbiſhopric of Saltſburg; ſeated on the river Saltza, among the mountains, wherein are mines of ſalt, which are the chief riches of the town and country. E. Lon. 12. 15. N. Lat. 47. 33.

HALLELUJA, a word ſignifying "Praiſe the Lord." The ſinging halleluja (firſt introduced into the church-ſervice by St Jerom), was a ſort of invitatory, or call to each other, to praiſe the Lord. St Auſtin ſays, that in ſome churches it was ſung only on Eaſter-day, and the 50 days of Pentecoſt; but that even in thoſe churches where it was moſt in uſe, it was never uſed in the time of Lent.

HALLER (Albert Van), an eminent phyſician, was born at Bern, on the 16th of October 1708. He was the ſon of an advocate, of conſiderable eminence in his profeſſion. His father had a numerous family, and Albert was the youngeſt of five ſons. From the firſt period of his education, he ſhewed a very great genius for literature of every kind: to forward the progreſs of his ſtudies, his father took into his family a private tutor, named *Abraham Billodz;* and ſuch was the diſcipline exerted by this pedagogue, that the accidental ſight of him, at any future period of life, excited in Haller very great uneaſineſs, and renewed all his former terrors.

According to the accounts which are given us, the progreſs of Haller's ſtudies, at the earlieſt periods of life, was rapid almoſt beyond belief. When other children were beginning only to read, he was ſtudying Bayle and Moreri; and at nine years of age he was able to tranſlate Greek, and was beginning the ſtudy of Hebrew. Not long after this, however, the courſe of his education was ſomewhat interrupted by the death of his father; an event which happened when he was in the 13th year of his age. After this he was ſent to the public ſchool at Bern, where he exhibited many ſpecimens of early and uncommon genius. He was diſtinguiſhed for his knowledge in the Greek and Latin languages; but he was chiefly remarkable for his poetical genius: and his eſſays of this kind, which were publiſhed in the German language, were read and admired throughout the whole empire.

In the 16th year of his age, he began the ſtudy of medicine at Tubingen, under thoſe eminent teachers Duvernoy and Camerarius; and continued there for the ſpace of two years, when the great reputation of the juſtly celebrated Boerhaave drew him to Leyden. Nor was this diſtinguiſhed teacher the only man from whoſe ſuperior abilities he had there an opportunity of profiting. Ruyſch was ſtill alive, and Albinus was riſing into fame. Animated by ſuch examples, he ſpent all the day, and the greateſt part of the night, in the

Haller.

moſt intenſe ſtudy; and the proficiency which he made, gained him univerſal eſteem both from his teachers and fellow-ſtudents.

From Holland, in the year 1727, he came to England. Here, however, his ſtay was but ſhort; and it was rather his intention to viſit the illuſtrious men of that period, than to proſecute his ſtudies at London. He formed connexions with ſome of the moſt eminent of them. He was honoured with the friendſhip of Douglas and Cheſelden; and he met with a reception proportioned to his merit from Sir Hans Sloane, preſident of the Royal Society. After his viſit to Britain, he went to France; and there, under thoſe eminent maſters, Winſlow and Le Dran, with the latter of whom he reſided during his ſtay in Paris, he had opportunities of proſecuting anatomy, which he had not before enjoyed. But the zeal of our young anatomiſt was greater than the prejudices of the people at that period, even in the enlightened city of Paris, could admit of. An information being lodged againſt him to the police for diſſecting dead bodies, he was obliged to cut ſhort his anatomical inveſtigations by a precipitate retreat. Still, however, intent on the farther proſecution of his ſtudies, he went to Baſil, where he became a pupil to the celebrated Bernoulli.

Thus improved and inſtructed by the lectures of the moſt diſtinguiſhed teachers of that period, by uncommon natural abilities, and by unremitting induſtry, he returned to the place of his nativity in the 26th year of his age. Not long after this, he offered himſelf a candidate, firſt for the office of phyſician to an hoſpital, and afterwards for a profeſſorſhip. But neither the character which he had before he left his native country, nor the fame which he had acquired and ſupported while abroad, were ſufficient to combat the intereſt oppoſed to him. He was diſappointed in both; and it was even with difficulty that he obtained, in the following year, the appointment of keeper of a public library at Bern. The exerciſe of this office was indeed by no means ſuited to his great abilities: but it was agreeable to him, as it afforded him an opportunity for that extenſive reading by which he has been ſo juſtly diſtinguiſhed.

The neglect of his merit which marked his firſt outſet, neither diminiſhed his ardour for medical purſuits, nor detracted from his reputation either at home or abroad. And ſoon after he was nominated a profeſſor in the univerſity of Gottingen, by king George II. The duties of this important office he diſcharged, with no leſs honour to himſelf than advantage to the public, for the ſpace of ſeventeen years; and it afforded him an ample field for the exertion of thoſe great talents which he poſſeſſed. Extenſively acquainted with the ſentiments of others reſpecting the œconomy of the human body, ſtruck with the diverſity of opinions which they held, and ſenſible that the only means of inveſtigating truth was by careful and candid experiment, he undertook the arduous taſk of exploring the phænomena of human nature from the original ſource. In theſe purſuits he was no leſs induſtrious than ſucceſsful, and there was hardly any function of the body on which his experiments did not reflect either a new or a ſtronger light. Nor was it long neceſſary for him, in this arduous undertaking, to labour alone. The example of the preceptor inſpired his pupils with the ſpirit of induſtrious exertion. Zinn, Zimmerman, Caldani, and many others, animated by a generous emulation, laboured with indefatigable induſtry to proſecute and to perfect the diſcoveries of their great maſter. And the mutual exertion of the teacher and his ſtudents, not only tended to forward the progreſs of medical ſcience, but placed the philoſophy of the human body on a more ſure, and an almoſt entirely new baſis.

But the labours of Dr Haller, during his reſidence at Gottingen, were by no means confined to any one department of ſcience. He was not more anxious to be an improver himſelf, than to inſtigate others to ſimilar purſuits. To him, the Anatomical Theatre, the School of Midwifery, the Chirurgical Society, and the Royal Academy of Sciences, at Gottingen, owe their origin. Such diſtinguiſhed merit could not fail to meet with a ſuitable reward from the ſovereign under whoſe protection he then taught. The king of Great Britain not only honoured him with every mark of attention which he himſelf could beſtow, but procured him alſo letters of nobility from the emperor. On the death of Dillenius, he had an offer of the profeſſorſhip of botany at Oxford; the ſtates of Holland invited him to the chair of the younger Albinus; the king of Pruſſia was anxious that he ſhould be the ſucceſſor of Maupertuis at Berlin. Marſhal Keith wrote to him in the name of his ſovereign, offering him the chancellorſhip of the univerſity of Halle, vacant by the death of the celebrated Wolff. Count Orlow invited him to Ruſſia, in the name of his miſtreſs the empreſs, offering him a diſtinguiſhed place at St Peterſburgh. The king of Sweden conferred on him an unſolicited honour, by raiſing him to the rank of knighthood of the order of the polar ſtar; and the emperor of Germany did him the honour of a perſonal viſit, during which he thought it no degradation of his character to paſs ſome time with him in the moſt familiar converſation.

Thus honoured by ſovereigns, revered by men of literature, and eſteemed by all Europe, he had it in his power to have held the higheſt rank in the republic of letters. Yet, declining all the tempting offers which were made to him, he continued at Gottingen, anxiouſly endeavouring to extend the riſing fame of that medical ſchool. But after ſeventeen years reſidence in that univerſity, an ill ſtate of health rendering him leſs fit for the duties of the important office which he held, he ſolicited and obtained permiſſion from the regency of Hanover to return to his native city of Bern. His fellow-citizens, who might at firſt have fixed him among themſelves, with no leſs honour than advantage to their city, were now as ſenſible as others of his ſuperior merit. A penſion was ſettled upon him for life, and he was nominated at different times to fill the moſt important offices in the ſtate. Theſe occupations, however, did not diminiſh his ardour for uſeful improvements. He was the firſt preſident, as well as the greateſt promoter, of the Oeconomical Society at Bern; and he may be conſidered as the father and founder of the Orphan-hoſpital of that city. Declining health, however, reſtrained his exertions in the more active ſcenes of life, and for many years he was confined entirely to his own houſe. Even this, however, could not put a period to his utility: for, with indefatigable induſtry he continued his favourite employment of writing till within a few days of his death; which happened in the 70th year of his age, on the 12th of December 1777. His *Elementa Phyſiologiæ* and *Bibliotheca Medicinæ*, will afford, to lateſt poſterity, undeniable proofs of his indefatigable induſtry, penetrating genius, and ſolid judgment. But he was not leſs diſtinguiſhed as a philoſopher, than beloved as a man; and he was not more eminent for his improvement in every department of medical ſcience, than for his piety to God, and benevolence to all mankind.

HALLEY (Dr Edmund), an eminent aſtronomer, was the only ſon of a ſoap-boiler in London, and was born in 1656. He firſt applied himſelf to the ſtudy of the languages and ſciences, but at length gave himſelf up wholly to that of aſtronomy. In 1676 he went to the iſland of St Helena to complete the catalogue of fixed ſtars, by the addition of thoſe that lie near the ſouth pole; and having delineated a planiſphere, in which he laid them all down in their exact places, he returned to England in 1678. In the year 1680 he took what is called *the grand tour*, accompanied by his friend the celebrated Mr Nelſon. In the midway between Calais and Paris, Mr Halley had a ſight of a remarkable comet, as it then appeared a ſecond time that year, in its return from the ſun. He had the November before ſeen it in its deſcent; and now haſtened to complete his obſervations upon it, in viewing it from the royal obſervatory of France. His deſign in this part of his tour was, to ſettle a friendly correſpondence between the two royal aſtronomers of Greenwich and Paris, and in the mean time to improve himſelf under ſo great a maſter as Caſſini. From thence he went to Italy, where he ſpent great part of the year 1681; but his affairs calling him home, he returned to England. In 1683, he publiſhed his *Theory of the variation of the magnetical compaſs*; in which he ſuppoſes the whole globe of the earth to be a great magnet, with four magnetical poles, or points of attraction: but afterwards thinking that this theory was liable to great exceptions, he procured an application to be made to king William, who appointed him commander of the Paramour pink, with orders to ſeek by obſervations the diſcovery of the rule of variations, and to lay down the longitudes and latitudes of his majeſty's ſettlements in America.—He ſet out on this attempt on the 24th of November 1698: but having croſſed the line, his men grew ſickly; and his lieutenant mutinying, he returned home in June 1699. Having got the lieutenant tried and caſhiered, he ſet ſail a ſecond time in September following, with the ſame ſhip, and another of leſs bulk, of which he had alſo the command. He now traverſed the vaſt Atlantic ocean from one hemiſphere to the other, as far as the ice would permit him to go; and having made his obſervations at St Helena, Braſil, Cape Verd, Barbadoes, the Madeiras, the Canaries, the coaſt of Barbary, and many other latitudes, arrived in September 1700; and the next year publiſhed a general chart, ſhewing at one view the variation of the compaſs in all thoſe places. Captain Halley, as he was now called, had been at home little more than half a year, when he was ſent by the king to obſerve the courſe of the tides, with the longitude and latitude of the principal head-lands in the Britiſh channel; which having executed with his uſual expedition and accuracy, he publiſhed a large map of the Britiſh channel. Soon after, the emperor of Germany reſolving to make a convenient harbour for ſhipping in the Adriatic, Captain Halley was ſent by queen Anne to view the two ports on the coaſt of Dalmatia. He embarked on the 22d of November 1702; paſſed over to Holland; and going through Germany to Vienna, he proceeded to Iſtria: but the Dutch oppoſing the deſign, it was laid aſide; yet the emperor made him a preſent of a rich diamond-ring from his finger, and honoured him with a letter of recommendation, written with his own hand, to queen Anne. Preſently after his return, he was ſent again on the ſame buſineſs; when paſſing thro' Hanover, he ſupped with king George I. then electoral prince, and his ſiſter the queen of Pruſſia. On his arrival at Vienna, he was the ſame evening preſented to the emperor, who ſent his chief engineer to attend him to Iſtria, where they repaired and added new fortifications to thoſe of Trieſte.

Mr Halley returned to England in 1703; and the ſame year was made profeſſor of geometry in the univerſity of Oxford, in the room of Dr Wallis, and had the degree of doctor of laws conferred on him by that univerſity. He is ſaid to have loſt the profeſſorſhip of aſtronomy in that city, becauſe he would not profeſs his belief of the Chriſtian religion. He was ſcarcely ſettled at Oxford, when he began to tranſlate into Latin from the Arabic, *Apollonius de ſectione rationis*; and to reſtore the two books *De ſectione ſpatii* of the ſame author, which are loſt, from the account given of them by Pappius; and he publiſhed the whole work in 1706. Afterwards he had a ſhare in preparing for the preſs Apollonius's Conics; and ventured to ſupply the whole eighth book, the original of which is alſo loſt. He likewiſe added Serenus on the ſection of the cylinder and cone, printed from the original Greek, with a Latin tranſlation, and publiſhed the whole in folio. In 1713, he was made ſecretary of the Royal Society; in 1720, he was appointed the king's aſtronomer at the royal obſervatory at Greenwich, in the room of Mr Flamſtead; and, in 1729, was choſen as a foreign member of the Academy of Sciences at Paris. He died at Greenwich in 1742. His principal works are, 1. *Catalogus ſtellarum auſtraliorum.* 2. *Tabulæ aſtronomicæ.* 3. An abridgment of the aſtronomy of comets, &c. We are alſo indebted to him for the publication of ſeveral of the works of the great Sir Iſaac Newton, who had a particular friendſhip for him, and to whom he frequently communicated his diſcoveries.

HALLEY's *Quadrant*. See QUADRANT.

HALLIARDS, the ropes or tackles uſually employed to hoiſt or lower any ſail upon its reſpective maſt or ſtay. See JEARS.

HALMOTE, or HALIMOTE, is the ſame with what we now call a *court-baron*, the word implying a meeting of the tenants of the ſame hall or manor. The name is ſtill retained at Luſton, and other places in Herefordſhire. See MOTE.

HALMSTADT. See HELMSTADT.

HALSTEAD, town of Eſſex, in England, ſeated on the river Coln, in E. Lon. 0. 45. N. Lat. 51. 55. It has an old church, the ſteeple of which was once burnt down by lightning, but rebuilt at the expence of an individual, (Robert Fiſke, eſq;). The town conſiſts of about 600 pretty good houſes, and is ſituated on a riſing ground, but the ſtreets are not paved. The inhabitants are about 4000 in number. Here is a good manufactory of ſays, bays, callimancoes, &c. alſo a good free-ſchool for 40 boys, and a very antique Bridewell.

HALO, or Corona, in natural hiſtory, a coloured circle appearing round the body of the ſun, moon, or any of the large ſtars. See Corona.

HALT, in war, a pauſe or ſtop in the march of a military body.—Some derive the word from the Latin *halitus*, breath; it being a frequent occaſion of halting to take breath: others from *alto*, becauſe in halting they raiſed their pikes on end, &c.

HALTERISTÆ, in antiquity, a kind of players at diſcus; denominated from a peculiar kind of diſcus called by the Greeks ἁλτηρ, and by the Latins *Halter*. See Discus.

Some take the diſcus to have been a leaden weight or ball which the vaulters bore in their hands, to ſecure and keep themſelves the more ſteady in their leaping. Others will have the *halter* to be a lump or maſs of lead or ſtone, with an hold or handle fixed to it, by which it might be carried; and that the *halteriſtæ* were thoſe who exerciſed themſelves in removing theſe maſſes from place to place.

Hier. Mercurialis, in his treatiſe *De arte gymnaſtica*, l. ii. c. 12. diſtinguiſhes two kinds of *halteriſtæ*; for though there was but one *halter*, there were two ways of applying it. The one was to throw or pitch it in a certain manner; the other only to hold it out at arm's-end, and in this poſture to give themſelves divers motions, ſwinging the hand backwards and forwards, according to the engraven figures thereof given us by Mercurialis.—The *halter* was of a cylindrical figure, ſmaller in the middle, where it was held, by one diameter, than at the two ends. It was above a foot long, and there was one for each hand: it was either of iron, ſtone, or lead.

Galen, *De tuend. valetud.* lib. i. v. & vi. ſpeaks of this exerciſe, and ſhews of what uſe it is in purging the body of peccant humours; making it equivalent both to purgation and phlebotomy.

HALTWHISTLE, a town of Northumberland, in England, ſituated in E. Lon. 2. 0. N. Lat. 55. 0. It is pretty well built, and affords good entertainment for travellers.

HALYMOTE, properly ſignifies an holy or eccleſiaſtical court. See Halmote.

There is a court held in London by this name before the Lord-Mayor and ſheriffs, for regulating the bakers. It was anciently held on Sunday next before St Thomas's day, and for this reaſon called the *Halymote*, or *Holy-court*.

HALYWERCFOLK, in old writers, were perſons who enjoyed land, by the pious ſervice of repairing ſome church, or defending a ſepulchre.

This word alſo ſignified ſuch perſons in the dioceſe of Durham, as held their lands to defend the corps of St Cuthbert, and who from thence claimed the privilege of not being forced to go out of the biſhopric.

HAM is a Saxon word uſed for "a place of dwelling;" a village or town: hence the termination of ſome of our towns, *Nottingham*, *Buckingham*, &c. Alſo a home cloſe, or little narrow meadow, is called a *ham*.

Ham, in cookery, the leg of a hog, ſeaſoned and dried.

To ſalt a ham in imitation of thoſe of Weſtphalia: Let the ham be of young pork; ſprinkle it with ſalt for one day, that it may fetch out the blood; then wipe it dry, and rub it with the following mixture: Take a pound of brown ſugar, half a pound of ſaltpetre, half a pint of bay-ſalt, and three pints of common ſalt; ſtir theſe together in an iron-pan over the fire till they are pretty hot, and then rub the leg of pork with it: let it lie three weeks in this ſalting, frequently turning it, and then dry it in a chimney.

Ham, a city of Germany, in the circle of Weſtphalia, capital of the county of Mark, and ſubject to the king of Pruſſia. It is ſeated on the river Lippe, on the frontiers of Munſter. The adjacent country abounds in corn, hemp, and flax; and the inhabitants get a good deal of money by travellers. It was formerly a hanſe-town, but is now reduced. E. Lon. 7. 53. N. Lat. 51. 42.

Ham, a town of Picardy, in France, ſeated on the river Somme, among marſhes. It has three pariſhes, and there is here a round tower whoſe walls are 36 feet thick. It was taken by the Spaniards in 1557, but reſtored by treaty. E. Lon. 3. 9. N. Lat. 49. 45.

HAMADAN. See Amadan.

HAMADRYADS, in Heathen theology, certain rural deities; being nymphs of the woods, whoſe fate depended upon certain trees, together with which they were ſuppoſed both to be born and to die.

HAMAH, a town of Turky in Aſia, in Syria, ſituated in E. Lon. 36. 15. N. Lat. 35. 15. By ſome travellers it is corruptly called *Amarl* and *Amant*. Some miſtake it for the ancient Apamea; but this is now called *Aſamiyah*, and is ſituated a day's journey from Hamah. Hamah is ſituated among hills, and has a caſtle ſeated on a hill. It has all along been a conſiderable place, and in the 13th century had princes of its own. It is very large, and being ſeated on the aſcent of a hill, the houſes riſe above one another, and make a fine appearance. It is, however, like moſt other towns under the Turkiſh government, going to decay. Many of the houſes are half ruined; but thoſe which are ſtill ſtanding, as well as the moſques and caſtle, have their walls built of black and white ſtones, diſpoſed in ſuch manner as to form various figures. The river Aſſi, the ancient Orontes, runs by the ſide of the caſtle, and fills the ditches round it, which are cut very deep into the rock. This river, leaving the caſtle, paſſes through the town from ſouth to north, and has a bridge over it, though it is pretty broad. In its courſe through the town it turns 18 great wheels, called by the natives *ſaki*, which raiſe great quantities of water to a conſiderable height, and throw it into canals ſupported by arches, by which means it is conveyed into the gardens and fountains. There are ſome pretty good bazars or market-places in Hamah, where there is a trade for linen, which is manufactured there, and ſent to Tripoli to be exported into Europe.

HAMAMELIS, witch hazel; a genus of the digynia order, belonging to the tetrandria claſs of plants. There is but one ſpecies, a native of Virginia. It hath a ſhrubby or woody ſtem, branching three or four feet high; oval, indented, alternate leaves, reſembling thoſe of common hazel; and flowers growing in cluſters from the joints of the young branches, but not ſucceeded by ſeeds in this country.—The plant is hardy, and is admitted as a variety in our gardens; but its flowers are more remarkable for their appearing in November and December, when the leaves are fallen, than for their beauty.—It may be propagated either by ſeeds or layers.

HAMBDEN (John), a celebrated patriot, deſcended of the ancient family of Hambden in Buckinghamſhire, was born in 1594. From the univerſity he went to the inns of court, where he made a conſiderable progreſs in the ſtudy of the law. He was choſen to ſerve in the parliament which began at Weſtminſter February 5th 1626; and ſerved in all the ſucceeding parliaments in the reign of Charles I. In 1636 he became univerſally known, by his refuſal to pay ſhip-money, as being an illegal tax; upon which he was proſecuted, and his carriage throughout this tranſaction gained him a great character. When the long parliament began, the eyes of all men were fixed on him as their *pater patriæ*. On January 3d 1642, the king ordered articles of high treaſon and other miſdemeanours to be prepared againſt Lord Kimbolton, Mr Hambden, and four other members of the Houſe of Commons, and went to that houſe to ſeize them: but they were then retired. Mr Hambden afterwards made a ſpeech in the houſe to clear himſelf of the charge laid againſt him. In the beginning of the wars he commanded a regiment of foot, and did good ſervice to the parliament at the battle of Edge-hill. He received a mortal wound in an engagement with Prince Rupert, in Chalgrave-field in Oxfordſhire, and died in 1643. He is ſaid to have had the art of Socrates to a great degree, of interrogating, and, under the notion of doubts, inſinuating objections, ſo that he infuſed his own opinions into thoſe from whom he pretended to learn and receive them. He was, ſay his panegyriſts, a very wiſe man, and of great parts; and poſſeſſed of the moſt abſolute ſpirit of popularity to govern the people, that ever was in any country: He was maſter over all his appetites and paſſions, and had thereby a very great aſcendant over other mens': He was of an induſtry and vigilance never to be tired out, of parts not to be impoſed upon by the moſt ſubtile, and of courage equal to his beſt parts.

HAMBURG, an imperial city of Germany, ſeated in E. Lon. 9. 40. N. Lat. 54. 0. Its name is derived from the old German word *Hamme*, ſignifying a wood, and *Burg*, a caſtle; and ſtands on the north-ſide of the river Elbe. This river is not leſs than four miles broad oppoſite the city. It forms two ſpacious harbours, and likewiſe runs through moſt part of it in canals. It flows above Hamburg many miles; but when the tide is accompanied with north-weſt winds, a great deal of damage is done by the inundations occaſioned thereby. There are a great many bridges over the canals, which are moſtly on a level with the ſtreets, and ſome of them have houſes on both ſides. In the year 833, Ludovicus Pius erected Hamburg firſt into a biſhopric, and afterwards into an archbiſhopric; and Adolphus III. duke of Saxony, among many other great privileges, granted it the right of fiſhing in the Elbe, eight miles above and below the city. The kings of Denmark, ſince they have ſucceed to the counts of Holſtein, have continually claimed the ſovereignty of this place, and often compelled the citizens to pay large ſums to purchaſe the confirmation of their liberties. Nay, it has more than once paid homage to the king of Denmark; who, notwithſtanding, keeps a miniſter here with credentials, which is a ſort of acknowledgment of its independency and ſovereignty. Though Hamburg has been conſtantly ſummoned to the diet of the empire ever ſince the year 1618, when it was declared a free imperial city, by a decree of the aulic council; yet it waves this privilege, in order to keep fair with Denmark. The emperor ſeveral other emperors, and the privilege is now exer-and ſilver money; and the emperor Frederic I. exempted the citizens from paying any tolls on the Elbe. By their ſituation among a number of poor princes, the Hamburghers are continually expoſed to their rapaciousneſs, eſpecially that of the Danes, who have extorted vaſt ſums from them. The city is very populous, in proportion to its bulk; for though one may walk with eaſe round the ramparts in two hours, yet it contains, excluſive of Jews, at leaſt 100,000 inhabitants. Here are a great many charitable foundations, the regulations of which are greatly admired by foreigners. All perſons found begging in the ſtreets are committed to the houſe of correction to hard labour, ſuch as the raſping of Brazil and other kinds of wood. There is an hoſpital into which unmarried women may be admitted for a ſmall ſum, and comfortably maintained during the reſidue of their lives. The number of hoſpitals in this place is greater in proportion to its bigneſs, than in any other Proteſtant city in Europe. The revenue of the orphan-houſe alone is ſaid to amount to between 50 and 60,000 l. There is a large ſumptuous hoſpital for receiving poor travellers that fall ſick. In one of their work-houſes or houſes of correction, thoſe who have not performed their taſk are hoiſted up in a baſket over the table in the common-hall while the reſt are at dinner, that they may be tantalized with the ſight and ſmell of what they cannot taſte. The eſtabliſhed religion of Hamburgh is Lutheraniſm; as for the Calviniſts and the Roman-catholics, they go to the ambaſſadors chapels to celebrate their divine ſervice and worſhip. They have here what they call *a private confeſſion*, previous to the holy communion, which differs in nothing from that of the church of England, and the abſolution is the ſame, only the pooreſt of the people here are forced to give a fee to the prieſt on theſe occaſions. Their churches, which are ancient large fabrics, are open thoroughfares, and in ſome of them there are bookſellers ſhops. The pulpit of St Catharine's is of marble, curiouſly carved and adorned with figures and other ornaments of gold; and its organ, reckoned one of the beſt in Europe, has 6000 pipes. The cathedral is very ancient, and its tower leans as if juſt going to fall; yet, on account of the ſingularity and beauty of its architecture, the danger attending it has been hitherto overlooked. There is ſtill a dean and chapter belonging to this church, though ſecularized; from whoſe court there lies no appeal, but to the imperial chamber at Wetzlar. The chapter conſiſts of a provoſt, dean, 13 canons, eight minor canons, and 30 *vicarii immunes*, beſides others who are under the juriſdiction of the city. The cathedral, with the chapter, and a number of houſes belonging to them, are under the immediate protection of his Britannic majeſty as duke of Bremen, who diſpoſes of the prebends that fall in ſix months of the year, not ſucceſſively, but alternately with the chapter. Hamburgh is almoſt of a circular form, and ſix miles in compaſs. It has ſix gates, and three entrances by water, viz. two from the Elbe and one from the Alſter, being divided into the old and new, which are ſtrongly fortified with moats, ramparts, baſtions, and out-works. The ramparts are very lofty, and planted with trees; and of ſuch a breadth, that ſeveral carriages may go a-breaſt. In the new town, towards Altena, are ſeveral ſtreets of mean houſes inhabited by Jews. Through that entrance from the Elbe called *the lower Baum*, paſs all ſhips going to or coming from ſea. Every morning at the opening of it is ſeen a multitude of boats and ſmall barks, whoſe cargoes conſiſt of milk, fruits, and all kinds of proviſions, ruſhing in at the ſame time. There are ſome fine chimes here, eſpecially thoſe of St Nicholas, which play every morning early, at one o'clock in the afternoon, and on all feſtivals and ſolemnities. The other public ſtructures in this city, beſides the churches, make no great appearance: however, the yard, arſenal, and two armories, are well worth ſeeing. There are ſeveral convents or cloiſters ſtill remaining; which having been ſecularized, are now poſſeſſed by the Lutherans. One of them holds its lands by this tenure, "That they offer a glaſs of "wine to every malefactor who is carried by it for "execution." There is a fine exchange, though inferior to that of London. It is the cuſtom of Hamburgh, that a citizen, when he dies, muſt leave the tenth of his eſtate to the city; and foreigners, not naturalized, muſt pay a certain ſum annually for liberty to trade. The common carts here are only a long pulley laid upon an axle-tree between two wheels, and drawn not by horſes, but by men, of whom a dozen or more are ſometimes linked to theſe machines, with ſlings acroſs their ſhoulders. Such of the ſenators, principal elders, divines, regular phyſicians, and graduates in law, as aſſiſt at funerals, have a fee. The hangman's houſe is the common priſon for all malefactors; on whom ſentence is always paſſed on Friday, and on Monday they are executed. As, by their laws, no criminal is puniſhable unleſs he plead guilty, they have five different kinds of torture to extort ſuch confeſſion. The government of this city is lodged in the ſenate and three colleges of burghers. The former is veſted with almoſt every act of ſovereignty, except that of laying taxes and managing the finances, which are the prerogatives of the latter. The magiſtracy is compoſed of four burgo-maſters, four ſyndics, and 24 aldermen, of whom ſome are lawyers and ſome merchants. Any perſon elected into the magiſtracy, and declining the office, muſt depart the place. No burgher is admitted into any of the colleges, unleſs he dwells in a houſe of his own within the city, and is poſſeſſed of 1000 rixdollars in ſpecie, over and above the ſum for which the houſe may be mortgaged; or 2000 in moveable goods, within the juriſdiction of the ſame. For the adminiſtration of juſtice, here are ſeveral inferior courts, from which an appeal lies to the Obergericht, or high court, and from that to the aulic council and other imperial colleges. For naval cauſes here is a court of admiralty, which, jointly with the city-treaſury, is alſo charged with the care of the navigation of the Elbe, from the city to the river's mouth. In conſequence of this, 100 large buoys, ſome white, others black, are kept conſtantly floating in the river in ſummer; but in winter, inſtead of ſome of them, there are machines, like thoſe called *ice-beacons*, to point out the ſhoals and flats. Subordinate to the admiralty is a company of pilots; and at the mouth of the Elbe is, or at leaſt ought to be, a veſſel always riding, with pilots ready to put on board the ſhips. At the mouth of the river alſo is a good harbour, called *Cuxhaven*, belonging to Hamburgh; a light-houſe; and ſeveral beacons, ſome of them very large. For defraying the expence of theſe, certain tolls and duties were formerly granted by the emperors to the city. Beſides the Elbe, there is a canal by which a communication is opened with the Trave, and thereby with Lubeck and the Baltic, without the hazard, trouble, and expence of going about by the Sound. The trade of Hamburgh is exceeding great, in exporting all the commodities and manufactures of the ſeveral cities and ſtates of Germany, and ſupplying them with whatever they want from abroad. Its exports conſiſt of linens of ſeveral ſorts and countries; as lawns, diapers, Oſnaburgs, dowlas, &c. linen-yarn, tin-plates, iron, braſs and ſteel wire, clap-board, pipe-ſtaves, wainſcot-boards, oak-plank and timber, kid-ſkins, corn, beer in great quantities, with flax, honey, wax, aniſeed, linſeed, drugs, wine, tobacco, and metals. Its principal imports are the woollen manufactures and other goods of Great Britain, to the amount of ſeveral hundred thouſand pounds a-year: they have alſo a great trade with Spain, Portugal, and Italy, which is carried on moſtly in Engliſh bottoms, on account of their Mediterranean paſſes. Their whale-fiſhery is alſo very conſiderable, 50 or 60 ſhips being generally ſent out every year in this trade. Add to theſe a variety of manufactures, which are performed here with great ſucceſs; the chief of which are, ſugar-baking, calico-printing, the weaving of damaſks, brocades, velvets, and other rich ſilks. The inland trade of Hamburgh is ſuperior to that of any in Europe, unleſs perhaps we ſhould except that of Amſterdam and London. There is a paper publiſhed here at ſtated times, called the *Preiſcourant*, ſpecifying the courſe of exchange, with the price which every commodity and merchandiſe bore laſt upon the exchange. There is alſo a board of trade, erected on purpoſe for the advancing every project for the improvement of commerce. Another great advantage to the merchants is, the bank eſtabliſhed in 1619, which has a flouriſhing credit. To ſupply the poor with corn at a low price, here are public granaries, in which great quantities of grain are laid up. By charters from ſeveral emperors, the Hamburghers have a right of coinage, which they actually exerciſe. The Engliſh merchants, or *Hamburgh company*, as it is called, enjoy great privileges; for they hold a court with particular powers, and a juriſdiction among themſelves, and have a church and miniſter of their own.—This city has a diſtrict belonging to it of conſiderable extent, which abounds with excellent paſtures, intermixed with ſeveral large villages and noblemens ſeats. A ſmall bailiwic, called *Bergedorſ*, belongs to this city and Lubeck.—Though Hamburgh has an undoubted right to a ſeat in the diet of the empire, yet as ſhe pays no contributions to the military cheſt in time of war, and is alſo unwilling to draw upon herſelf the reſentment of Denmark, ſhe makes no uſe of that privilege. There is a *ſchola illuſtris* or gymnaſium here, well endowed, with ſix able profeſſors, who read lectures in it as at the univerſities. There are alſo ſeveral free ſchools, and a great number of libraries, public and private. The public cellar of this town has always a prodigious ſtock and vent of old hock, which brings in a conſiderable revenue to the ſtate. Beſides the militia, or trained bands, there is an eſtabliſhment of regular forces, conſiſting of 12 companies of infantry, and one troop of dragoons, under the commandant, who is uſually a foreigner, and one who has diſtinguiſhed himſelf in the ſervice. There is alſo an artillery company, and a night-guard; the laſt of which is poſted at night all over the city, and calls the hours.

HAMEL (John Baptiſte du), a very learned French philoſopher and writer in the 17th century. At 18 he wrote a treatiſe, in which he explained in a very ſimple manner, Theodoſius's three books of Spherics; to which he added a tract upon trigonometry, extremely perſpicuous, and deſigned as an introduction to aſtronomy. Natural philoſophy, as it was then taught, was only a collection of vague, knotty, and barren queſtions; when our author undertook to eſtabliſh it upon right principles, and publiſhed his *Aſtronomia Phyſica*. In 1666 Mr Colbert propoſed to Lewis XIV. a ſcheme, which was approved of by his majeſty, for eſtabliſhing a royal academy of ſciences; and appointed our author ſecretary of it. He publiſhed a great many books; and died at Paris in 1706, of mere old age, being almoſt 83. He was regius profeſſor of philoſophy, in which poſt he was ſucceeded by M. Varignon. He wrote Latin with purity and elegance.

HAMELIN, a ſtrong town of Germany, in the duchy of Calemberg in Lower Saxony. It is ſituated at the extremity of the duchy of Brunſwick, to which it is the key, near the confluence of the rivers Hamel and Weſer, in E. Long. 9. 55. N. Lat. 52. 13.

HAMESECKEN. BURGLARY, or *Nocturnal Houſebreaking*, was by the ancient Engliſh law called *Hameſecken*, as it is in Scotland to this day.—Violating the privilege of a man's houſe in Scotland is as ſeverely puniſhed as raviſhing a woman.

HAMILTON, a town of Scotland, in Clydeſdale, ſeated on the river Clyde, eleven miles ſouth-eaſt of Glaſgow; from whence the noble family of Hamilton take their name, and title of duke. The town is ſeated in the middle of a very agreeable plain; and on the weſt of the town this family has a large park, which is near ſeven miles in circumference, incloſed with a high wall, full of deer and other game. The rivulet called *Avon* runs through the park, and falls into the river Clyde, over which laſt there is a bridge of free-ſtone. W Lon. 3. 50. N. Lat. 55. 40. The original name of this place, or the lands about it, was *Cadzow* or *Cadyow*, a barony granted to an anceſtor of the noble owner, on the following occaſion. In the time of Edward II. lived *Sir Gilbert de Hamilton*, or *Hampton*, an Engliſhman of rank; who happening at court to ſpeak in praiſe of Robert Bruce, received on the occaſion an inſult from John de Spenſer, chamberlain to the king; whom he fought and ſlew. Dreading the reſentment of that potent family, he fled to the Scottiſh monarch; who received him with open arms, and eſtabliſhed him at the place poſſeſſed by the duke of Hamilton. In aftertimes the name was changed from *Cadzow* to *Hamilton*; and in 1445 the lands were erected into a lordſhip, and the then owner Sir James ſat in parliament as lord Hamilton. The ſame nobleman founded the collegiate church at Hamilton in 1451, for a provoſt and ſeveral prebendaries. The endowment was ratified at Rome by the pope's bull, which he went in perſon to procure.—Hamilton-houſe, or palace, is at the end of the town; a large diſagreeable pile, with two deep wings at right angles with the centre: the gallery is of great extent; and furniſhed, as well as ſome other rooms, with moſt excellent paintings.

HAMILTON (Anthony, count), deſcended from a noble family in Scotland, was born in Ireland, and ſettled in France. He wrote ſeveral poetical pieces; and was the firſt who compoſed romances in an agreeable taſte, without imitating the burleſque of Scarron. He is alſo ſaid to be the author of the *Memoirs of the count de Grammont*, one of the beſt written pieces in the French language. His works were printed in 6 vols 12mo. He died at St Germain-en-Laye, in 1720.

HAMILTON (George), earl of Orkney, and a brave warrior, was the fifth ſon of William earl of Selkirk, and early betook himſelf to the profeſſion of arms. Being made colonel in 1689-90, he diſtinguiſhed himſelf by his bravery at the battle of the Boyne; and ſoon after, at thoſe of Aghrim, Steinkirk, and Landen, and at the ſieges of Athlone, Limerick, and Namur. His eminent ſervices in Ireland and Flanders, through the whole courſe of that war, recommended him ſo highly to king William III. that, in 1696, he advanced him to the dignity of a peer of Scotland, by the title of *earl of Orkney*; and his lady, the ſiſter of Edward viſcount Villiers, afterwards earl of Jerſey, had a grant made to her, under the great ſeal of Ireland, of almoſt all the private eſtates of the late king James, of very conſiderable value.

Upon the acceſſion of queen Anne to the throne, he was promoted to the rank of major-general in 1702, and the next year to that of lieutenant-general, and was likewiſe made knight of the thiſtle. His lordſhip afterwards ſerved under the great duke of Marlborough; and contributed by his bravery and conduct to the glorious victories of Blenheim and Malplaquet, and to the taking ſeveral of the towns in Flanders.

In the beginning of 1710, his lordſhip, as one of the 16 peers of Scotland, voted for the impeachment of Dr Sacheverel; and the ſame year was ſworn of the privy-council, and made general of the foot in Flanders. In 1712, he was made colonel of the royal regiment of fuzileers, and ſerved in Flanders under the duke of Ormond. In 1714, he was appointed gentleman-extraordinary of the bed chamber to king George I. and afterwards governor of Virginia. At length he was appointed conſtable, governor, and captain of Edinburgh caſtle, lord lieutenant of the county of Clydeſdale, and field-marſhal. He died at his houſe in Albemarle-ſtreet, in 1737.

HAMLET, Hamel, or *Hampſel*, (from the Saxon *Ham*, i. e. *Domus*, and the German *Let*, i. e. *Membrum*), ſignifies a little village, or part of a village or pariſh; of which three words the firſt is now only uſed, tho' Kitchen mentions the two laſt. By Spelman there is a difference between *villam integram*, *villam dimidiam*, and *hamletam*; and Stowe expounds it to be the ſeat of a freeholder. Several county-towns have hamlets, as there may be ſeveral hamlets in a pariſh; and ſome particular places may be out of a town or hamlet, though not out of the county.

HAMMOCK, on ſhipboard, a piece of canvas ſix feet long and three feet wide, gathered together at the two ends, and hung horizontally under the deck lengthwiſe, for the ſailors to ſleep therein. There are uſually from 14 to 20 inches in breadth allowed between-decks for every hammock in a ſhip of war: this ſpace, however, muſt in ſome meaſure depend on the number of the crew, &c. in proportion to the room of the veſſel. In the time of battle the hammocks, together with their bedding, are all firmly corded, and fixed in the nettings on the quarter-deck, or wherever the men are too much expoſed to the view or fire of the enemy.

HAMMER, a well-known tool uſed by mechanics, conſiſting of an iron-head, fixed croſſwiſe upon a handle of wood. There are ſeveral ſorts of hammers uſed by blackſmiths; as, 1. The hand-hammer, which is of ſuch weight that it may be wielded or governed with one hand at the anvil. 2. The up-hand ſledge, uſed with both hands, and ſeldom lifted above the head. 3. The about-ſledge, which is the biggeſt hammer of all, and held by both hands at the fartheſt end of the handle; and being ſwung at arms-length over the head, is made to fall upon the work with as heavy a blow as poſſible. There is alſo another hammer uſed by ſmiths, called a *rivetting-hammer*; which is the ſmalleſt of all, and is ſeldom uſed at the forge, unleſs upon ſmall work.—Carpenters and joiners have likewiſe hammers accommodated to their ſeveral purpoſes.

HAMMOND (Henry), D. D. one of the moſt learned Engliſh divines in the 17th century, was born in 1605. He ſtudied at Oxford, and in 1629 entered into holy orders. In 1633 he was inducted into the rectory of Penſhurſt in Kent. In 1643 he was made archdeacon of Chicheſter. In the beginning of 1645 he was made one of the canons of Chriſt-church, Oxford, and chaplain in ordinary to king Charles I. who was then in that city; and he was alſo choſen public orator of the univerſity. In 1647, he attended the king in his confinement at Wooburn, Caveſham, Hampton-Court, and the iſle of Wight, where he continued till his majeſty's attendants were again put from him. He then returned to Oxford, where he was choſen ſub-dean; and continued there till the parliament viſitors firſt ejected him, and then impriſoned him for ſeveral weeks in a private houſe in Oxford. During this confinement he began his Annotations on the New Teſtament. At the opening of the year 1660, when every thing viſibly tended to the reſtoration of the royal family, the doctor was deſired by the biſhops to repair to London, to aſſiſt there in the compoſure of the breaches of the church, his ſtation in which was deſigned to be the biſhopric of Worceſter; but on the 4th of April he was ſeized by a fit of the ſtone, of which he died on the 25th of that month, aged 55. Beſides the above work, he wrote many others; all of which have been publiſhed together in four volumes folio.

HAMMOND (Anthony, eſq;) an ingenious Engliſh poet, deſcended from a good family of Somerſham Place in Huntingdonſhire, was born in 1608. After a liberal education at St John's college, Cambridge, he was choſen member of parliament, and ſoon diſtinguiſhed himſelf as a fine ſpeaker. He became a commiſſioner of the royal navy, which place he quitted in 1712. He publiſhed "A miſcellany of original poems by the moſt eminent hands;" in which himſelf, as appears by the poems marked with his own name, had no inconſiderable ſhare. He wrote the life of Walter Moyle, eſq; prefixed to his works. He was the intimate friend of that gentleman, and died about the year 1726.

Hammond (Mr), known to the world by the Love-Elegies, which, ſome years after his death, were publiſhed by the earl of Cheſterfield, was the ſon of a merchant in London, and preferred to a place about the perſon of the late prince of Wales, which he held till an unfortunate accident deprived him of his ſenſes. The cauſe of this calamity was a paſſion he entertained for a lady, who would not return it: upon which he wrote thoſe love-elegies which have been ſo much celebrated for their tenderneſs. The editor obſerves, that he compoſed them before he was 21 years of age: a period, ſays he, when fancy and imagination commonly riot at the expence of judgment and correctneſs. He was ſincere in his love as in his friendſhip; and wrote to his miſtreſs as he ſpoke to his friends, nothing but the genuine ſentiments of his heart. Tibullus ſeems to have been the model our author judiciouſly preferred to Ovid; the former writing directly from the heart to the heart, the latter too often yielding and addreſſing himſelf to the imagination. Mr Hammond died in the year 1743, at Stow, the ſeat of lord Cobham, who honoured him with a particular intimacy.

HAMPSHIRE, a county of England, bounded on the weſt by Dorſetſhire and Wiltſhire, on the north by Berkſhire, on the eaſt by Surry and Suſſex, and on the ſouth by the Engliſh channel. It extends 64 miles in length from north to ſouth, and 36 in breadth from eaſt to weſt. It is divided into 39 hundreds, and 253 pariſhes; in which are one city, 18 market-towns, and about 180,000 inhabitants. It ſends 26 members to parliament; viz. two for the county, two for the city of Wincheſter the capital, and two for each of the following boroughs, Southampton, Portſmouth, Yarmouth, Petersfield, Newport, Stockbridge, Newton, Chriſtchurch, Lymington, Whitchurch, and Andover.—The air is very pure and pleaſant, eſpecially upon the downs, on which vaſt flocks of ſheep are kept and bred. In the champaign part of the county, where it is free of wood, the ſoil is very fertile, producing all kinds of grain. The county is extremely well wooded and watered; for beſides many woods on private eſtates, in which there are vaſt quantities of well-grown timber, there is the new foreſt of great extent, belonging to the crown, well ſtored with venerable oaks. In theſe woods and foreſts, great numbers of hogs run at large, and feed on the acorns; and hence it is that the Hampſhire bacon ſo far excells that of moſt other countries. The rivers are the Avon, Anton, Arle, Teſt, Stowre, and Itchin; beſides ſeveral ſmaller ſtreams, all abounding in fiſh, eſpecially trout. As its ſea-coaſt is of a conſiderable extent, it poſſeſſes many good ports and harbours, and is well ſupplied with ſalt-water fiſh. Much honey is produced in the county, and a great deal of mead and metheglin made. Here is alſo plenty of game, and on the downs is moſt delightful hunting. The manufacture of cloth and kerſies in this county, though not ſo extenſive as that of ſome others, is yet far from being inconſiderable, and employs great numbers of the poor, as well as contributes to the enriching of the manufacturers by what is ſent abroad.

New **HAMPSHIRE**, a province of North America, in New England. It is bounded on the north by Nova Scotia, on the eaſt by the Ocean, on the ſouth by Maſſachuſet's bay, and on the weſt by New-York. Before the commencement of the American war, it was ruled by a governor and council appointed by the king, and a houſe of repreſentives. As it is a very proper country for furniſhing naval ſtores, great part of its timber was appointed for maſts and yards to the royal navy.

HAMPSTEAD, a pleaſant village of Middleſex, five miles north of London. As the air is exceeding good, the place is well furniſhed with fine ſeats built in an elegant manner, and much reſorted to in the ſummer-time by all ſorts of people. As for the medicinal waters formerly in requeſt, they are now much neglected. In Henry VIII's time it was chiefly inhabited by laundreſſes, who waſhed for the Londoners.

HAMPTON, a town of Gloceſterſhire in England, ſeated on the Cotſwold hills, and had formerly a nunnery. W. Long. 2. 15. N. Lat. 51. 38.

HAMPTON-*Court*, a town of Middleſex in England, ſeated on the river Thames, 12 miles weſt of London, and two from Kingſtown. It is chiefly famous for the royal palace there, which is the fineſt in Britain. It was built by cardinal Wolſey, who had 280 ſilk beds for ſtrangers only, and furniſhed it richly with gold and ſilver plate. The buildings, gardens, and the two parks, to which William III. made conſiderable additions, are about four miles in circumference, and are watered on three ſides by the Thames. The inward court, built by king William, forms a piazza, the pillars of which are ſo low, that it looks more like a cloyſter than a palace; however, the apartments make ample amends, being extremely magnificent, and more exactly diſpoſed than in any other palace in the world, and adorned with moſt elegant furniture. Since the acceſſion of his preſent majeſty, however, this palace hath been much neglected, as the king has generally made choice of Richmond for his ſummer retreat. Thoſe inimitable paintings by Raphael Urbin called the *cartoons*, which were placed there by king William, have been removed to the queen's palace at Weſtminſter. For theſe pieces Lewis XV. is ſaid to have offered 100,000l.

HANAU, a town of Germany, and capital of a county of the ſame name, is pleaſantly ſituated on the river Kenzig near its confluence with the Mayne. The river divides it into the old and new towns, both of which are fortified. The new town, which was built at firſt by French and Flemiſh refugees, who had great privileges granted them, is regular and handſome. The caſtle in which the counts uſed to reſide, and which ſtands in the old town, is fortified, and has a fine flower-garden with commodious apartments, but makes no great appearance. The Jews are tolerated here, and dwell in a particular quarter. The magiſtracy of the new town, and the diſpoſal of all offices in it, belong to the French and Dutch congregations. Here is an univerſity, with ſeveral manufactures, particularly of that of roll tobacco, and a very conſiderable traffic. E. Long. 9. 0. N. Lat. 49. 58.

HANAU-*Munzenberg*, a county of Germany. The greateſt part of it is ſurrounded by the electorate of Mentz, the biſhopric of Fulda, the lordſhips of Reineck, Iſenburg, and Solms; as alſo by the territories of Heſſe-Homburg, Burg-Friedburg, and Frankfort. Its length is near 40 miles, but its greateſt breadth not above 12. It is exceeding fertile in corn, wine, and fruits; yielding alſo ſalt ſprings, with ſome copper, ſilver, and cobalt. The chief rivers are, the Mayne, the Kinzeg, and the Nidda. The prevailing religion is Calviniſm, but Lutherans and Catholics are tolerated. The country is populous, and trade and manufactures flouriſh in it. In 1736, the whole male line of the counts of Hanau failing in John Reinard, William VIII. landgrave of Heſſe Caſſel, by virtue of a treaty of mutual ſucceſſion between the families of Hanau and Heſſe Caſſel, took poſſeſſion of the county, ſatisfaction having been firſt made to the houſe of Saxony for their claims; and in the year 1754 transferred it to prince William, eldeſt ſon to the then hereditary prince Frederic, afterwards landgrave. The revenues of the laſt count, ariſing from this and other territories, are ſaid to have amounted to 500,000 florins. The principal places are Hanau, Bergen, Steinau, and Glenhauſen.

HAND, in anatomy, the extreme part of the arm. Anaxagoras is repreſented by ancient authors, as maintaining, that man owes all his wiſdom, knowledge, and ſuperiority over other animals, to the uſe of his hands. —Galen puts the thing another way: man, according to him, is not the wiſeſt creature becauſe he has hands; but he had hands given him becauſe he was the wiſeſt creature.

HAND, in the manege, a meaſure of four inches, or of a clenched fiſt, by which the height of a horſe is computed.

HAND-*Breadth*, a meaſure of three inches.

HANDEL (George Frederic), a moſt eminent maſter and compoſer of muſic, was born at Hall, a city of Upper Saxony in Germany. His father was a phyſician and ſurgeon of that place, and was upwards of 60 years of age when Handel was born. During his infancy young Handel is ſaid to have amuſed himſelf with muſical inſtruments, and to have made conſiderable progreſs before he was ſeven years of age, without any inſtructions. His propenſity for muſic at laſt became ſo ſtrong, that his father, who deſigned him for the ſtudy of the civil law, thought proper to forbid him, even at this early period of life, to touch a muſical inſtrument, and would ſuffer none to remain in his houſe. Notwithſtanding this prohibition, however, Handel found means to get a little clavichord privately conveyed to a room in the uppermoſt ſtory of the houſe, to which room he conſtantly ſtole when the family were aſleep; and thus made ſuch advances in his art, as enabled him to play on the harpſichord. He was firſt taken notice of by the duke of Saxe Weiſenfels on the following occaſion. His father went to pay a viſit to another ſon by a former wife, who was valet de chambre to the duke, and reſided at his court. Young Handel, being then in his ſeventh year, earneſtly deſired permiſſion to go along with him; but being refuſed, he followed the chaiſe on foot, and overtook it, the carriage being probably retarded by the roughneſs of the way. His father at firſt chid him for his diſobedience, but at laſt took him into the chaiſe along with him. While he was in the duke's court, he ſtill continued to ſhew the ſame inclination for muſic: it was impoſſible to keep him from harpſichords; and he uſed ſometimes to get into the organloft at church, and play after ſervice was over. On one of theſe occaſions, the duke happening to go out later than uſual, found ſomething ſo uncommon in Handel's manner of playing, that he inquired of his valet who it was; and receiving for anſwer that it was his brother, he deſired to ſee him. This nobleman was ſo much taken with the muſical genius ſhewn by young Handel, that he perſuaded his father to let him follow the bent of his inclination. He made the boy a preſent; and told him, that if he minded his ſtudies, no encouragement ſhould be wanting.

On his return to Hall, Handel was placed under one Zackaw, the organiſt of the cathedral church; and our young muſician was even then able to ſupply his maſter's place in his abſence. At nine years of age he began to compoſe church-ſervices for voices and inſtruments, and continued to compoſe one ſuch ſervice every week for three years ſucceſſively. At the age of 14, he far excelled his maſter, as he himſelf owned; and he was ſent to Berlin, where he had a relation in ſome place about the court, on whoſe care and fidelity his parents could rely. The opera was then in a flouriſhing condition, being encouraged by the grandfather of the preſent king of Pruſſia, and under the direction of many eminent perſons from Italy, among whom were Buononcini and Attilio. Buononcini, being of a haughty diſpoſition, treated Handel with contempt; but Attilio behaved to him with great kindneſs, and he profited much by his inſtructions. His abilities ſoon recommended him to the king, who frequently made him preſents, and at laſt propoſed to ſend him into Italy under his own patronage, and to take him under his immediate protection as ſoon as his ſtudies ſhould be compleated. But Handel's parents not thinking proper to ſubmit their child to the caprice of the king, declined the offer; upon which it became neceſſary for him to return to Hall.

Handel having now obtained ideas in muſic far excelling every thing that could be found in Hall, continued there very unwillingly, and it was reſolved to ſend him into Italy: but as the expence of this journey could not then be ſpared, he went to Hamburg, where the opera was little inferior to that of Berlin. Soon after his arrival in this city, his father died; and his mother being left in narrow circumſtances, her ſon thought it neceſſary to procure ſome ſcholars, and to accept a place in the orcheſtra, by which means, inſtead of being a burden, he became a great relief to her.

At this time, the firſt harpſichord in Hamburg was played by one Keſer, a man who alſo excelled in compoſition; but he, having involved himſelf in ſome debts, was obliged to abſcond. Upon this vacancy, the perſon who had been uſed to play the ſecond harpſichord claimed the firſt by right of ſucceſſion: but he was oppoſed by Handel, who founded a claim to the firſt harpſichord upon his ſuperior abilities. After much diſpute, in which all who ſupported or directed the opera engaged with much vehemence, it was decided in favour of Handel; but this good ſucceſs had almoſt coſt him his life. His antagoniſt reſented the ſuppoſed affront ſo much, that, as they were coming out of the orcheſtra together, he made a puſh at Handel's breaſt with a ſword; which muſt undoubtedly have killed him, had there not fortunately been a muſic-book in the boſom of his coat.

Handel, though yet but in his 15th year, became compoſer to the houſe; and the ſucceſs of *Almeria*, his firſt opera, was ſo great, that it ran 30 nights without interruption. Within leſs than a twelvemonth after this, he ſet two others, called *Florinda* and *Norene*, which were received with the ſame applauſe. During his ſtay here, which was about four or five years, he alſo compoſed a conſiderable number of ſonatas, which are now loſt. Here his abilities procured him the acquaintance of many perſons of note, particularly the prince of Tuſcany, brother to John Gaſton de Medicis the grand duke. This prince preſſed him to go with him to Italy, where he aſſured him that no convenience ſhould be wanting; but this offer Handel thought proper to decline, being reſolved not to give up his independency for any advantage that could be offered him.

In the 19th year of his age, Handel took a journey to Italy on his own bottom; where he was received with the greateſt kindneſs by the prince of Tuſcany, and had at all times acceſs to the palace of the grand duke. His Serene Highneſs was impatient to have ſomething compoſed by ſo great a maſter; and notwithſtanding the difference between the ſtyle of the Italian muſic and the German, to which Handel had hitherto been accuſtomed, he ſet an opera called *Roderigo*, which pleaſed ſo well, that he was rewarded with 100 ſequins, and a ſervice of plate. After ſtaying about a year in Florence, he went to Venice, where he is ſaid to have been firſt diſcovered at a maſquerade. He was playing on a harpſichord in his viſor, when Scarlatti, a famous performer, cried out, that the perſon who played could be none but the famous Saxon or the devil. But a ſtory ſimilar to this is reported of many eminent perſons whoſe abilities have been diſcovered in diſguiſe. Here he compoſed his opera called *Agrippina*, which was performed 27 nights ſucceſſively, with the moſt extravagant applauſe.

From Venice, our muſician proceeded to Rome, where he became acquainted with cardinal Ottoboni and many other dignitaries of the church, by which means he was frequently attacked on account of his religion; but Handel declared he would live and die in the religion in which he had been educated, whether it was true or falſe. Here he compoſed an oratorio called *Reſurrectione*, and 150 cantatas, beſides ſome ſonatas, and other muſic. Ottoboni alſo contrived to have a trial of ſkill between him and Dominici Scarlatti, who was conſidered as the greateſt maſter on that inſtrument in Italy. The event is differently reported. Some ſay that Scarlatti was victorious, and others give the victory to Handel; but when they came to the organ, Scarlatti himſelf aſcribed the ſuperiority to Handel.

From Rome, Handel went to Naples; after which, he paid a ſecond viſit to Florence; and at laſt, having ſpent ſix years in Italy, ſet out for his native country. In his way thither, he was introduced at the court of Hanover with ſo much advantage by the baron Kilmanſeck, that his Electoral Highneſs offered him a penſion of 1500 crowns a-year as an inducement for him to continue there. This generous offer he declined on account of his having promiſed to viſit the court of the Elector Palatine, and likewiſe to come over to England in compliance with the repeated invitations of the duke of Mancheſter. The elector, however, being made acquainted with this objection, generouſly ordered him to be told, that his acceptance of the penſion ſhould neither reſtrain him from his promiſe nor reſolution; but that he ſhould be at full liberty to be abſent a year or more if he choſe it, and to go wherever he thought fit. Soon after, the place of maſter of the chapel was beſtowed upon Handel; and our muſician having viſited his mother, who was now extremely old and blind, his old maſter Zackaw, and ſtaid ſome time at the court of the Elector Palatine, ſet out for England, where he arrived in 1710.

At that time operas were a new entertainment in England, and were conducted in a very abſurd manner: but Handel ſoon put them on a better footing; and ſet a drama called *Rinaldo*, which was performed with uncommon ſucceſs. Having ſtaid a year in England, he returned to Hanover; but in 1712 he again came over to England; and the peace of Utrecht being concluded a few months afterwards, he compoſed a grand *Te Deum* and *Jubilate* on the occaſion. He now found the nobility very deſirous that he ſhould reſume the direction of the opera houſe in the Hay-market; and the queen having added her authority to their ſolicitations, and conferred on him a penſion of L. 200 a-year, he forgot his engagements to the elector of Hanover, and remained in Britain till the death of the queen in 1714. On the arrival of king Geo. I. Handel, conſcious of his ill behaviour, durſt not appear at court; but he was extricated from his dilemma by the baron Kilmanſeck. Having engaged ſeveral of the Engliſh nobility in his behalf, the baron perſuaded the king to a party of pleaſure on the water. Handel was appriſed of the deſign, and ordered to prepare ſome muſic for the occaſion. This he executed with the utmoſt attention, and on the day appointed it was performed and conducted by himſelf. The king with pleaſure and ſurpriſe inquired whoſe it was, and how the entertainment came to be provided without his knowledge. The baron then produced the delinquent; and aſked leave to preſent him to his Majeſty as one too ſenſible of his fault to attempt an excuſe, but ſincerely deſirous to atone for it. This interceſſion was accepted, Handel was reſtored to favour, his water-muſic was honoured with the higheſt approbation, and the king added a penſion of L. 200 a-year to that formerly beſtowed on him by queen Anne; which he ſoon after increaſed to L. 400, on his being appointed to teach the young princeſſes muſic.

In the year 1715, Handel compoſed his opera of *Amadige;* but from that time to the year 1720 he compoſed only *Teſeo* and *Paſtor Fido*, Buononcini and Attilio being then compoſers for the operas. About this time a project was formed by the nobility for erecting a kind of academy at the Hay-market, with a view of ſecuring to themſelves a conſtant ſupply of operas to be compoſed by Handel, and performed under his direction. No leſs than L. 50,000 was ſubſcribed for this ſcheme, of which the king himſelf ſubſcribed L. 1000, and it was propoſed to continue the undertaking for 14 years. Handel went over to Dreſden in order to engage ſingers, and returned with Seneſino and Duriſtanti. Buononcini and Attilio had ſtill a ſtrong party in their favour, but not equal to that of Handel; and therefore in 1720 he obtained leave to perform his opera of *Radamiſto*. The houſe was ſo crowded, that many fainted through exceſſive heat; and forty ſhillings were offered by ſome for a ſeat in the gallery, after having in vain attempted to get one elſewhere. The contention, however, ſtill ran very high between Handel's party and that of the two Italian maſters; and at laſt it was determined that the rivals ſhould be jointly employed in making an opera, in which each ſhould take a diſtinct act, and he who by the general ſuffrage was allowed to have given the beſt proof of his abilities ſhould be put in poſſeſſion of the houſe. This opera was called *Muzio Scævola*, and Handel ſet the laſt act. It is ſaid that Handel's ſuperiority was owned even in the overture before it; but when the act came to be performed, there remained no pretence of doubt or diſpute. The academy was now therefore firmly eſtabliſhed, and Handel conducted it for nine years with great ſucceſs; but about that time an irreconcileable emnity took place between Handel himſelf and Seneſino. Seneſino accuſed Handel of tyranny, and Handel accuſed Seneſino of rebellion. The merits of the quarrel are not known: the nobility, however, became mediators for ſome time; and having failed in that good deſign, they became parties in the quarrel. Handel was reſolved to diſmiſs Seneſino, and the nobility ſeemed alſo reſolved not to permit him to do ſo. The haughtineſs of Handel's temper would not allow him to yield, and the affair ended in the total diſſolution of the academy.

Handel now found that his abilities, great as they were, could not ſupport him againſt the powerful oppoſition he met with. After the diſmiſſion of Seneſino, his audience inſenſibly dwindled away, and Handel entered into an agreement with Mr Keidegger to carry on operas in conjunction with him. New ſingers were engaged from Italy; but the offended nobility raiſed a ſubſcription againſt him, to carry on operas in the playhouſe in Lincoln's-Inn fields. Handel bore up four years againſt this oppoſition; three in partnerſhip with Keidegger, and one by himſelf: but though his muſical abilities were ſuperior to thoſe of his antogoniſts, the aſtoniſhing powers of the voice of Farinelli, whom the oppoſite party had engaged, determined the victory

tory againſt him. At laſt Handel, having ſpent all he was worth in a fruitleſs oppoſition, thought proper to deſiſt. His diſappointment had ſuch an effect upon him, that for ſome time he was diſordered in his underſtanding, and at the ſame time his right arm was rendered uſeleſs by a ſtroke of the palſy. In this deplorable ſituation, it was thought neceſſary that he ſhould go to the baths of Aix-la-Chapelle; and from them he received ſuch extraordinary and ſudden relief, that his cure was looked upon by the nuns as miraculous.

In 1736, Handel again returned to England; and ſoon after his return his Alexander's feaſt was performed with applauſe at Covent-Garden. The ſucceſs and ſplendor of the Hay-market was by this time ſo much reduced by repeated miſmanagements, that lord Middleſex undertook the direction of it himſelf, and once more applied to Handel for compoſition. He accordingly compoſed two operas called *Faromondo*, and *Aleſſandro Severo*, for which in 1737 he received L. 1000. In 1738 he received L. 1500 from a ſingle benefit, and nothing ſeemed wanting to retrieve his affairs, excepting ſuch conceſſions on his part as his opponents had a right to expect. Theſe conceſſions, however, he could not be prevailed upon to make; and that he might no longer be under obligations to act as he was directed by others, he refuſed to enter into any engagements upon ſubſcription. After having tried a few more operas at Covent-Garden without ſucceſs, he introduced another ſpecies of muſic called *oratorios*, which he thought better ſuited to the native gravity of an Engliſh audience. But as the ſubjects of theſe pieces were always taken from ſacred hiſtory, it was by ſome thought to be a profanation to ſet them to muſic and perform them at a playhouſe. In conſequence of this prejudice, the oratorios met with very indifferent ſucceſs; and in 1741 Mr Handel found his affairs in ſuch a bad ſituation, that he was obliged to quit England, and go to Dublin.

He was received in Ireland in a manner ſuitable to his great merit; and his performing his oratorio called the *Meſſiah*, for the benefit of the city-priſon, brought him into univerſal favour. In nine months time he had brought his affairs into a better ſituation; and on his return to England in 1742, he found the public much more favourably diſpoſed. His oratorios were now performed with great applauſe: his Meſſiah, which before had been but coldly received, became a favourite performance; and Handel, with a generous humanity, determined to perform it annually for the benefit of the foundling hoſpital, which at that time was only ſupported by private benefactions. In 1743, he had a return of his paralytic diſorder; and in 1751 became quite blind by a *gutta ſerena* in his eyes. This laſt miſfortune for ſome time ſunk him into the deepeſt deſpondency; but at laſt he was obliged to acquieſce in his ſituation, after having without any relief undergone ſome very painful operations. Finding it now impoſſible to manage his oratorios alone, he was aſſiſted by Mr Smith, who at his requeſt frequently played for him, and conducted them in his ſtead; and with this aſſiſtance they were continued till within eight days of his death. During the latter part of his life, his mind was often diſordered; yet at times it appears to have reſumed its full vigour, and he compoſed ſeveral ſongs, choruſes, &c. which from their dates may be conſidered almoſt as the laſt ſounds of his dying voice. From about October 1758 his health declined very faſt; his appetite, which had been remarkably keen, and which he had gratified to a great degree, left him; and he became ſenſible of the approach of death. On the 6th of April 1759, his laſt oratorio was performed, at which he was preſent, and died on the 14th of the ſame month. On the 20th he was buried by the right reverend Dr Pearce, biſhop of Rocheſter, in Weſtminſter abbey; where, by his own order, and at his own expence, a monument was erected to his memory.

With regard to the character of this moſt eminent muſician, he is univerſally allowed to have been a great epicure. In his temper he was very haughty, but was ſeldom or never guilty of mean actions. His pride was uniform; he was not by turns a tyrant and a ſlave. He appears to have had a moſt extravagant love for liberty and independence; inſomuch, that he would, for the ſake of liberty, do things otherwiſe the moſt prejudicial to his own intereſt. Nay, ſo far is he ſaid to have carried this principle, that, merely for the ſake of preſerving his independence, he often refuſed the higheſt favours from the ladies; though others aſcribe this to a very different cauſe. Certain it is, that he never ſhewed the leaſt attachment to the fair ſex. He was liberal even when poor, and remembered his former friends when he was rich. His muſical powers can perhaps be beſt expreſſed by Arbuthnot's reply to Pope, who ſeriouſly aſked his opinion of him as a muſician; "Conceive (ſaid he) the higheſt you can of his abilities, and they are much beyond any thing you can conceive."

HANDS, in heraldry, are borne in coat-armour dexter and ſiniſter; that is, right and left, expanded or open. Theſe are the moſt neceſſary parts of the human body, as they ſerve to expreſs all actions, and even our very thoughts and deſigns; thus, joining of hands is an univerſal token of friendſhip, and clapping of hands a general mark of applauſe.

HANGING, a common method of inflicting death on criminals, by ſuſpending them by the neck. Phyſicians are not agreed as to the manner in which death is brought on by hanging. De Haen hanged three dogs, whom he afterwards opened. In one, nothing remarkable appeared in the lungs. In another, from whom half an ounce of blood was taken from the jugular vein, the dura and pia mater were of the natural appearance; but the lungs were much inflamed. In the third, the meninges were ſound, and there was no effuſion of blood in the ventricles of the brain, but the left lobe of the lungs was turgid with blood. Wepfer, Littræus, Alberti, Bruhierius, and Boerhaave, affirm that hanged animals die apoplectic. Their arguments for this are chiefly drawn from the livid colour of the face; from the turgeſcency of the veſſels of the brain; the inflammation of the eyes; and from the ſparks of fire which thoſe who have ſurvived hanging allege they have ſeen before their eyes. On the contrary, Bonetus, Petit, Haller, and Lanciſi, from obſerving that death is occaſioned by any ſmall body falling into the glottis, have aſcribed it to the ſtoppage of reſpiration. Others, deeming both theſe cauſes ill-founded, have aſcribed it to a luxation of the vertebræ of the neck.—De Haen adduces the authority of many eminent authors to prove the poſſibility of recovering hanged perſons; and obſerves, in general, that with bleeding in the jugular vein, and anointing the neck with warm oil, the ſame remedies are to be employed in this caſe as for the recovery of drowned people. See DROWNING.

HANGINGS, denote any kind of drapery hung up againſt the walls or wainſcotting of a room.

Paper HANGINGS. See PAPER-*Hangings*.

Wove HANGINGS. See TAPESTRY.

HANGCLIFF, a remarkable point of land on the eaſt coaſt of the largeſt of the Shetland Iſlands. It is frequently the firſt land ſeen by ſhips in northern voyages. Captain Phipps determined its ſituation to be in W. Long. 0° 56′ 30″. N. Lat. 60° 9′.

HANNIBAL, a famous Carthaginian general, of whoſe exploits an account is given under the articles CARTHAGE and ROME. After having had the miſfortune to loſe a ſea-fight with the Rhodians, through the cowardice of Apollonius one of the admirals of Antiochus the Great, he was forced to fly into Crete, to avoid falling into the hands of the Romans. On his arrival in this iſland, he took ſanctuary among the Gortynii; but as he had brought great treaſure along with him, and knew the avarice of the Cretans, he thought proper to ſecure his riches by the following ſtratagem. He filled ſeveral veſſels with melted lead, juſt covering them over with gold and ſilver. Theſe he depoſited in the temple of Diana, in the preſence of the Gortynii, with whom, he ſaid, he truſted all his treaſure: Juſtin tells us, that he left this with them as a ſecurity for his good behaviour, and lived for ſome time very quietly in theſe parts. He took care, however, to conceal his riches in hollow ſtatues of braſs; which, according to ſome, he always carried along with him; or, as others will have it, expoſed in a public place, as things of little value. At laſt he retired to the court of Pruſias king of Bithynia, where he found means to unite ſeveral of the neighbouring ſtates with that prince into a confederacy againſt Eumenes king of Pergamus, a profeſſed friend to the Romans; and during the enſuing war gave Eumenes ſeveral defeats, more through the force of his own genius, than the valour of his troops. The Romans having received intelligence of the important ſervices performed by Hannibal, immediately diſpatched T. Quintius Flaminius as an ambaſſador to Pruſias, in order to procure his deſtruction. At his firſt audience, he complained of the protection given to that famous general, repreſenting him "as the moſt inveterate and implacable enemy the Romans ever had; as one who had ruined both his own country and Antiochus, by drawing them into a deſtructive war with Rome."—Pruſias, in order to ingratiate himſelf with the Romans, immediately ſent a party of ſoldiers to ſurround Hannibal's houſe, that he might find it impoſſible to make his eſcape. The Carthaginian, having before diſcovered that no confidence was to be repoſed in Pruſias, had contrived ſeven ſecret paſſages from his houſe, in order to evade the machinations of his enemies, even if they ſhould carry their point at the Bithynian court. But guards being poſted at theſe, he could not fly, though, according to Livy, he attempted it. Perceiving, therefore, no poſſibility of eſcaping, he had recourſe to poiſon, which he had long reſerved for ſuch a melancholy occaſion. Then taking it in his hand, "Let us (ſaid he) deliver the Romans from the diſquietude with which they have long been tortured, "ſince they have not patience to wait for an old man's "death. Flaminius will not acquire any reputation "or glory by a victory gained over a betrayed and "defenceleſs perſon. This ſingle day will be a laſting teſtimony of the degeneracy of the Romans. "Their anceſtors gave Pyrrhus intelligence of a deſign to poiſon him, that he might guard againſt the "impending danger, even when he was at the head "of a powerful army in Italy; but they have deputed "a perſon of conſular dignity to excite Pruſias impiouſly to murder one who has taken refuge in his "dominions, in violation of the laws of hoſpitality." Then having denounced dreadful imprecations againſt Pruſias, he drunk the poiſon, and expired at the age of 70 years. Cornelius Nepos acquaints us, that he put an end to his life by a ſubtle poiſon which he carried about with him in a ring. Plutarch relates, that, according to ſome writers, he ordered a ſervant to ſtrangle him with a cloak wrapped about his neck; and others ſay, that, in imitation of Midas and Themiſtocles, he drank bull's blood.

With reſpect to the character of this general, it appears to have been in military affairs what Demoſthenes was in oratory, or Newton in mathematics; namely, abſolutely perfect, in which no human wiſdom could diſcover a fault, and to which no man could add a perfection. Rollin hath contraſted his character with that of Scipio Africanus. He enumerates the qualities which make a complete general; and having then given a ſummary of what hiſtorians have related concerning both commanders, is inclined to give the preference to Hannibal. "There are, however, (he ſays) two difficulties which hinder him from deciding; one drawn from the characters of the generals whom Hannibal vanquiſhed; the other from the errors he committed. May it not be ſaid, (continues our author,) that thoſe victories which made Hannibal ſo famous were as much owing to the imprudence and temerity of the Roman generals, as to his bravery and ſkill? When a Fabius and a Scipio were ſent againſt him, the firſt ſtopped his progreſs, the other conquered him."

Theſe reaſons have been anſwered by Mr Hooke, who hath taken ſome pains to vindicate Hannibal's character, by fully and fairly comparing it with that of Scipio Africanus, and other Roman commanders. "I do not ſee (ſays he) why theſe difficulties ſhould check our author's inclination to declare in favour of the Carthaginian. That Fabius was not beaten by Hannibal, we cannot much wonder, when we remember how ſteadily the old man kept to his reſolution never to fight with him. But from Fabius's taking this method to put a ſtop to the victories of the enemy, may we not conclude that he knew no other, and thought Hannibal an overmatch for him? And why does our author forget Publius Scipio (Africanus's father), a prudent and able general, whom Hannibal vanquiſhed at the Ticin? Livy relates ſome victories of Hannibal over the celebrated Marcellus; but neither Marcellus nor any other general ever vanquiſhed Hannibal before the battle of Zama, if we may believe Polybius, (lib. xv. c. 16.). Terentius Varro, indeed, is repreſented as a headſtrong raſh man; but the battle of Cannæ was not loſt by his imprudence. The order in which he drew up his army is no where condemned; and Chevalier Folard thinks it excellent. And as to the conduct of the battle, Æmilius Paulus, a renowned captain, and a diſciple of Fabius, had a greater ſhare in it than his colleague. The imprudence with which Varro is taxed, was his venturing, contrary to his colleague's advice, with above 90,000 men to encounter in a plain field, an enemy who had only 50,000, but was ſuperior in horſe. And does not the very advice of Æmilius, and the charge of temerity on Varro for not following it, imply a confeſſion of Hannibal's ſuperiority in military ſkill, over Æmilius as well as Varro? It ought likewiſe to be obſerved, that Hannibal's infantry had gained the victory over the Roman infantry, before this latter ſuffered any thing from the Carthaginian cavalry. It was otherwiſe when Scipio gained the victory at Zama. His infantry would probably have been vanquiſhed but for his cavalry. Hannibal, with only his third line of foot (his Italian army), maintained a long fight againſt Scipio's three lines of foot; and ſeems to have had the advantage over them, when Maſiniſſa and Lælius, with the horſe, came to their aſſiſtance. Polybius indeed ſays, that Hannibal's Italian forces were equal in number to all Scipio's infantry; but this is contradicted by Livy, and is not very probable. The authority of Polybius, who was an intimate friend of Scipio Æmilianus, is, I imagine, of little weight in matters where the glory of the Scipios is particularly concerned. His partiality and flattery to them are, in many inſtances, but too viſible."

Our author then proceeds to ſhew, that Hannibal was not guilty of any of the faults laid to his charge as a general; and having contraſted the moral characters of the two generals with each other, makes it evident, that as a man, as well as a general, Hannibal had greatly the advantage of his rival. See *Hooke's Roman hiſtory*, vol. iv. p. 151. *& ſeq.*

HANNO, general of the Carthaginians, was commanded to ſail round Africa. He entered the ocean through the Straits of Gibraltar, and diſcovered ſeveral countries. He would have continued his navigation, had it not been for want of proviſions. He wrote an account of his voyage, which was often quoted, but not much credited. Sigiſmund Gelenius publiſhed it in Greek at Baſil, by Frobenius, in 1533. He lived, according to Pliny, when the affairs of the Carthaginians were in the moſt flouriſhing condition; but this is a very indeterminate expreſſion.

HANOVER, a city of Germany, and capital of an electorate of the ſame name, of which the king of Great Britain is elector.—Though the houſe of Hanover is the laſt that hath been raiſed to the electoral dignity in the empire, it may vie with any in Germany for the antiquity and nobleneſs of its family. It is likewiſe very conſiderable for the extent of its territories, which at preſent are, The duchy of Calenberg, in which are the cities of Hanover, Calenberg, Hamelen, Neuſtadt, Gottingen, &c.; the duchy of Grubenhagen, the county of Diepholt, the county of Iloga, in the biſhopric of Hildeſheim; the bailiages of Coldingen, Luther, Badenburg, and Weſterſhoven, with the right of protection of the city of Hildeſheim; and the county of Danneberg, ceded by the dukes of Wolfenbuttle to the dukes of Lunenburg, as an equivalent for their pretenſions on the city of Brunſwic. The elector poſſeſſes likewiſe the county of Delmenhorſt, and the duchies of Bremen and Verden, ſold by the king of Denmark in 1715: the right of poſſeſſing alternatively the biſhopric of Oſnabruck belongs ſolely to the electoral branch; but if it ſhall happen to fail, the dukes of Wolfenbuttle are to enjoy the ſame right.

In conſideration of the great ſervices performed by Erneſt Auguſtus, duke of Brunſwic-Hanover, in the wars which the emperor Leopold had with Louis XIV. that emperor conferred the dignity of an elector of the holy Roman empire upon him and his heirs male, of which he received the inveſtiture on the 19th of December 1692. This new creation met with great oppoſition both in the electoral college and the college of princes; but at laſt, by a concluſion of the three colleges on the 30th of January 1708, it was unanimouſly determined, that the electoral dignity ſhould be confirmed to the duke of Hanover and his heirs male; but it was added, that if, while that electoral dignity ſubſiſted, the Palatine electorate ſhould happen to fall into the hands of a Proteſtant prince, the firſt Catholic elector ſhould have a ſupernumerary vote.

The princes of this houſe have their ſeat in the college of princes, immediately after thoſe of the electoral houſes; each branch having a vote. The elector, beſides his ſeat in the electoral college, was inveſted with the office of arch ſtandard-bearer of the empire; but this being diſputed with him by the duke of Wirtemberg, the elector Palatine having obtained the office of arch-ſteward, yielded that of arch-treaſurer to the elector of Hanover, who was confirmed in this dignity by a decree of the diet of the 13th of January 1710. For the adminiſtration of the government, the elector has a council of ſtate, a council of war, the court of juſtice, the chancery, the juſtice of the court, and a conſiſtory. But for making new laws, or eſtabliſhing new taxes, the conſent of the ſtates, which are compoſed of the nobility, clergy, and burghers, is required.

The city of Hanover is agreeably ſituated in a ſandy plain on the river Leyne, in E. Long. 10. 5. N. Lat. 22. 5. It is a large well-built town, and pretty well fortified. The eſtabliſhed religion is the Lutheran; but the Catholics are tolerated, and have a handſome church. It has ſuffered greatly by the French, who got poſſeſſion of it in 1757, but were ſoon after driven out. It is noted for a particular kind of beer, reckoned excellent in theſe parts. This city was the reſidence of the elector before he aſcended the throne of Great Britain. The palace makes no great ſhew outwardly, but within it is richly furniſhed. The regency of the country is adminiſtered in the ſame manner as if the ſovereign was preſent.

HANSE, or **HANS**, an ancient name for a ſociety or company of merchants; particularly that of certain cities in Germany, &c. hence called *Hanſe-towns*. See HANSE-*Towns*.—The word *hanſe* is obſolete High Dutch or Teutonic; and ſignifies "alliance, confederacy, aſſociation," &c. Some derive it from the two German words, *am-ſee*, that is, "on the ſea;" by reaſon the firſt hanſe towns were all ſituated on the ſeacoaſt: whence the ſociety is ſaid to have been firſt called *am zee ſteden*, that is, "cities on the ſea;" and afterwards, by abbreviation, *hanſee*, and *hanſe*.

HANSE *Towns*. The hanſeatic ſociety was a league between ſeveral maritime cities of Germany, for the mutual protection of their commerce. Bremen and Amſterdam were the two firſt that formed it; whoſe trade received ſuch advantage by their fitting out two men of war in each to convoy their ſhips, that more cities continually entered into the league: even kings and princes made treaties with them, and were often glad of their aſſiſtance and protection; by which means they grew ſo powerful both by ſea and land, that they raiſed armies as well as navies, enjoyed countries in ſovereignty, and made peace or war, though always in defence of their trade, as if they had been an united ſtate or commonwealth.

At this time alſo abundance of cities, though they had no great intereſt in trade, or intercourſe with the ocean, came into their alliance for the preſervation of their liberties: ſo that in 1200 we find no leſs than 72 cities in the liſt of the towns of the Hanſe; particularly Bremen, Amſterdam, Antwerp, Rotterdam, Dort, Bruges, Oſtend, Dunkirk, Middleburg, Calais, Rouen, Rochelle, Bourdeaux, St Malo, Bayonne, Bilboa, Liſbon, Seville, Cadiz, Carthagena, Barcelona, Marſeilles, Leghorn, Naples, Meſſina, London, Lubec, Roſtock, Stralſund, Stetin, Wiſmar, Konigſberg, Dantzig, Elbing, Marienburg.

The alliance was now ſo powerful, that their ſhips of war were often hired by other princes to aſſiſt them againſt their enemies. They not only awed, but often defeated, all that oppoſed their commerce; and, particularly in 1358, they took ſuch revenge of the Daniſh fleet in the Sound, for having interrupted their commerce, that Waldemar III. then king of Denmark, for the ſake of peace, gave them up all Schonen for 16 years; by which they commanded the paſſage of the Sound in their own right.—In 1428 they made war on Erick king of Denmark with 250 ſail, carrying on board 12,000 men. Theſe ſo ravaged the coaſt of Jutland, that the king was glad to make peace with them.

Many privileges were beſtowed upon the hanſe towns by Lewis XI. Charles VIII. Lewis XII. and Francis I. kings of France; as well as by the emperor Charles V. who had divers loans of money from them; and by king Henry III. who alſo incorporated them into a trading body, in acknowledgment for money which they had advanced to him, as well as for the good ſervices they did him by their naval forces in 1206.

Theſe towns exerciſed a juriſdiction among themſelves; for which purpoſe they were divided into four colleges or provinces, diſtinguiſhed by the names of their four principal cities, viz. Lubec, Cologne, Brunſwic, and Dantzic, wherein were held their courts of judicature. They had a common ſtock or treaſury at Lubec, and power to call an aſſembly as often as neceſſary.—They kept magazines or warehouſes for the ſale of their merchandiſes in London, Bruges, Antwerp, Berg in Norway, Revel in Livonia, Novogorod in Muſcovy, which were exported to moſt parts of Europe, in Engliſh, Dutch, and Flemiſh bottoms. One of their principal magazines was at London, where a ſociety of German merchants was formed, called the *ſteelyard company*. To this company great privileges were granted by Edward I. but revoked by act of parliament in 1552 in the reign of Edward VI. on a complaint of the Engliſh merchants that this company had ſo engroſſed the cloth-trade, that, in the preceding year, they had exported 50,000 pieces, while all the Engliſh together had ſhipped off but 1100. Queen Mary, who aſcended the throne the year following, having reſolved to marry Philip the emperor's ſon, ſuſpended the execution of the act for three years: but after that term, whether by reaſon of ſome new ſtatute, or in purſuance of that of king Edward, the privileges of that company were no longer regarded, and all efforts of the hanſe-towns to recover this loſs were in vain.

Another accident that happened to their mortification was while queen Elizabeth was at war with the Spaniards. Sir Francis Drake happening to meet 60 ſhips in the Tagus, loaden with corn belonging to the hanſe-towns, took out all the corn as contraband goods which they were forbid to carry by their original patent. The hanſe towns having complained of this to the diet of the empire, the queen ſent an ambaſſador thither to declare her reaſons. The king of Poland likewiſe intereſted himſelf in the affair, becauſe the city of Dantzic was under his protection. At laſt, though the queen ſtrove hard to preſerve the commerce of the Engliſh in Germany, the emperor excluded the Engliſh company of merchant-adventurers, who had conſiderable factories at Stade, Embden, Bremen, Hamburg, and Elbing, from all trade in the empire. In ſhort, the hanſe-towns, in Germany in particular, were not only in ſo flouriſhing, but in ſo formidable a ſtate, from the 14th to the 16th centuries, that they gave umbrage to all the neighbouring princes, who threatened a ſtrong confederacy againſt them; and, as the firſt ſtep towards it, commanded all the cities within their dominion or juriſdiction to withdraw from the union or hanſe, and be no farther concerned therein. This immediately ſeparated all the cities of England, France, and Italy, from them. The hanſe, on the other hand, prudently put themſelves under the protection of the empire: and as the cities juſt now mentioned had withdrawn from them; ſo they withdrew from ſeveral more, and made a decree among themſelves, that none ſhould be admitted into their ſociety but ſuch as ſtood within the limits of the German empire, or were dependent thereon; except Dantzic, which continued a member, though in nowiſe dependent on the empire, only it had been ſummoned formerly to the imperial diet. By this means they maintained their confederacy for the protection of their trade, as it was begun, without being any more envied by their neighbours. Hereby likewiſe they were reduced to Lubec, Bremen, Hamburgh, and Dantzic; in the firſt of which they kept their regiſter, and held aſſemblies once in three years at leaſt. But this hanſe or union has for ſome time been diſſolved; and now every one of the cities carries on a trade ſeparately for itſelf, according to the ſtipulation in ſuch treaties of peace, &c. as are made for the empire betwixt the emperor and other potentates.

HARANGUE, a modern French name for a ſpeech or oration made by an orator in public.—Menage derives the word from the Italian *arenga*, which ſignifies the ſame; formed, according to Ferrari, from *arringo*,

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" a juſt, or place of juſting." Others derive it from the Latin *ara*, " altar;" by reaſon the firſt harangues were made before altars: whence the verſe of Juvenal,

Aut Lugdunenſis rhetor dicturus ad aram.

The word is alſo frequently uſed in an ill ſenſe, viz. for a too pompous, prolix, or unſeaſonable ſpeech or declamation.

HARBOUR, a general name given to any ſea-port or haven; as alſo to any place convenient for mooring ſhipping, although at a great diſtance from the ſea. The qualities requiſite in a good harbour are, that the bottom be entirely free from rocks or ſhallows; that the opening be of ſufficient extent to admit the entrance or departure of large ſhips, without difficulty; that it ſhould have good anchoring-ground, and be eaſy of acceſs; that it ſhould be well defended from the violence of the wind and ſea; that it ſhould have room and convenience to receive the ſhipping of different nations, and thoſe which are laden with different merchandiſes; that it be furniſhed with a good lighthouſe, and have variety of proper rings, poſts, moorings, &c. in order to remove or ſecure the veſſels contained therein; and, finally, that it have plenty of wood, and other materials for firing, beſides hemp, iron, mariners, &c.

HARBURG, a ſmall town of Germany in the circle of Lower Saxony, and duchy of Lunenburg, ſeated on the river Elbe over againſt Hamburgh. It was ſurrounded with walls in 1355; and 30 years after, a ſtrong caſtle, which ſtill remains, was built by the biſhop. E. Long. 9. 41. N. Lat. 53. 51.

HARDENING, the giving a greater degree of hardneſs to bodies than they had before.

There are ſeveral ways of hardening iron and ſteel, as by hammering them, quenching them in cold water, &c. See STEEL.

Caſe HARDENING. See CASE-*Hardening*.

HARDERWICK, a town of the United Provinces in Dutch Guelderland. It is a well-built town, and the chief of the ſea-ports of this province. It has ſeveral good buildings, particularly the great church, which is much admired. In 1648, the public ſchool here was turned into an univerſity. The French did it a great deal of damage in 1672, ſince which time it has been on the decline. E. Long. 5. 37. N. Lat. 52. 14.

HARDNESS, a quality of certain bodies, which conſiſts in an intimate union and ſtrong adheſion of their integrant parts, which cannot therefore be eaſily disjoined.—We cannot preciſely determine what diſpoſition of parts occaſions the greateſt hardneſs; but this probably depends on the perfection and extent of the contact of theſe parts: and this quality depends eſſentially upon their figure, which we do not know.—The hardeſt of bodies which we do know, are vitrifiable ſtones; and amongſt theſe the hardeſt are alſo the the moſt pure and homogeneous, that is, diamonds. Not any one of all known bodies is perfectly hard. This quality belongs undoubtedly to the primary or elementary particles of matter, which of all beings we know the leaſt of.

HARDOUIN (John), a learned French Jeſuit in the beginning of the 18th century, known by the remarkable paradoxes he advanced in his writings; this in particular, That all the works of the ancient profane writers, except Cicero's works, Virgil's Georgics, Horace's ſatires and epiſtles, and Pliny's natural hiſtory, are mere forgeries. He died at Paris in 1729, aged 83. His principal works are, 1. An edition of Pliny's natural hiſtory, with notes, which is much eſteemed. 2. An edition of the councils, which made much noiſe. 3. Chronology reſtored by medals, 4to. 4. A commentary on the New Teſtament, folio; in which he pretends that our Saviour and his apoſtles preached in Latin, &c.

HARDWICKE. See YORK.

HARE, in zoology. See LEPUS.

The hare is a beaſt of venery, or of the foreſt, but peculiarly ſo termed in the ſecond year of her age. There are reckoned four ſorts of them, from the place of their abode: ſome live in the mountains, ſome in the fields, ſome in marſhes, and ſome wander about every where. The mountain-hares are the ſwifteſt, the field-hares are not ſo nimble, and thoſe of the marſhes are the floweſt: but the wandering hares are the moſt dangerous to follow; for they are cunning in the ways and mazes of the fields, and, knowing the neareſt ways, run up the hills and rocks, to the confuſion of the dogs, and the diſcouragement of the hunters. See the article HUNTING.

HARE-*Lip*, in ſurgery. See SURGERY.

HARFLUER, an ancient town of France, in Normandy; but is now a poor place, on account of its fortifications being demoliſhed, and its harbour choaked up. It was taken by the Engliſh, by aſſault, in the year 1415. It is ſeated on the river Lizarda, near the Seine, five miles from Havre de Grace, forty north-weſt of Rouen, and one hundred and ſix north-weſt of Paris. E. Lon. 0. 17. N. Lat. 49. 30.

HARIOT, or HERIOT, in law, a due belonging to a lord at the death of his tenant, conſiſting of the beſt beaſt, either horſe, or cow, or ox, which he had at the time of his death; and in ſome manors the beſt goods, piece of plate, &c. are called hariots.

HARIOT (Thomas), See HARRIOT.

HARLECH, a town of Merionethſhire, in north Wales. It is ſeated on a rock, on the ſea-ſhore; and is but a poor place, though the ſhire-town, and ſends a member to parliament. It had formerly a ſtrong, handſome caſtle, which was a garriſon for Charles I. in the civil wars, for which reaſon it was afterwards demoliſhed by the parliament. W. Long. 4. 0. N. Lat. 54. 47.

HARLEIAN COLLECTION.—A moſt valuable collection of uſeful and curious manuſcripts, begun near the end of the laſt century, by Robert Harley of Brampton Bryan, eſq. in Herefordſhire, afterwards earl of Oxford and lord high-treaſurer; and which was conducted upon the plan of the great Sir Robert Cotton. He publiſhed his firſt conſiderable collection in Auguſt 1705, and in leſs than ten years he got together near 2500 rare and curious MSS. Soon after this, the celebrated Dr George Hicks, Mr Anſtis garter king at arms, biſhop Nicolſon, and many other eminent antiquaries, not only offered him their aſſiſtance in procuring MSS. but preſented him with ſeveral that were very valuable. Being thus encouraged to perſeverance by his ſucceſs, he kept many perſons employed in purchaſing MSS. for him abroad, giving them written inſtructions for their conduct. By theſe means the MS. library was, in the year 1721 increaſed to near 6000 books, 14,000 original charters, and 500 rolls.

On the 21ſt of May 1724, lord Oxford died: but his ſon Edward, who ſucceeded to his honours and eſtate, ſtill farther enlarged the collection; ſo that when he died, June 16th 1741, it conſiſted of 8000 volumes, ſeveral of them containing diſtinct and independent treatiſes, beſides many looſe papers which have been ſince ſorted and bound up in volumes; and above 40,000 original rolls, charters, letters patents, grants, and other deeds and inſtruments of great antiquity.

The principal deſign of making this collection was the eſtabliſhment of a MS. Engliſh hiſtorical library, and the reſcuing from deſtruction ſuch national records as had eluded the diligence of preceding collectors: but lord Oxford's plan was more extenſive; for his collection abounds alſo with curious MSS. in every ſcience.—This collection is now in the Britiſh Muſæum; and an enumeration of its contents may be ſeen in the Annual Regiſter, vi. 140, &c.

HARLEM, a town of the United Provinces, in Holland, ſituated on the river Sparen, in E. Lon. 5. 17. N. Lat. 53. 22. It is a large and populous city, and ſtands near a lake of the ſame name, with which it has a communication as well as with Amſterdam and Leyden, by means of ſeveral canals. Schemes have been often formed for draining of this lake, but were never put in execution. To the ſouth of the town lies a wood, cut into delightful walks and viſtas. The town is famous for the ſiege which it held out againſt the Spaniards for ten months in 1573; the townſmen, before they capitulated, being reduced to eat the vileſt animals, and even leather and graſs. The inhabitants correſponded with the prince of Orange for a conſiderable time by means of carrier-pigeons. Harlem, as is well known, claims the invention of printing; and in fact, the firſt eſſays of the art are indiſputably to be attributed to Laurentius, a magiſtrate of that city. [See LAURENTIUS, and *(Hiſtory of)* PRINTING.] Before the Reformation, Harlem was a biſhop's ſee; and the Papiſts ſtill greatly outnumber the Proteſtants. An academy of ſciences was founded here in 1752. Vaſt quantities of linen and thread are bleached here; the waters of the lake having a peculiar quality, which renders them very fit for that purpoſe.—A ſort of phrenſy with regard to flowers, particularly tulips, once prevailed here, in conſequence of which the moſt beautiful ſorts were bought and ſold at an extravagant price.

HARLEQUIN, a buffoon or merry-andrew; but the word is now uſed for a perſon of extraordinary agility, dreſſed in party-coloured clothes, the principal character in a pantomime entertainment.

HARLEY (Robert), earl of Oxford and Mortimer, was the eldeſt ſon of Sir Edward Harley, and born in 1661. At the Revolution, Sir Edward and his ſon raiſed a troop of horſe at their own expence; and after the acceſſion of king William and queen Mary, he obtained a ſeat in parliament. His promotions were rapid: in 1702, he was choſen ſpeaker of the houſe of commons; in 1704, he was ſworn of queen Anne's privy council, and the ſame year made ſecretary of ſtate; in 1706, he acted as one of the commiſſioners for the treaty of Union; and in 1710, was appointed a commiſſioner of the treaſury, and chancellor and under-treaſurer of the exchequer. A daring attempt was made on his life, March 8. 1711, by the marquis of Guiſcard a French papiſt; who, when under an examination before a committee of the privy council, ſtabbed him with a penknife. Of this wound, however, he ſoon recovered; and was the ſame year created earl of Oxford, and lord high treaſurer, which office he reſigned juſt before the queen's death. He was impeached of high treaſon in 1715, and committed to the tower; but was cleared by trial, and died in 1724. His character has been variouſly repreſented, but cannot be here diſcuſſed. He was not only an encourager of literature, but the greateſt collector in his time of curious books and MSS. his collection of which makes a capital part of the Britiſh Muſeum. See HARLEIAN *Collection*.

HARLING. See HERLING.

HARLINGEN, a ſea-port town of the United Netherlands, in Weſt Frieſland. It ſtands on the coaſt of the Zuyder ſea, at the mouth of a large canal, in E. Long. 5. 25. N. Lat. 53. 12. It was only a hamlet till about the year 1234, when it was deſtroyed by the ſea; and being afterwards rebuilt, became a conſiderable town. In 1579, it was conſiderably enlarged by the care of William prince of Orange. It is now very well fortified, and is naturally ſtrong, as the adjacent country can very eaſily be laid under water. The city is ſquare; and the ſtreets are handſome, ſtraight, and clean, with canals in the middle of them. It has five gates; four towards the land, and one towards the ſea; but though the harbour is good, yet veſſels of great burthen cannot get into it until they are lightened, for want of water. The admiralty college of Frieſland has its ſeat here. The manufactures are ſalt, bricks, and tiles; a conſiderable trade is alſo carried on in all ſorts of linen cloth, and the adjacent country yields abundance of corn and good paſtures.

HARLOT, a woman given to incontinency, or that makes a habit or a trade of proſtituting her body.—The word is ſuppoſed to be uſed for the diminutive *whorelet*, a "little whore."—Others derive it from *Arletta*, miſtreſs to Robert duke of Normandy, and mother to William the Conqueror: Camden derives it from one *Arlotha*, concubine to William the Conqueror: Others from the Italian *Arlotta*, "a proud whore."

HARMONIA, in fabulous hiſtory, the wife of Cadmus, both of whom were turned into ſerpents. See CADMUS.

Though many of the ancient authors make Harmonia a princeſs of divine origin, there is a paſſage in Athenæus from Euhemerus, the Vanini of his time, which tells us, that ſhe was by profeſſion a player on the flute. and in the ſervice of the prince of Zidon previous to her departure with Cadmus. This circumſtance, however, might encourage the belief, that, as Cadmus brought letters into Greece, his wife brought *harmony* thither; as the word αρμονια, *harmonia*, has been ſaid to have no other derivation than from her name: which makes it very difficult to aſcertain the ſenſe in which the Greeks made uſe of it in their muſic†; for it has no roots by which it can be decompounded, in order to deduce from them its etymology. The common account of the word, however, that is given

† See Harmon

given by lexicographers, and generally adopted by the learned, does not confirm this opinion. It is generally derived from αρμοζω, and this from the old verb Αρωα *apto*, to *fit* or *join*.

HARMONICA. This word, when originally appropriated by Dr Franklin to that peculiar form or mode of *muſical glaſſes*, which he himſelf, after a number of happy experiments, had conſtituted, was written *Armonica*. In this place, however, we have ventured to reſtore it to its native plenitude of ſound, as we have no antipathy againſt the moderate uſe of aſpirations. It is derived from the Greek word ἁρμονια. The radical word is αρειν, to *ſuit* or *fit one thing to another*. By the word ἁρμονια, the Greeks expreſſed *aptitudes* of various kinds; and from the uſe which they made of that expreſſion, we have reaſon to conclude, that it was intended to import the higheſt degree of refinement and delicacy in thoſe relations which it was meant to ſignify. Relations or aptitudes of ſound, in particular, were underſtood by it; and in this view, Dr Franklin could not have ſelected a name more expreſſive of its nature and genius, for the inſtrument which we are now to deſcribe; as, perhaps, no muſical tone can poſſibly be finer, nor conſequently ſuſceptible of juſter concords, than thoſe which it produces.

In an old Engliſh book, whoſe title we cannot at preſent recollect, and in which a number of various amuſements were deſcribed, we remember to have ſeen the elements or firſt approaches to muſic by glaſſes. That author enjoins his pupil to chooſe half a dozen of ſuch as are uſed in drinking; to fill each of them with water in proportion to the gravity or acuteneſs of the ſound which he intended it ſhould produce; and, having thus adjuſted them one to another, he might entertain the company with a church-tune. Theſe, perhaps, were the rude and barbarous hints which Mr Puckeridge afterwards improved. But, for a farther account of him, of the ſtate in which he left the inſtrument, and of the ſtate to which it has afterwards been carried, we muſt refer our readers to the following extracts from Dr Franklin's letters, and from others who have written upon the ſame ſubject.

The Doctor, in his letter to Father Beccaria, has given a minute and elegant account of the *Harmonica*. Nor does it appear that his ſucceſſors have either more ſenſibly improved, or more accurately delineated, that angelic inſtrument. The detail of his own improvements, therefore, ſhall be given in his own words.

"Perhaps (ſays he) it may be agreeable to you, as you live in a muſical country, to have an account of the new inſtrument lately added here to the great number that charming ſcience was poſſeſſed of before: As it is an inſtrument that ſeems peculiarly adapted to *Italian* muſic, eſpecially that of the ſoft and plaintive kind, I will endeavour to give you ſuch a deſcription of it, and of the manner of conſtructing it, that you or any of your friends may be enabled to imitate it, if you incline ſo to do, without being at the expence and trouble of the many experiments I have made in endeavouring to bring it to its preſent perfection.

"You have doubtleſs heard the ſweet tone that is drawn from a drinking-glaſs, by preſſing a wet finger round its brim. One Mr Puckeridge, a gentleman from Ireland, was the firſt who thought of playing tunes formed of theſe tones. He collected a number of glaſſes of different ſizes; fixed them near each other on a table; and tuned them, by putting into them water, more or leſs, as each note required. The tones were brought out by preſſing his fingers round their brims. He was unfortunately burnt here, with his inſtrument, in a fire which conſumed the houſe he lived in. Mr E. Delaval, a moſt ingenious member of our Royal Society, made one in imitation of it, with a better choice and form of glaſſes, which was the firſt I ſaw or heard. Being charmed with the ſweetneſs of its tones, and the muſic he produced from it, I wiſhed to ſee the glaſſes diſpoſed in a more convenient form, and brought together in a narrower compaſs, ſo as to admit of a greater number of tones, and all within reach of hand to a perſon ſitting before the inſtrument; which I accompliſhed, after various intermediate trials, and leſs commodious forms, both of glaſſes and conſtruction, in the following manner.

"The glaſſes are blown as near as poſſible in the form of hemiſpheres, having each an open neck or ſocket in the middle. The thickneſs of the glaſs near the brim is about the tenth of an inch, or hardly quite ſo much, but thicker as it comes nearer the neck; which in the largeſt glaſſes is about an inch deep, and an inch and a half wide within; theſe dimenſions leſſening as the glaſſes themſelves diminiſh in ſize, except that the neck of the ſmalleſt ought not to be ſhorter than half an inch.—The largeſt glaſs is nine inches diameter, and the ſmalleſt three inches. Between theſe there are 23 different ſizes, differing from each other a quarter of an inch in diameter. To make a ſingle inſtrument, there ſhould be at leaſt ſix glaſſes blown of each ſize; and out of this number one may probably pick 37 glaſſes (which are ſufficient for three octaves with all the ſemitones) that will be each either the note one wants, or a little ſharper than that note, and all fitting ſo well into each other as to taper pretty regularly from the largeſt to the ſmalleſt. It is true, there are not 37 ſizes; but it often happens that two of the ſame ſize differ a note or half a note in tone, by reaſon of a difference in thickneſs, and theſe may be placed one in the other without ſenſibly hurting the regularity of the taper form.

"The glaſſes being choſen, and every one marked with a diamond the note you intend it for, they are to be tuned by diminiſhing the thickneſs of thoſe that are too ſharp. This is done by grinding them round from the neck towards the brim, the breadth of one or two inches as may be required; often trying the glaſs by a well-tuned harpſichord, comparing the note drawn from the glaſs by your finger, with the note you want, as ſounded by that ſtring of the harpſichord. When you come near the matter, be careful to wipe the glaſs clean and dry before each trial, becauſe the tone is ſomething flatter when the glaſs is wet than it will be when dry;—and grinding a very little between each trial, you will thereby tune to great exactneſs. The more care is neceſſary in this, becauſe, if you go below your required tone, there is no ſharpening it again but by grinding ſomewhat off the brim, which will afterwards require poliſhing, and thus increaſe the trouble.

"The glaſſes being thus tuned, you are to be

Harmonica.

provided with a caſe for them, and a ſpindle on which they are to be fixed. My caſe is about three feet long, eleven inches every way wide within at the biggeſt end, and five inches at the ſmalleſt end; for it tapers all the way, to adapt it better to the conical figure of the ſet of glaſſes. This caſe opens in the middle of its height, and the upper part turns up by hinges fixed behind. The ſpindle is of hard iron, lies horizontally from end to end of the box within, exactly in the middle, and is made to turn on braſs gudgeons at each end. It is round, an inch diameter at the thickeſt end, and tapering to a quarter of an inch at the ſmalleſt.—A ſquare ſhank comes from its thickeſt end through the box, on which ſhank a wheel is fixed by a ſcrew. This wheel ſerves as a fly to make the motion equable, when the ſpindle, with the glaſſes, is turned by the foot like a ſpinning wheel. My wheel is of mahogany, 18 inches diameter, and pretty thick, ſo as to conceal near its circumference about 25 ℔ of lead.—An ivory pin is fixed in the face of this wheel, about four inches from the axis. Over the neck of this pin is put the loop of the ſtring that comes up from the moveable ſtep to give it motion. The caſe ſtands on a neat frame with four legs.

" To fix the glaſſes on the ſpindle, a cork is firſt to be fitted in each neck pretty tight, and projecting a little without the neck, that the neck of one may not touch the inſide of another when put together, for that would make a jarring. Theſe corks are to be perforated with holes of different diameters, ſo as to ſuit that part of the ſpindle on which they are to be fixed. When a glaſs is put on, by holding it ſtiffly between both hands, while another turns the ſpindle, it may be gradually brought to its place. But care muſt be taken that the hole be not too ſmall, leſt in forcing it up the neck ſhould ſplit; nor too large, leſt the glaſs, not being firmly fixed, ſhould turn or move on the ſpindle, ſo as to touch or jar againſt its neighbouring glaſs. The glaſſes thus are placed one in another; the largeſt on the biggeſt end of the ſpindle, which is to the left hand: the neck of this glaſs is towards the wheel; and the next goes into it in the ſame poſition, only about an inch of its brim appearing beyond the brim of the firſt; thus proceeding, every glaſs when fixed ſhows about an inch of its brim (or three quarters of an inch, or half an inch, as they grow ſmaller) beyond the brim of the glaſs that contains it; and it is from theſe expoſed parts of each glaſs that the tone is drawn, by laying a finger on one of them as the ſpindle and glaſſes turn round.

" My largeſt glaſs is G a little below the reach of a common voice, and my higheſt G, including three complete octaves.—To diſtinguiſh the glaſſes more readily to the eye, I have painted the apparent parts of the glaſſes within-ſide, every ſemitone white, and the other notes of the octave with the ſeven priſmatic colours, viz. C, red; D, orange; E, yellow; F, green; G, blue; A, indigo; B, purple; and C, red again;—ſo that the glaſſes of the ſame colour (the white excepted) are always octaves to each other.

" This inſtrument is played upon, by ſitting before the middle of the ſet of glaſſes, as before the keys of a harpſicord, turning them with the foot, and wetting them now and then with a ſpunge and clean water. The fingers ſhould be firſt a little ſoaked in water, and quite free from all greaſineſs; a little fine chalk upon them is ſometimes uſeful, to make them catch the glaſs and bring out the tone more readily. Both hands are uſed, by which means different parts are played together.—Obſerve, that the tones are beſt drawn out when the glaſſes turn *from* the ends of the fingers, not when they turn *to* them.

" The advantages of this inſtrument are, that its tones are incomparably ſweet beyond thoſe of any other; that they may be ſwelled and ſoftened at pleaſure by ſtronger or weaker preſſures of the finger, and continued to any length; and that the inſtrument, being once well-tuned, never again wants tuning."

Such was the ſtate in which this learned and ingenious author found, and ſuch the perfection to which he carried, that celeſtial inſtrument of which we now treat. We call it *celeſtial;* becauſe, in compariſon with any other inſtrument which we know, the ſounds that it produces are indeed heavenly. Some of them, however, are ſtill conſtructed in the ſame imperfect manner as the inſtrument of Mr Puckeridge. They are contained in an oblong cheſt; their poſitions are either exactly or nearly rectilineal; the artificial ſemitones by which the full notes are divided, form another parallel line; but the diſtances between each of them are much greater than thoſe between the notes of the natural ſcale, as they take their places, not directly oppoſite to the notes which they are intended to heighten or depreſs, but in a ſituation between the higheſt and loweſt, to ſhow, that, in aſcending, they are ſharps to the one, and, in deſcending, flats to the other. This ſtructure, however, is doubly inconvenient; for it not only increaſes the labour and difficulty of the performer, but renders ſome muſical operations impracticable, which upon the *Harmonica*, as conſtituted by Dr Franklin, may be executed with eaſe and pleaſure. In this fabric, if properly formed and accurately tuned, the inſtrument is equally adapted to harmony and melody. But as no material ſtructure could ever yet be brought to the perfection even of human ideas, this inſtrument ſtill in ſome meaſure retains the perverſe nature of its original ſtamina. Hence it is not without the utmoſt difficulty that the glaſſes can be tuned by grinding, and the leaſt conceivable redundancy or defect renders the diſcord upon this inſtrument more conſpicuous and intolerable than upon any other. Hence likewiſe that inexpreſſible delicacy to be obſerved in the manner of the friction by which the ſound is produced: for if the touch be too gentle, it cannot extort the tone; and if too ſtrong, beſides the mellow and delicate ſound which ought to be heard, we likewiſe perceive the finger jarring upon the glaſs, which, mingled with thoſe ſofter ſounds by which the ſenſes had been ſoothed, gives a feeling ſimilar to iron grating upon iron, but more diſagreeable. In wind-inſtruments the operation of the tongue, in harpſichords the ſtroke of the quill, and on the violin the motion of the bow, gives that ſtrong and ſenſible interruption of ſound which may be called *articulation*, and which renders the rithmus or meaſure of an air more perceptible: but, upon the glaſſes, the touch of the finger is too ſoft to divide the notes with ſo much force; ſo that, unleſs the mind be ſteadily attentive, they ſeem to melt one into another, by which means the idea of rhythmus is almoſt loſt. There is no way of performing a ſlur, but by forbearing to ſtop the firſt ſound, when that which is immediately ſubſequent commences. Thus, when the ſlur is of any length, and regularly deſcends or riſes by the interval of a ſecond, all the notes in the ſlur muſt be heard together, and produce no agreeable diſſonance; yet if it riſes or deſcends by perfect chords, the effect is pleaſing. The open ſhake, or trill, is another unhappy operation upon muſical glaſſes; which can only be performed by the alternate pulſations of two continued ſounds, differing from each other only by a note or ſemitone. But, as theſe pulſations, thus managed, cannot be diſtinct, the reſult is far from being pleaſant; nor is there any ſuccedaneum for the cloſe ſhake, which in the violin is performed by alternately depreſſing the ſtring to the finger-board, and ſuffering it to riſe without entirely removing the finger from it, and which, by giving the note that tremulous ſound produced by the human voice affected with grief, is a grace peculiarly adapted to pathetic and plaintive airs.

We proceed, however, to a farther account of the ſame inſtrument, extracted from the Annual Regiſter, vol. iv. p. 149.

“ Beſides thoſe tones (ſays the author of that account) which every elaſtic ſtring produces by a vibration of all its parts, it is capable of another ſet of tones, in which only a part of the ſtring is ſuppoſed to vibrate. Theſe ſounds are produced by the lighteſt touches, either by air, as in Oſwald's lyre, or by rubbing the bow in the ſofteſt manner on the ſtring of a fiddle.

“ Analogous to theſe ſounds are thoſe produced by bells: in thoſe laſt, beſides thoſe tones produced by their elliptical vibrations, there are a ſet of tones which may be brought by gently rubbing their edges, and in which the whole inſtrument does not appear to vibrate in all its parts as before.

“ Take, for inſtance, a bell finely poliſhed at the edges; or, what will perhaps be more convenient, a drinking-glaſs: let the edges be as free from any thing oily as poſſible; then, by moiſtening the finger in water (I have found alum-water to be beſt), and rubbing it circularly round the edge of the glaſs, you will at length bring out the tone referred to.

“ This note is poſſeſſed of infinite ſweetneſs; it has all the excellencies of the tone of a bell, without its defects. It is loud, has a ſufficient body, is capable of being ſwelled and continued at pleaſure; and, beſides, has naturally that vibratory ſoftening, which muſicians endeavour to imitate, by mixing with the note to be played, a quarter-tone from below.

“ To vary theſe tones, nothing more is required than to procure ſeveral bells or glaſſes of different tones, tuned as nearly as poſſible, which may be done by thinning the edges of either: or, for immediate ſatisfaction, the glaſſes may be tuned by pouring in water; the more water is poured in, the graver the tone will be.

“ Let us ſuppoſe then a double octave of thoſe glaſſes, thus tuned, to be procured. Any common tune may be executed by the fingers rubbing upon each glaſs ſucceſſively; and this I have frequently done without the leaſt difficulty, only chooſing thoſe tunes which are ſlow and eaſy. Here then are numbers of delicate tones, with which muſicians have been, till very lately, unacquainted; and the only defect is, that they cannot be made to follow each other with that celerity and eaſe which is requiſite for melody. In order to remedy this, I took a large drinking-glaſs, and by means of a wheel and gut, as in the electrical machine, made it to turn upon its axis with a moderately quick but equable motion; then moiſtening the finger as before, nothing more was required than merely to touch the glaſs at the edge, without any other motion, in order to bring out the tone.

“ Inſtead of one glaſs only turning in this manner, if the whole number of glaſſes were ſo fixed as to keep continually turning, by means of a wheel, it follows, that upon every touch of the finger a note would be expreſſed; and thus, by touching ſeveral glaſſes at once, an harmony of notes might be produced, as in an harpſichord.

“ As I write rather to excite than ſatiſfy the curious, I ſhall not pretend to direct the various ways this number of glaſſes may be contrived to turn; it may be ſufficient to ſay, that if the glaſſes are placed in the ſegment of a circle, and then a ſtrap, as in a cutler's wheel, be ſuppoſed to go round them all, the whole number will by this means be made to turn, by means of a wheel.

“ Inſtead of the finger, I have applied moiſtened leather to the edge of the glaſs, in order to bring out the tone: but, for want of a proper elaſticity, this did not ſucceed. I tried cork, and this anſwered every purpoſe of the finger; but made the tone much louder than the finger could do. Inſtead, therefore of the finger, if a number of corks were ſo contrived as to fall with a proper degree of preſſure on the edge of the glaſs, by means of keys like the jacks of an organ, it is evident, that in ſuch a caſe a new and tolerably perfect inſtrument would be produced; not ſo loud indeed as ſome, but infinitely more melodious than any.

“ The mouths of the glaſſes or bells uſed in this experiment ſhould not reſemble the mouth of a trumpet, but ſhould rather come forward with a perpendicular edge. The corks uſed in this caſe ſhould be ſmooth, even free from thoſe blemiſhes which are uſually found in them, and at the ſame time the more elaſtic the better.”

In the two accounts here given ſeems to be comprehended every thing valuable which has been ſaid upon the ſubject. It remains, however, our permanent opinion, that the form and ſtructure deſigned and conſtituted by Dr Franklin is by much the moſt eligible; nor can we admit, that a cork, however ſucceſsfully applied, will produce the ſame mellowneſs and equability of tone in general, with the finger. It appears to us, that, by this kind of voluntary attrition, a note may be ſunk or ſwelled with much more art and propriety than by the ſubſtitution of any thing elſe extrinſic to the hand; and when chords are long protracted, that degree of friction, which renders every ſound in the chord ſenſible to the ear, without harſhneſs, muſt be the moſt agreeable. For this reaſon, likewiſe, we ſhould recommend alum-water in preference to chalk.

From what has already been ſaid, it will eaſily be perceived, that this inſtrument requires to be tuned with the niceſt degree of delicacy which the laws of temperament will poſſibly admit. For theſe laws the reader will naturally have recourſe to the article MUSIC †,

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† Chap. vii. art. 64.

Harmonica.

in this Dictionary; where, from M. D'Alembert, is given a plain and ſatisfactory account, both of the method propoſed by Rameau, and of that eſtabliſhed in common practice, without anticipating the experience and taſte of the reader, by dictating which of theſe plans is preferable. To thoſe who have occaſion to tune the inſtrument, it may likewiſe be uſeful to peruſe the detached article TEMPERAMENT in this Work. Without recapitulating the different rules of alteration preſcribed in theſe accounts, we ſhall preſuppoſe the reader acquainted with them; and proceed to deſcribe how, under their influence, the *Harmonica* may be tuned. But it is previouſly expedient to obſerve, that the ſame rules which conduct the proceſs of tuning a harpſichord, will be equally effectual in tuning the *Harmonica;* with this only difference, that greater delicacy in adjuſting the chords ſhould, if practicable, be attempted.

There are different notes from whence the procedure of tuning may commence. *La* or A, which is the key that pretty nearly divides the harpſichord, is choſen by ſome; this *la* in common ſpinets is 24 natural keys from the bottom, and 13 from the top: and the *ut* above it, or ſecond C upon the G cleff, by others. This laſt we ſhould rather adviſe, becauſe we imagine thoſe intervals which we have called *ſeconds major* to be more juſt through the whole octave, when the courſe of tuning is begun by a natural ſemitone. The initiate, therefore, may begin by tuning the ſecond *ut* of his *Harmonica*, or C above the treble cleff, in uniſon with its correſpondent C upon the harpſichord or any other inſtrument in concert-pitch; then, deſcending to its octave below, adjuſt it with the *ut* above, till every pulſation if poſſible be loſt, and the ſounds rendered ſcarcely diſtinguiſhable when ſimultaneouſly heard. To the loweſt note of this octave he muſt tune the *ſol* or G immediately above it by a fifth, ſtill obſerving the laws of temperament: To this G, the *re*, or D immediately above it, by the ſame chord: To the *re*, or D above, its octave below: To this, by a fifth, the *la* or A immediately above it: To *la*, the *mi* or E aſcending in the ſame proportion: To *mi*, its octave below: To this, the *ſi* or B immediately above it by a fifth: To the firſt *ut*, or C, which was tuned, the *fa* or F immediately below by the ſame chord.

That the practitioner may be ſtill more ſecure in the juſtice and propriety of his procedure, he may try the thirds of the notes already adjuſted, and alter, as much as is conſiſtent with the fifths and octaves, ſuch among theſe thirds as may ſeem grating and diſagreeable to his ear. Thus far having accompliſhed his operation, he may tune all the other natural notes whether above or below by octaves. His next concern is with the ſemitones. And here it will be ſuggeſted by common ſenſe, that as in all inſtruments with fixed ſcales the ſharp of a lower muſt likewiſe anſwer for the flat of a higher tone, the ſemitone ought as nearly as poſſible to divide the interval. He may begin with *la* or A ſharp, which *la* in its natural ſtate is a third minor beneath the *ut* or C, from whence he began in the natural ſcale. This ſemitone ſhould correſpond with the F natural immediately above by a fifth. To it may be tuned the *re* or D ſharp immediately below by a ſimilar chord: To D ſharp, its octave above: To *ſi* or B natural, immediately above the *la* or A firſt mentioned, may be adjuſted the F or *fa* ſharp immediately above it: To this its octave below: To that octave, the C or *ut* ſharp above by a fifth: To the C ſharp, its octave below: To this, by a fifth, the G or *ſol* ſharp above. Between this G ſharp and the D ſharp immediately above it, the fifth will probably be too ſharp; but if the others are juſtly tuned, that diſcord will not be extremely offenſive; and it is a neceſſary conſequence of temperament. The reſt of the ſharps and flats, like their naturals, whether aſcending or deſcending, may be tuned by their octaves.

The notes, with their chords, may be expreſſed by letters and figures, thus; where, however, it muſt be obſerved, that the higher notes of any chord are marked with larger capitals. It ſhould likewiſe be remarked, that the figures are not expreſſive of the different ratios which the notes bear one to another, conſidered with reſpect to their vibrations; but only ſignificant of their nominal diſtances, according to the received denominations of the intervals. $\mathrm{C}\overset{8}{}\mathrm{c}$ $\mathrm{c}\overset{5}{}\mathrm{G}$ $\mathrm{c}\overset{5}{}\mathrm{D}$ $\textsc{d}\overset{8}{}\mathrm{D}$ $\textsc{d}\overset{5}{}\mathrm{A}$ $\textsc{a}\overset{5}{}\mathrm{E}$ $\mathrm{E}\overset{8}{}\textsc{e}$ $\textsc{e}\overset{5}{}\mathrm{B}$ $\mathrm{C}\overset{5}{}\textsc{f}$. The ſharps and flats thus, $\textsc{a}\overset{5}{\sharp}\mathrm{F}\natural$, $\mathrm{A}\overset{5}{\sharp}\textsc{d}\sharp$, $\textsc{d}\overset{8}{\sharp}\mathrm{D}\sharp$, $\textsc{b}\overset{5}{\natural}\mathrm{F}\sharp$, $\mathrm{F}\overset{8}{\sharp}\textsc{f}\sharp$, $\textsc{f}\overset{5}{\sharp}\mathrm{C}\sharp$, $\mathrm{C}\overset{8}{\sharp}\mathrm{c}\sharp$, $\mathrm{c}\overset{5}{\sharp}\mathrm{G}\sharp$. In running over the ſharps and flats as the naturals, it will likewiſe be neceſſary to try the thirds, and to alter ſuch as may offend the ear; which, if cautiouſly done, will not ſenſibly injure the other chords.—Though this article has been protracted to a length which we did not originally intend, we have however the ſatisfaction to find, that it comprehends every thing eſſential; ſo that any perſon who underſtands the nature of chords, and the practical principles of muſic as univerſally taught, may not only be able to tune his inſtrument, but to acquire its whole manœuvre, without the leaſt aſſiſtance from a maſter.

On Plate CLIX. is repreſented an inſtrument of this kind, made by Mr Dobb of St Paul's Church-yard, London.

HARMONIC. As an adjective, it ſignifies in general any thing belonging to harmony; though, in our language, the adjective is more properly written *harmonical*. In this ſenſe it may be applied to the *harmonical* diviſions of a monochord; or, in a word, to conſonances in general. As a ſubſtantive neuter, it imports all the concomitant or acceſſory ſounds which, upon the principles reſulting from the experiments made on ſonorous bodies, attend any given ſound whatever, and render it appretiable. Thus all the aliquot parts of a muſical ſtring produce *harmonical* ſounds, or *harmonics*.

HARMONY. The ſenſe which the Greeks gave to this word in their muſic, is ſo much leſs eaſy to be determined, becauſe, the word itſelf being originally a ſubſtantive proper, it has no radical words by which we might analyſe it, to diſcover its etymology. In the ancient treatiſes which remain to us, *harmony* appears to be that department whoſe object is the agreeable ſucceſſion of ſounds, merely conſidered as high or low; in oppoſition to the two others called *rhythmica* and *metrica*, which have their principle in time and meaſure. This leaves our ideas concerning that aptitude of ſound vague and undetermined; nor can we fix them without ſtudying for that purpoſe all the rules of the art: and even after we have done ſo, it will be very difficult to diſtinguiſh *harmony* from melody, unleſs we add to the laſt the ideas of rhythmus and meaſure; without which, in reality, no melody can have a diſtinguiſhing character: whereas harmony is characteriſed by its own nature, independent of all other quantities except the chords or intervals which compoſe it.

It appears by a paſſage of Nicomachus, and by others, that they likewiſe gave the name of *harmony* to the chord of an octave, and to concerts of voices and inſtruments, which performed in the diſtance of an octave one from the other, and which is more commonly called *antiphone*.

Harmony, according to the moderns, is a ſucceſſion of chords agreeable to the laws of modulation. For a long time this *harmony* had no other principle but ſuch rules as were almoſt arbitrary, or ſolely founded on the approbation of a practiſed ear, which decided concerning the agreeable or diſagreeable ſucceſſion of chords, and whoſe determinations were at laſt reduced to calculation. But Father Merſenne and M. Saveur having found, that every ſound, however ſimple in appearance, was always accompanied with other ſounds leſs ſenſible, which conſtitute with itſelf a perfect chord-major; with this experiment M. Rameau ſet out, and upon it formed the baſis of his harmonic ſyſtem, which he has extended to a great many volumes, and which at laſt M. D'Alembert has taken the trouble of explaining to the public.

Signior Tartini, taking his route from an experiment which is newer and more delicate, yet not leſs certain, has reached concluſions ſimilar enough to thoſe of Rameau, by purſuing a path whoſe direction ſeems quite oppoſite. According to M. Rameau, the treble is generated by the baſs; Signior Tartini makes the baſs reſult from the treble. One deduces *harmony* from melody, and the other ſuppoſes quite the contrary. To determine from which of the two ſchools the beſt performances are likely to proceed, no more is neceſſary than to inveſtigate the end of the compoſer, and diſcover whether the air is made for the accompaniments, or the accompaniments for the air. At the word SYSTEM in Rouſſeau's Muſical Dictionary, is given a delineation of that publiſhed by Signor Tartini. Here he continues to ſpeak of M. Rameau, whom he has followed through this whole work, as the artiſt of greateſt authority in the country where he writes.

He thinks himſelf obliged, however, to declare, That this ſyſtem, however ingenious it may be, is far from being founded upon nature; an affirmation which he inceſſantly repeats: "That it is only eſtabliſhed upon analogies and congruities, which a man of invention may overturn to-morrow, by ſubſtituting others more natural: that, in ſhort, of the experiments from whence he deduces it, one is detected fallacious, and the other will not yield him the conſequences which he would extort from it. In reality, when this author took it in his head to dignify with the title of *demonſtration* the reaſonings upon which he eſtabliſhed his theory, every one turned the arrogant pretence into ridicule. The Academy of Sciences loudly diſapproved a title ſo ill-founded, and ſo gratuitouſly aſſumed; and M. Eſtive, of the Royal Society at Montpelier, has ſhewn him, that even to begin with this propoſition, That according to the law of nature, ſounds are repreſented by their octaves, and that the octaves may be ſubſtituted for them, there was not any one thing demonſtrated, or even firmly eſtabliſhed, in his pretended demonſtration." He returns to his ſyſtem.

"The mechanical principle of reſonance preſents us with nothing but independent and ſolitary chords; it neither preſcribes nor eſtabliſhes their ſucceſſion. Yet a regular ſucceſſion is neceſſary; a dictionary of ſelected words is not an oration, nor a collection of legitimate chords a piece of muſic: there muſt be a meaning, there muſt be connections in muſic as well in language: it is neceſſary that what has preceded ſhould tranſmit ſomething of its nature to what is ſubſequent, ſo that all the parts conjoined may form a whole, and be ſtamped with the genuine character of unity.

"Now, the complex ſenſation which reſults from a perfect chord, muſt be reſolved into the ſimple ſenſation of each particular ſound which compoſes it, and into the ſenſation of each particular interval which forms it, aſcertained by compariſon one with another. Beyond this there is nothing ſenſible in any chord; from whence it follows, that it is only by the relation between ſounds, and by the analogy between intervals, that the connection now in queſtion can be eſtabliſhed; and this is the genuine, the only ſource, from whence flow all the laws of *harmony* and modulation. If, then, the whole of *harmony* were only formed by a ſucceſſion of perfect chords-major, it would be ſufficient to proceed by intervals ſimilar to thoſe which compoſe ſuch a chord; for then ſome one or more ſounds of the preceding chord being neceſſarily protracted in that which is ſubſequent, all the chords would be found ſufficiently connected, and the *harmony* would, at leaſt in this ſenſe, be one.

"But beſides that theſe ſucceſſions muſt exclude all melody by excluding the diatonic ſeries which forms its foundation, it would not arrive at the real end of the art; becauſe, as muſic is a ſyſtem of meanings like a diſcourſe, it ought like a diſcourſe to have its periods, its phraſes, its ſuſpenſes, its cadences, its punctuation of every kind; and becauſe the uniformity of a harmonical procedure implies nothing of all this. Diatonic procedures require that major and minor chords ſhould be intermixed; and the neceſſity of diſſonances has been felt in order to diſtinguiſh the phraſes, and render the cadences ſenſible. Now, a connected ſeries of perfect chords-major, can neither be productive of perfect chords-minor nor of diſſonances, nor can ſenſibly mark any muſical phraſe, and the punctuation muſt there be found entirely defective.

"M. Rameau being abſolutely determined, in his ſyſtem, to deduce from nature all the *harmony* practiſed among us, had recourſe, for this effect, to another experiment of his own invention, of which I have formerly ſpoken, and which by a different arrangement is taken from the firſt. He pretended, that any ſimple ſound whatever afforded in its multiples a perfect minor or flat chord, of which it was the dominant or fifth, as it furniſhed a perfect chord-major by the vibration of its aliquot parts, of which it is the tonic or fundamental ſound. He has affirmed as a certain fact, that a vocal ſtring cauſed two others lower than itſelf to vibrate through their whole extent, yet without making them produce any ſound, one to its twelfth major and the other to its ſeventeenth; and from this joined to the former fact, he has very ingeniouſly deduced, not only the application of the minor mode and of diſſonances in *harmony*, but the rules of harmonic phraſes and of all modulation, ſuch as they are found at the words *Chord*, *Accompaniment*, *Fundamental Baſs*, *Cadence*, *Diſſonance*, *Modulation*.

“ But firſt, (continues Rouſſeau) the experiment is falſe. It is diſcovered, that the ſtrings tuned beneath the fundamental ſound do not entirely vibrate when this fundamental ſound is given; but that they are divided in ſuch a manner as to return its uniſon alone, which of conſequence can have no harmonics below. It is moreover diſcovered, that the property of ſtrings in dividing themſelves, is not peculiar to thoſe which are tuned by a twelfth and ſeventeenth below the principal ſound; but that oſcillations are likewiſe produced in the lower ſtrings by all its multiples. Whence it follows, that the intervals of the twelfth and ſeventeenth below, not being ſingular phenomena of their kind, nothing can be concluded in favour of the perfect minor chord which they repreſent.

“ Though the truth of this experiment were granted, even this would by no means remove the difficulty. If, as M. Rameau alleges, all harmony is derived from the reſonance of ſonorous bodies, it cannot then be derived only from the vibrations of ſuch bodies as do not reſound. In reality, it is an extraordinary theory, to deduce from bodies that do not reſound the principles of *harmony*; and it is a poſition in natural philoſophy no leſs ſtrange, that a ſonorous body ſhould vibrate without reſounding, as if ſound itſelf were any thing elſe but the air impelled by theſe vibrations. Moreover, ſonorous bodies do not only produce, beſides the principal ſound, the other tones which with itſelf compoſe a perfect chord; but an infinite number of other ſounds, formed by all the aliquot parts of the bodies in vibration, which do not enter into that perfect harmony. Why then ſhould the former ſounds produce conſonances, and why ſhould the latter not produce them, ſince all of them equally reſult from nature?

“ Every ſound exhibits a chord truly perfect, ſince it is compoſed of all its harmonics, and ſince it is by them that it becomes a ſound. Yet theſe harmonics are not heard, and nothing is diſtinguiſhed but a ſimple ſound, unleſs it be exceedingly ſtrong: whence it follows, that the only good harmony is an uniſon; and that as ſoon as the conſonances can be diſtinguiſhed, the natural proportion being altered, the *harmony* has loſt its purity.

“ That alteration is in this caſe produced two different ways. Firſt, by cauſing certain harmonics to reſound, and not the others, the proportion of force which ought to prevail in all of them is altered, for producing the ſenſation of a ſingle ſound; whence the unity of nature is deſtroyed. By doubling theſe harmonics, an effect is exhibited ſimilar to that which would be produced by ſuppreſſing all the others; for in that caſe we cannot doubt, but that, along with the generating ſound, the tones of the other harmonics which were permitted to ſound would be heard: whereas, in leaving all of them to their natural operations, they deſtroy one another, and conſpire together in forming and ſtrengthning the ſimple ſenſation of the principal ſound. It is the ſame effect which the full ſound of a ſtop in the organ produces, when, by ſucceſſively removing the ſtopper or regiſter, the third and fifth are permitted to ſound with the principal; for then that fifth and third, which remained abſorbed in the other ſounds, are ſeparately and diſagreeably diſtinguiſhed by the ear.

“ Moreover, the harmonics which we cauſe to ſound have other harmonics pertaining to themſelves, which cannot be ſuch to the fundamental ſound. It is by theſe additional harmonics that the ſounds which produce them are diſtinguiſhed with a more ſenſible degree of harſhneſs; and theſe very harmonics which thus render the chord perceptible, do not enter into its *harmony*. This is the reaſon why the moſt perfect chords are naturally diſpleaſing to ears whoſe reliſh for harmony is not ſufficiently formed; and I have no heſitation in thinking, that even the octave itſelf might be diſpleaſing, if the mixture of male and female voices did not inure us to that interval from our infancy.

“ With diſſonance it is ſtill worſe; becauſe, not only the harmonics of the ſound by which the diſcord is produced, but even the ſound itſelf is excluded from the natural harmony of the fundamental: which is the cauſe why diſcord is always diſtinguiſhed amongſt all the other ſounds in a manner ſhocking to the ſenſe.

“ Every key of an organ, with the ſtop fully opened, gives a perfect chord with its third-major, which are not diſtinguiſhed from the fundamental ſound, if the hearer is not extremely attentive, and if he does not ſound the whole ſtop in ſucceſſion; but theſe harmonic ſounds are never abſorbed in the fundamental, but on account of the prodigious noiſe, and by ſuch a ſituation of the regiſters as may cauſe the pipes which produce the fundamental ſound to conceal by their force the other ſounds which produce theſe harmonics. Now, no perſon obſerves, nor can obſerve, this continual proportion in a concert; ſince, by the manner of inverting the *harmony*, its greateſt force muſt in every inſtant be transferred from one part to another; which is not practicable, and would deſtroy the whole melody.

“ When we play upon the organ, every key in the baſs cauſes to reſound the perfect chord major; but becauſe that baſs is not always fundamental, and becauſe the muſic is often modulated in a perfect minor chord, this perfect chord-major is rarely ſtruck with the right hand; ſo that we hear the third minor with the major, the fifth with the triton, the ſeventh redundant with the octave, and a thouſand other cacophonies, which, however, do not much diſguſt our ears, becauſe habit renders them tractable; but it is not to be imagined that an ear naturally juſt would prove ſo patient of diſcords, when firſt expoſed to the teſt of this *harmony*.

“ M. Rameau pretends, that trebles compoſed with a certain degree of ſimplicity naturally ſuggeſt their own baſſes; and that any man having a juſt, though unpractiſed ear, would ſpontaneouſly ſing that baſs. This is the prejudice of a muſician, refuted by univerſal experience. Not only would he, who has never heard either baſs or *harmony*, be of himſelf incapable of finding either the baſs or the *harmony* of M. Rameau, but they would be diſpleaſing to him if he heard them, and he would greatly prefer the ſimple uniſon.

“When we conſider, that, of all the people upon earth, who have all of them ſome kind of muſic and melody, the Europeans are the only people who have a *harmony* conſiſting of chords, and who are pleaſed with this mixture of ſounds; when we conſider that the world has endured for ſo many ages, whilſt, of all the nations which cultivated the fine arts, not one has found out this *harmony*: that not one animal, not one bird, not one being in nature, produces any other chord but the uniſon, nor any other muſic but melody: that the eaſtern languages, ſo ſonorous, ſo muſical; that the ears of the Greeks, ſo delicate, ſo ſenſible, practiſed and cultivated with ſo much art, have never conducted this people, luxurious and enamoured of pleaſure as they were, towards this *harmony* which we imagined ſo natural: that without it their muſic produced ſuch aſtoniſhing effects; that with it ours is ſo impotent: that, in ſhort, it was reſerved for the people of the north, whoſe groſs and callous organs of ſenſation are more affected with the noiſe and clamour of voices, than with the ſweetneſs of accents and the melody of inflections, to make this grand diſcovery, and to vend it as the eſſential principle upon which all the rules of the art were founded; when, in ſhort, attention is paid to all theſe obſervations, it is very difficult not to ſuſpect that all our *harmony* is nothing but a Gothic and barbarous invention, which would never have entered into our minds, had we been truly ſenſible to the genuine beauties of art, and of that muſic which is unqueſtionably natural.

“M. Rameau aſſerts, however, that *harmony* is the ſource of the moſt powerful charms in muſic. But this notion is contradictory both to reaſon and to matter of fact. To fact it is contradictory; becauſe, ſince the invention of counter-point, all the wonderful effects of muſic have ceaſed, and it has loſt its whole force and energy. To which may be added, that ſuch beauties as purely reſult from harmony are only perceived by the learned; that they affect none with tranſport but ſuch as are deeply converſant in the art: whereas the real beauties of muſic, reſulting from nature, ought to be, and certainly are, equally obvious to the adept and the novice. To reaſon it is contradictory; ſince harmony affords us no principle of imitation by which muſic, in forming images and expreſſing ſentiments, can riſe above its native excellence till it becomes in ſome meaſure dramatic or imitative, which is the higheſt pitch of elevation and energy to which the art can aſpire; ſince all the pleaſures which we can receive from the mere mechanical influence of ſounds are extremely limited, and have very little power over the human heart.”

Thus far we have heard M. Rouſſeau, in his obſervations on *harmony*, with patience; and we readily grant, that the *ſyſtem of harmony* by M. Rameau is neither demonſtrated, nor capable of demonſtration. But it will not follow, that any man of invention can ſo eaſily and ſo quickly ſubvert thoſe aptitudes and analogies on which the ſyſtem is founded. Every hypotheſis is admitted to poſſeſs a degree of probability proportioned to the number of phenomena for which it offers a ſatiſfactory ſolution. The firſt experiment of M. Rameau is, that every ſonorous body, together with its principal ſound and its octave, gives likewiſe its twelfth and ſeventeenth major above; which being approximated as much as poſſible, even to the chords immediately repreſented by them, return to the third, fifth, and octave, or, in other words, produce perfect harmony. This is what nature, when ſolicited, ſpontaneouſly gives; this is what the human ear, unprepared and uncultivated, imbibes with ineffable avidity and pleaſure. Could any thing which claims a right to our attention, and acceptance from nature, be impreſſed with more genuine or more legible ſignatures of her ſanction than this? We do not contend for the truth of M. Rameau's ſecond experiment. Nor is it neceſſary we ſhould. The firſt, expanded and carried into all its conſequences, reſolves the phenomena of harmony in a manner ſufficient to eſtabliſh its authenticity and influence. The difficulties for which it affords no ſolution are too few and too trivial either to merit the regard of an artiſt or a philoſopher, as M. D'Alembert in his *elements* has clearly ſhown. The facts with which M. Rouſſeau confronts this principle, the armies of multiplied harmonics generated *in infinitum*, which he draws up in formidable array againſt it, only ſhow the thin partitions which ſometimes may divide philoſophy from whim. For, as bodies are infinitely diviſible, according to the philoſophy now eſtabliſhed, or as, according to every philoſophy, they muſt be indefinitely diviſible, each infiniteſimal of any given maſs, which are only harmonics to other principal ſounds, muſt have fundamental tones and harmonics peculiar to themſelves; ſo that, if the reaſoning of Rouſſeau has any force againſt M. Rameau's experiment, the ear muſt be continually diſtracted with a chaos of inappretiable harmonics, and melody itſelf muſt be loſt in the confuſion. But the truth of the matter is, that, by the wiſe inſtitution of nature, there is ſuch a conformity eſtabliſhed between our ſenſes and their proper objects, as muſt prevent all theſe diſagreeable effects. Rouſſeau and his opponent are agreed in this, that the harmonics conſpire to form one predominant ſound; and are not to be detected but by the niceſt organs, applied with the deepeſt attention. It is equally obvious, that, in an artificial harmony, by a proper management of this wiſe precaution of nature, diſſonances themſelves may be either entirely concealed, or conſiderably ſoftened. So that, ſince by nature ſonorous bodies in actual vibration are prediſpoſed to exhibit perfect harmony; and ſince the human ear is, by the ſame wiſe regulation, fabricated in ſuch a manner as to perceive it; the harmonical chaos of M. Rouſſeau may be left to operate on his own brain, where it will probably meet with the warmeſt reception it can expect to find†. Nor does it avail him to pretend, that before the harmonics can be diſtinguiſhed, ſonorous bodies muſt be impelled with a force which alters the chords, and deſtroys the purity of the harmony; for this poſition is equally falſe both in theory and practice. In theory, becauſe an impulſe, however forcible, muſt proportionally operate on all the parts of any ſonorous body, ſo far as it extends: in practice, becauſe the human ear actually perceives the harmony to be pure. What effects his various manœuvres upon the organ may have, we leave to ſuch as have leiſure and curioſity enough to try the experiments: but it is ap-

† M. Rouſſeau was alive when this article was written.

apprehended, that when tried, their reſults will leave the ſyſtem of Rameau, particularly as remodelled by D'Alembert, in its full force.

Of all the whims and paradoxes maintained by this philoſopher, none is more extravagant than his aſſertion, that every chord, except the ſimple uniſon, is diſpleaſing to the human ear: nay, that we are only reconciled to octaves themſelves by being inured to hear them from our infancy. Strange, that nature ſhould have fixed this invariable proportion between male and female voices, whilſt at the ſame time ſhe inſpired the hearers with ſuch violent prepoſſeſſions againſt it as were invincible but by long and confirmed habit! The tranſlator of *D'Alembert's Elements*, as given under the article MUSIC in this Dictionary, has been at peculiar pains to inveſtigate his earlieſt recollections upon this ſubject; and has had ſuch opportunities, both of attending to his original perceptions, and of recogniſing the fidelity of his memory, as are not common. He can remember, even from a period of early childhood, to have been pleaſed with the ſimpleſt kinds of artificial harmony; to have diſtinguiſhed the harmonics of ſonorous bodies with delight; and to have been ſtruck with horror at the ſound of ſuch bodies as, by their ſtructure, or by the coheſion of their parts, exhibited theſe harmonics falſe. This is the chief, if not the only cauſe, of the tremendous and diſagreeable ſenſation which we feel from the ſound of the Chineſe ghong. The ſame horrible cacophony is frequently, in ſome degree, produced by a drum unequally braced: from this ſound the tranſlator often remembers to have ſtarted and ſcreamed, when carried through the ſtreets of the town in which he was born in the arms of his nurſery-maid; and as he is conſcious, that the acouſtic organs of many are as exquiſite as his own, he cannot doubt but they may have had the ſame ſenſations, though perhaps they do not recollect the facts. So early and ſo nicely may the ſenſations of harmony and diſcord be diſtinguiſhed. But after all, it ſeems that *harmony* is no more than a modern invention, and, even at this late period, only known to the Europeans. We ſhould, however, be glad to know, from what oracle our philoſopher learned, that harmony was not known to antiquity. From what remains of their works, no proof of his poſition can be derived; and we have at leaſt mentioned one probability againſt it in our notes to the Preliminary Diſcourſe to the article MUSIC, (ſee Note B.) But though Rouſſeau's mighty objections were granted, that harmony can only be endured by ſuch ears as are habitually formed and cultivated; that the period of its prevalence has been ſhort, and the extent of its empire limited to Europe; ſtill his concluſion, that it is a Gothic and barbarous invention, is not fairly deducible even from theſe premiſes. Muſt we affirm, that epic poetry has no foundation in nature, becauſe, during the long interval which happened from the beginning of the world to the deſtruction of Troy, no epic poem ſeems to have appeared? Or becauſe a natural and mellifluous verſification is leſs reliſhed by an unpoliſhed taſte, than the uncouth rhymes of a common ballad, ſhall we infer, that the power of numbers is merely ſuppoſititious and arbitrary? On the contrary, we will venture to affirm, that though harmony cannot, as Rameau ſuppoſes, be mathematically demonſtrated from the nature and vibrations of ſonorous bodies; yet the idea of its conſtituent parts, and of their coaleſcence, is no leſs eſtabliſhed, no leſs preciſe and definite, than any mode or property of ſpace or quantity to be inveſtigated by geometrical reſearches or algebraical calculations. It is certain, that the mimetic or imitative power of muſic chiefly conſiſts in melody; but from this truth, however evident, it cannot be fairly deduced, that harmony is abſolutely unſuſceptible of imitation. Perhaps every muſical ſound, even to the moſt ſimple, and all modulations of ſound, are more or leſs remotely connected with ſome ſentiment or paſſion of the human heart. We know, that there are inſtinctive expreſſions of pain or pleaſure in their various modes and degrees, which, when uttered by any ſenſitive, and perceived by any conſcious being, excite in the mind of the percipient a feeling ſympathetic with that by which they are prompted. We likewiſe know from experience, that all artificial ſounds modulated in the ſame manner, have ſimilar, though not equal, effects. We have ſeen, that, in order to render harmony compatible with itſelf, the melody of each part muſt be congenial; and, for that reaſon, one kindred melody reſult from the whole. So far, therefore, as any compoſer has it in his power to render the general melody homogeneous; ſo far the imitation may be preſerved, and even heightened: for ſuch objects as are majeſtic and auguſt, or the feelings which they excite, are more aptly expreſſed by a compoſition of kindred ſounds, than by any ſimple tone whatever. They who ſuppoſe the mimetic powers of muſic to be conſummated in the imitation of mere unmeaning ſounds or degrees of motion, muſt entertain limited and unworthy ideas of its province. It is naturally a repreſentative almoſt of every ſentiment or affection of the ſoul; and, when this end is gained, the art muſt have reached its higheſt perfection, and produced its nobleſt effects. But theſe effects, however ſenſible among the ancients, may in us be ſuperſeded by other cauſes which remain yet unexplored. Theatrical performances are likewiſe, by them, ſaid to have produced the moſt wonderful effects; yet theſe we do not recogniſe amongſt ourſelves, tho' we have dramatic entertainments perhaps not inferior to theirs.

Rouſſeau proceeds to tell us, that among the ancients, the *enharmonick* ſpecies of muſic was ſometimes called *harmony*.

Direct HARMONY, is that in which the baſs is fundamental, and in which the upper parts preſerve among themſelves, and with that fundamental baſs, the natural and original order which ought to ſubſiſt in each of the chords that compoſe this harmony.

Inverted HARMONY, is that in which the fundamental or generating ſound is placed in ſome of the upper parts, and when ſome other ſound of the chord is transferred to the baſs beneath the others.

HARMONY *of the Spheres*, or *Celeſtial* HARMONY, a ſort of muſic much talked of by many of the ancient philoſophers and fathers, ſuppoſed to be produced by the ſweetly tuned motions of the ſtars and planets. This harmony they attributed to the various proportionate impreſſions of the heavenly globes upon one another, acting at proper intervals. It is impoſſible, according to them, that ſuch prodigious large bodies, moving with ſo much rapidity, ſhould be ſilent: on the contrary,

trary, the atmoſphere, continually impelled by them, muſt yield a ſet of ſounds proportionate to the impreſſion it receives; conſequently, as they do not all run the ſame circuit, nor with one and the ſame velocity, the different tones ariſing from the diverſity of motions, directed by the hand of the Almighty, muſt form an admirable ſymphony or concert.

They therefore ſuppoſed, that the moon, as being the loweſt of the planets, correſponded to *mi;* Mercury, to *fa;* Venus to *ſol;* the Sun, to *la;* Mars, to *ſi;* Jupiter, to *ut;* Saturn, to *re;* and the orb of the fixed ſtars, as being the higheſt of all, to *mi*, or the octave.

HAROLD, the name of two Engliſh kings. See England, n° 76, 82.

HARP, a muſical inſtrument of the ſtringed kind, of a triangular figure, and held upright between the legs of the performer.

There is ſome diverſity in the ſtructure of harps. That called the *triple harp* has three rows of ſtrings or chords, which in all make 78, or four octaves; the ſecond row makes the half turn, and the third is uniſon with the firſt. There are two rows of pins on the right ſide, called *buttons*, that ſerve to keep the ſtrings tight in their holes; which are faſtened at the other end to three rows of pins on the upper ſide called the *keys*. This inſtrument is ſtruck with the fingers and thumbs of both hands: its muſic is like that of the ſpinet, whence ſome have called it the *inverted ſpinet*. There are among us two ſorts of this inſtrument, viz. the Iriſh harp, which is ſtrung with wire; and the Welſh harp, ſtrung with gut.

As to ancient harps, two are repreſented on Plate CL.——Fig. 26. is a *trigonum* or triangular harp. It is taken from an ancient painting in the muſeum of the king of Naples, in which it is placed on the ſhoulder of a little dancing cupid, who ſupports the inſtrument with his left hand, and plays upon it with his right. The trigonum is mentioned by Athenæus, lib. iv. and by Julius Pollux, lib. iv. cap. 9. According to Athenæus, Sophocles calls it a *Phrygian inſtrument;* and one of his dipnoſophiſts tells us, that a certain muſician, named *Alexander Alexandrinus*, was ſuch an admirable performer upon it, and had given ſuch proofs of his abilities at Rome, that he made the inhabitants μησομανειν, muſically mad.

Fig. 25. is the Theban harp, according to a drawing made by J. Bruce, eſq; from an ancient painting in one of the ſepulchral grottos of the firſt kings of Thebes. "The performer is clad in a habit made like a ſhirt, ſuch as the women ſtill wear in Abyſſinia, and the men in Nubia. This ſeems to be white linen or muſlin, with narrow ſtripes of red. It reaches down to his ancles; his feet are without ſandals and bare; his neck and arms are alſo bare; his looſe wide ſleeves are gathered above his elbows; and his head is cloſe ſhaved. His left hand ſeems employed in the upper part of the inſtrument among the notes in *alto*, as if in an arpeggio; while, ſtooping forwards, he ſeems with his right hand to be beginning with the loweſt ſtring, and promiſing to aſcend with the moſt rapid execution: this action, ſo obviouſly rendered by an indifferent artiſt, ſhews that it was a common one in his time; or, in other words, that great hands were then frequent, and conſequently that muſic was well underſtood, and diligently followed.

"If we allow the performer's ſtature to be about five feet ten inches, then we may compute the harp in its extreme length to be ſomething leſs than ſix feet and a half. It ſeems to ſupport itſelf *in equilibrio* on its foot or baſe, and needs only the player's guidance to keep it ſteady. It has 13 ſtrings; the length of theſe, and the force and liberty with which they are treated, ſhew that they are made in a very different manner from thoſe of the lyre. (See Lyre.)

"This inſtrument is of a much more elegant form than the triangular Grecian harp. It wants the forepiece of the frame, oppoſite to the longeſt ſtring; which certainly muſt have improved its tone, but muſt likewiſe have rendered the inſtrument itſelf weaker, and more liable to accidents if carriage had not been ſo convenient in Egypt. The back part is the ſounding board, compoſed of four thin pieces of wood, joined together in form of a cone, that is, growing wider towards the bottom; ſo that, as the length of the ſtring increaſes, the ſquare of the correſpondent ſpace, in the ſounding board, in which the tone is to undulate, always increaſes in proportion.

"Beſides that the whole principles upon which the harp is conſtructed are rational and ingenious, the ornamental parts are likewiſe executed in the very beſt manner; the bottom and ſides of the frame ſeem to be fineered, or inlaid, probably with ivory, tortoiſeſhell, and mother-of-pearl, the ordinary produce of the neighbouring ſeas and deſerts. It would be even now impoſſible to finiſh an inſtrument with more taſte and elegance.

"Beſides the elegance of its outward form, we muſt obſerve, likewiſe, how near it approached to a perfect inſtrument; for it wanted only two ſtrings of having two complete octaves in compaſs. Whether theſe were intentionally omitted or not, we cannot now determine, as we have no idea of the muſic or taſte of that time; but if the harp be painted in the proportions in which it was made, it might be demonſtrated that it could ſcarce bear more than the 13 ſtrings with which it was furniſhed. Indeed the croſs-bar would break with the tenſion of the four longeſt, if they were made of the ſize and conſiſtence and tuned to the pitch that ours are at preſent.

"I look upon this inſtrument then, as the Theban harp, before and at the time of Seſoſtris, who adorned Thebes, and probably cauſed it to be painted there, as well as the other figures in the ſepulchre of his father, as a monument of the ſuperiority which Egypt had in muſic at that time over all the barbarous nations that he had ſeen or conquered.

"We know, about the time of Seſoſtris, if, as Sir Iſaac Newton ſuppoſes, this prince and Seſac were the ſame, that in Paleſtine the harp had only ten ſtrings; but as David, while he played upon it, both danced and ſung before the ark, it is plain, that the inſtrument upon which he played could have been but of ſmall volume, we may ſuppoſe little exceeding in weight our guitar; though the origin of this harp was probably Egyptian, and from the days of Moſes it had been degenerating in ſize, that it might be more portable in the many peregrinations of the Iſraelites."

To the above account by Mr Bruce, Dr Burney ſubjoins the following obſervations. "The number of

Hiſtory of Muſic, p. 225.

of ſtrings, the ſize and form of this inſtrument, and the elegance of its ornaments, awaken reflections, which to indulge would lead us too far from our purpoſe, and indeed out of our depth. The mind is wholly loſt in the immenſe antiquity of the painting in which it is repreſented. Indeed the time when it was executed is ſo remote, as to encourage a belief, that arts after having been brought to great perfection, were again loſt, and again invented long after this period.—

"With reſpect to the number of ſtrings upon this harp, if conjectures may be allowed concerning the method of tuning them, two might be offered to the reader's choice. The firſt idea that preſented itſelf at the ſight of 13 ſtrings was, that they would furniſh all the ſemitones to be found in modern inſtruments within the compaſs of an octave, as from C to *c*, D to *d*, or E to *e*. The ſecond idea is more Grecian, and conformable to antiquity; which is, that if the longeſt ſtring repreſented *Proſlambanomenos*, or D, the remaining 12 ſtrings would ſupply all the tones, ſemitones, and quarter-tones, of the diatonic, chromatic, and enharmonic genera of the ancients, within the compaſs of an octave: but for my part I would rather incline to the firſt arrangement, as it is more natural, and more conformable to the ſtructure of our organs, than the ſecond. For with reſpect to the genera of the Greeks, though no hiſtoric teſtimony can be produced concerning the invention of the diatonic and chromatic, yet ancient writers are unanimous in aſcribing to Olympus the Phrygian the firſt uſe of the enharmonic: and though in the beginning the melody of this genus was ſo ſimple and natural as to reſemble the wild notes and rude eſſays of a people not quite emerged from barbariſm; yet in after-times it became overcharged with finical fopperies, and fanciful beauties, ariſing from ſuch minute diviſions of the ſcale as had no other merit than the great difficulty of forming them.

"It ſeems a matter of great wonder, with ſuch a model before their eyes as the Theban harp, that the form and manner of uſing ſuch an inſtrument ſhould not have been perpetuated by poſterity; but that, many ages after, another of an inferior kind, with fewer ſtrings, ſhould take place of it. Yet if we conſider how little we are acquainted with the uſe and even conſtruction of the inſtruments which afforded the greateſt delight to the Greeks and Romans, or even with others in common uſe in a neighbouring part of Europe only a few centuries ago, our wonder will ceaſe; eſpecially if we reflect upon the ignorance and barbariſm into which it is poſſible for an ingenious people to be plunged by the tyranny and devaſtation of a powerful and cruel invader."

Bell-Harp, a muſical inſtrument of the ſtring kind, thus called from the common players on it ſwinging it about, as a bell on its bais.

It is about three feet long; its ſtrings, which are of no determinate number, are of braſs or ſteel wire, fixed at one end, and ſtretched acroſs the ſound-board by ſcrews fixed at the other. It takes in four octaves, according to the number of the ſtrings, which are ſtruck only with the thumbs, the right hand playing the treble, and the left hand the baſe: and in order to draw the ſound the clearer, the thumbs are armed with a little wire pin. This may perhaps be the lyra, or cythara of the ancients; but we find no mention made of it under the name it now bears, which muſt be allowed to be modern.

Harp *of Æolus*. See Acoustics, n° 10.

HARPAGIUS. See Arpagius.

HARPALUS, a Greek aſtronomer, who flouriſhed about 480 B. C. corrected the cycle of eight years invented by Cleoſtratus; and propoſed a new one of nine years, in which he imagined the ſun and moon returned to the ſame point. But Harpalus's cycle was afterwards altered by Meton, who added ten full years to it. See Astronomy, n° 304.

HARPIES, among the ancient poets, fabulous impure monſters, ſaid to be the daughters of Neptune and Terra. Virgil mentions three of them, Aello, Ocypete, and Celæno; they are deſcribed to be fowls, with the face of a virgin, bears ears, their bodies like vultures, and hands like their crooked talons.

HARPING iron. See Harpoon.

HARPINGS, the fore-parts of the wales which encompaſs the bow of a ſhip, and are faſtened to the ſtem, being thicker than the after part of the wales, in order to reinforce the ſhip in this place, where ſhe ſuſtains the greateſt ſhock of reſiſtance in plunging into the ſea, or dividing it, under a great preſſure of ſail.

HARPOCRATES, in Pagan theology, was the ſon of Iſis, and eſteemed the god of ſilence. He was repreſented under the form of a young man half naked, crowned with an Egyptian mitre, holding in his left hand a cornucopia, and a finger of the other placed on his lips as recommending ſilence.

HARPOCRATION, (Valerius), a celebrated ancient rhetorician of Alexandria, who has left us an excellent *Lexicon upon the ten orators of Greece*. Aldus firſt publiſhed this lexicon in the Greek at Venice in 1603. Many learned men have laboured upon it; but the beſt edition was given by James Gronovius at Leyden in 1696.

HARPSICHORD, the moſt harmonious of all the muſical inſtruments of the ſtring-kind. It is played on after the manner of the organ, and he is furniſhed with a ſet, and ſometimes with two ſets of keys; the touching or ſtriking of theſe keys moves a kind of little jacks, which alſo move a double row of chords or ſtrings, of braſs or iron, ſtretched over four bridges on the table of the inſtrument.

HARPOON, or Harping-iron, a ſpear or javelin uſed to ſtrike the whales in the Greenland fiſhery.

The harpoon, which is ſometimes called the *harping-iron*, is furniſhed with a long ſtaff, having at one end a broad and flat triangular head ſharpened at both edges, ſo as to penetrate the whale with facility: to the head of this weapon is faſtened a long cord, called the *whale line*, which lies carefully *coiled* in the boat, in ſuch a manner, as to run out without being interrupted or entangled. See Whale-*Fiſhery*.

HARQUEBUSS, a piece of fire-arms, of the length of a muſket, uſually cocked with a wheel. It carried a ball that weighed one ounce ſeven-eighths.

There was alſo a larger ſort, called the great harquebuſs, uſed for the defence of ſtrong places, which carried a ball of about three ounces and a half: but they are now but little uſed, except in ſome old caſtles, and by the French in ſome of their garriſons.

HARRIER, a kind of hound, endowed with an admirable gift of ſmelling, and very bold in the purſuit of his game.

HARRINGTON (Sir John), an ingenious Engliſh poet, was the ſon of John Harrington, eſq; who was committed to the tower by queen Mary for holding a correſpondence with her ſiſter Elizabeth; who, when ſhe came to the crown, ſtood godmother to this ſon. Before he was 30, he publiſhed a tranſlation of Arioſto's Orlando Furioſo, a work by which he was principally known; for though he afterwards publiſhed ſome epigrams, his talent did not ſeem to have lain that way. He was created knight of the bath by James I.; and preſented a MS. to prince Henry, levelled chiefly at the married biſhops. He is ſuppoſed to have died about the latter end of James's reign.

HARRINGTON (James), a moſt eminent Engliſh writer in the 17th century, bred at Oxford, travelled into Holland, France, Denmark and Germany, and learned the languages of thoſe countries. Upon his return to England, he was admitted one of the privy-chamber extraordinary to king Cha. I. He ſerved the king with great fidelity, and made uſe of his intereſt with his friends in parliament to procure matters to be accommodated with all parties. The king loved his company except when the converſation happened to turn upon commonwealths. He found means to ſee the king at St James's; and attended him on the ſcaffold, where, or a little before, he received a token of his majeſty's affection. After the death of king Charles, he wrote his *Oceana*; a kind of political romance, in imitation of Plato's Commonwealth, which he dedicated to Oliver Cromwell. It is ſaid, that when Oliver peruſed it, he declared, that "the gentleman had wrote very well, but muſt not think to cheat him out of his power and authority; for that what he had won by the ſword, he would not ſuffer himſelf to be ſcribbled out of." This work was attacked by ſeveral writers, againſt whom he defended it. Beſide his writings to promote republican principles, he inſtituted likewiſe a nightly meeting of ſeveral ingenious men in the New Palace-Yard, Weſtminſter; which club was called the *Rota*, and continued till the ſecluded members of parliament being reſtored by general Monk, all their models vaniſhed. In 1661, he was committed to the tower for treaſonable deſigns and practices; and chancellor Hyde, at a conference with the lords and commons, charged him with being concerned in a plot. But a committee of lords and commons could make nothing of that plot. He was conveyed to St Nicolas' iſland, and from thence to Plymouth, where he fell into an uncommon diſorder of the imagination. Having obtained his liberty by means of the earl of Bath, he was carried to London, and died in 1677. He publiſhed, beſides the above works, ſeveral others, which were firſt collected by Toland, in one volume folio, in 1700; but a more complete edition was publiſhed, in 1737, by the reverend Dr Birch.

HARRIOT (Thomas), a celebrated algebraiſt, was born at Oxford in 1560, where he was alſo educated. In 1579, he completed his bachelor's degree; and, being already diſtinguiſhed for his mathematical learning, was ſoon after recommended to Sir Walter Raleigh, as a proper perſon to inſtruct him in that ſcience. He was accordingly received into the family of that gentleman; who, in 1585, ſent him with the colony, under Sir Richard Grenville, to Virginia; of which country, having remained there about a year, he afterwards publiſhed a topographical deſcription. About the year 1588, Mr Hariot was introduced by his patron Sir Walter Raleigh, to Henry Percy earl of Northumberland, who allowed him a penſion of 120 l. *per annum*. He ſpent many years of his life in Sion college; where he died in July 1621, of a cancer in his lip, and was buried in the church of St Chriſtopher, where a handſome monument was erected to his memory. Anthony Wood tells us he was a deiſt, and that the divines looked upon his death as a judgement. Be his religious opinions what they might, he was doubtleſs one of the firſt mathematicians of the age in which he lived, and will always be remembered as the inventor of the preſent improved method of algebraical calculation. His improvements in algebra were adopted by Des Cartes, and for a conſiderable time impoſed upon the French nation as his own invention; but the theft was at laſt detected, and expoſed by Dr Wallis, in his Hiſtory of Algebra, where the reader will find our author's invention accurately ſpecified. His works are, 1. A brief and true report of the new-found land of Virginia; of the commodities there found, and to be raiſed, &c. 2. *Artis analyticæ praxis ad æquationes algebraicas nova expedita, et generali methodo reſolvendas, e poſthumis Thomæ Harrioti*, &c. 3. *Ephemeris chyrometrica.* Manuſcript, in the library of Sion college. He is ſaid to have left ſeveral other manuſcripts which are probably loſt.

HARRISON (John), a moſt accurate mechanic, the celebrated inventor of the famous *time-keeper* for aſcertaining the longitude at ſea, and alſo of the compound, or, as it is commonly called, the *gridiron pendulum*; was born at Foulby, in the pariſh of Wragby, near Pontefract in Yorkſhire, in 1693. The vigour of his natural abilities, if not even ſtrengthened by the want of education, which confined his attention to few objects, at leaſt amply compenſated the deficiencies of it; as fully appeared from the aſtoniſhing progreſs he made in that branch of mechanics to which he devoted himſelf. His father was a carpenter, in which profeſſion the ſon aſſiſted; occaſionally alſo, according to the miſcellaneons practice of country artiſts, ſurveying land, and repairing clocks and watches. He was, from his early childhood, attached to any machinery moving by wheels, as appeared while he lay ſick of the ſmall-pox about the 6th year of his age, when he had a watch placed open upon his pillow to amuſe himſelf by contemplating on the movement. In 1700, he removed with his father to Barrow in Lincolnſhire; where, though his opportunities of acquiring knowledge were very few, he eagerly improved every incident from which he might collect information; frequently employing all, or great part of his nights, in writing, or drawing: and he always acknowledged his obligations to a clergyman who came every ſunday to officiate in the neighbourhood, who lent him a MS. copy of profeſſor Saunderſon's Lectures; which he carefully and neatly tranſcribed, with all the diagrams. His native genious exerted itſelf ſuperior to theſe ſolitary diſadvantages; for in the year 1726, he had conſtructed two clocks, moſtly of wood, in which he applied the eſcapement and compound pendulum of his own invention: theſe ſurpaſſed every thing then made, ſcarcely erring a ſecond in a month. In 1728, he came up to London with the drawings of a machine for determining the longitude at ſea, in expectation of being enabled to execute one by the the board of longitude. Upon application to Dr Halley, he referred him to Mr George Graham; who, diſcovering he had uncommon merit, adviſed him to make his machine before he applied to the board of longitude. He returned home to perform this taſk; and 1735, came to London again with his firſt machine; with which he was ſent to Liſbon the next year for a trial of it's properties. In this ſhort voyage, he corrected the dead reckoning about a degree and a half; a ſucceſs that proved the means of his receiving both public and private encouragement. About the year 1739, he completed his ſecond machine, of a conſtruction much more ſimple than the former, and which anſwered much better: this, though not ſent to ſea, recommended Mr Harriſon yet ſtronger to the patronage of his private friends and of the public. His third machine, which he produced in 1749, was ſtill leſs complicated than the ſecond, and ſuperior in accuracy, as erring only three or four ſeconds in a week. This he conceived to be the *ne plus ultra* of his attempts; but in an endeavour to improve pocket-watches, he found the principles he applied, to ſurpaſs his expectations ſo much, as to encourage him to make his fourth time-keeper, which is in the form of a pocket watch, about ſix inches diameter. With this time-keeper his ſon made two voyages, the one to Jamaica, and the other to Barbadoes: in both which experiments it corrected the longitude within the neareſt limits required by the act of the 12th of queen Anne; and the inventor therefore, at different times, though not without infinite trouble, received the propoſed reward of 20,000 l. Theſe four machines were given up to the board of longitude. The three former were not of any uſe, as all the advantages gained by making them were comprehended in the laſt: they were worthy, however, of being carefully preſerved as mechanical curioſities, in which might be traced the gradations of ingenuity executed with the moſt delicate workmanſhip; whereas they now lie totally neglected, in the royal obſervatory at Greenwich. The fourth machine, emphatically diſtinguiſhed by the name of *The time-keeper*, has been copied by the ingenious Mr Kendal; and that duplicate, during a three years circumnavigation of the globe in the ſouthern hemiſphere by captain Cook, anſwered as well as the original. The latter part of Mr Harriſon's life was employed in making a fifth improved time-keeper on the ſame principles with the preceding one; which, at the end of a ten weeks trial, in 1772, at the king's private obſervatory at Richmond, erred only $4\frac{1}{2}$ ſeconds. Within a few years of his death, his conſtitution viſibly declined; and he had frequent fits of the gout, a diſorder that never attacked him before his 77th year: he died at his houſe in Red-Lion Square, in 1776, aged 83. The recluſe manner of his life in the unremitted purſuit of his favourite object, was by no means calculated to qualify him as a man of the world; and the many diſcouragements he encountered in ſoliciting the legal reward of his labours, ſtill leſs diſpoſed him to accommodate himſelf to the humours of mankind. In converſing on his profeſſion, he was clear, diſtinct, and modeſt; yet, like many other mere mechanics, found a difficulty in delivering his meaning by writing; in which he adhered to a peculiar and uncouth phraſeology. This was but too evident in his *Deſcription concerning ſuch mechaniſm as will afford a nice or true menſuration of time*, &c. 8vo. 1775; which his well-known mechanical talents will induce the public to account for from his unacquaintance with letters, from his advanced age, and attendant mental infirmities; among which may be reckoned his obſtinate refuſal to accept of any aſſiſtance whatever in this publication. This ſmall work includes alſo an account of his new muſical ſcale; or mechanical diviſion of the octave, according to the proportion which the radius and diameter of a circle have repectively to the circumference. He had in his youth been the leader of a diſtinguiſhed band of church-ſingers; had a very delicate ear for muſic; and his experiments on ſound, with a moſt curious monochord of his own improvement, are reported to have been not leſs accurate than thoſe he was engaged in for the menſuration of time.

HARROW, in agriculture. See there, nº 89.

HART, a ſtag, or male deer, in the ſixth year. See Cervus.

Hart's *Horns*, in pharmacy, the whole horns of the common male deer, as ſeparated from the head, without farther preparation.

The chemical analyſis of hart's-horn is ſufficiently known: it yields a water highly impregnated with a volatile ſalt, which is called *ſpirit of hartſhorn*, with a fetid oil, and a volatile ſalt, by the common diſtillation in a retort.—The ſalt of hartſhorn, when pure, differs in nothing from other purified volatile alkalies. See Chemistry, nº 329—336; Volatile *Alkali*; and *Alkaline* Spirits.

HARTFORDSHIRE, a county of England, deriving its name from Hartford, the capital; and that from the harts with which it anciently abounded, being then over-run with woods. It is bounded on the eaſt by Eſſex, on the weſt by Bedfordſhire and Buckinghamſhire, on the ſouth by Middleſex, and on the north by Cambridgeſhire. This county is much indented by thoſe that ſurround it: the longeſt part is about 30 miles, the broadeſt about 24, and 130 in compaſs; in which are contained about 451,000 acres, 18 market-towns, 120 pariſhes, and above 95,000 inhabitants, who ſend ſix members to parliament, viz. two for the ſhire, two for Hartford, and two for St Alban's. Before the reign of queen Elizabeth, one ſheriff ſerved both for this ſhire and Eſſex; but in the ninth year of her reign, it had one allotted for itſelf. With regard to eccleſiaſtical juriſdiction, it belongs partly to the dioceſe of Lincoln, and partly to that of London.

Though the ſoil in general, eſpecially in the Chiltern and ſouthern parts, is but very indifferent, and much inferior to that of the neighbouring counties; yet the air is ſo much ſuperior, that lands in this ſhire generally ſell at three or four years purchaſe more than in many others, on that account. But it muſt be owned, that the ſoil of Hartfordſhire has been much improved of late, by draining, ſowing graſs-ſeeds, and other methods. There are few or no manufactures in the county; but its markets are much frequented, in conſequence of its being near London, for malt and all ſorts of grain, which, with the many thoroughfares through it, make ample amends.

HARTFORD, the capital of the county of the ſame name, ſignifying, as is commonly thought, the "ford of harts," ſtands on the river Lea, in W. Long. 7′. N. Lat. 51. 45. In William the Conqueror's time, as we find in doomſday-book, there were 26 burgeſſes in it. It has a caſtle upon the Lea, ſuppoſed to have been built by Edward the Elder, which Edward III. granted to his ſon John duke of Lancaſter, together with the town and honour of Hartford, that (as it is expreſſed in the grant) he might keep a houſe ſuitable to his quality and have a decent habitation. Here the Eaſt-Saxon kings often kept their court; and here, in 673, was held a ſynod. King Edward the Elder built a village for his tenants, and fortified it with a wall of turf for their defence, which is what was originally meant by a burgh, whence the houſes were called *burgages*, and the inhabitants *burgher* or *burgeſſes*. The manor of this town was an honour and a royal manor, and even the town and caſtle were held of the king *in capite;* of the latter of which the ſheriffs of Hartfordſhire and Eſſex were uſually governors. The manor was granted by queen Elizabeth to lord Burleigh, whoſe deſcendants ſtill poſſeſs it. The town ſent members to parliament in Edward I.'s time, but after the ſeventh of Henry V. the bailiff and burgeſſes petitioned the parliament to be excuſed on account of their poverty. It has had ſeveral charters and grants of privileges from different kings, particularly ſeveral fairs and markets. In Henry VII.'s reign, the ſtandards of weights and meaſures were ordered to be kept here. Here was anciently a monaſtery; founded by a nephew of William the Conqueror's, and five churches, which are now reduced to two. As the town is remarkable for its pleaſant dry ſituation and wholeſome air, the governors of Chriſt's-hoſpital have fitted up a large building for the reception of their ſickly or ſupernumerary children. It is governed at preſent by a mayor, high-ſteward, recorder, nine aldermen, a town-clerk, chamberlain, 10 capital burgeſſes, and 16 aſſiſtants; and it has two ſergeants at mace. Its markets are very conſiderable for wool, wheat, and malt; of which, eſpecially the laſt, great quantities are conveyed to London by the river Lea. The town has had a great many benefactors; but to particularize them and their benefactions, would require more room than we can allow. It gives the title of earl to the noble family of Seymour-Conway.

HARTLAND, a town in Devonſhire, near the Briſtol channel, with a market on Saturdays, much frequented by the people of Cornwall, who come hither in boats. It gives its name to a point, called *Hartland Point*, at the entrance of Briſtol channel. W. Lon. 4. 45. N. Lat. 51. 9.

HARTLEPOOL, a ſea-port town in the county of Durham. It is commodiouſly ſeated on a promontory, and is almoſt encompaſſed by the ſea. It is an ancient corporation, governed by a mayor and aldermen, with other ſubordinate officers. It is at preſent a pretty large, but poor place. It depends chiefly on the fiſhing trade; and its harbour is much frequented by colliers paſſing to and from Newcaſtle. W. Lon. 0. 55. N. 54. 40.

HARTLEY (David), M. A. born at Ilingworth, where his father was curate, received his academical education at Jeſus college, Cambridge, of which he was a fellow. He firſt began to practiſe phyſic at Newark, in Nottinghamſhire; from whence he removed to St Edmund's Bury, in Suffolk. After this, he ſettled for ſome time in London; and laſtly went to live at Bath, where he died in 1757, aged 53, leaving two ſons and a daughter. He publiſhed "A view of the preſent evidence for and againſt Mrs Stephens's* medicines as a ſolvent for the ſtone, containing 155 caſes, with ſome experiments and obſervations;" London, 1739.

He is ſaid to have alſo written againſt Dr Warren, of St Edmund's Bury, in defence of inoculation; and ſome letters of his are to be met with in the Philoſophical Tranſactions.—The doctor was certainly a man of learning, and reputed a good phyſician; but too fond of noſtrums.

But his moſt conſiderable literary production is a work entitled, "Obſervations on man, his frame, his duty, and his expectations, in two parts;" London, 1749, 2 vols, 8vo. The firſt part contains obſervations on the frame of the human body and mind, and on their mutual connexions and influences. The ſecond part contains obſervations on the duty and expectations of mankind.

HARTMAN (John Adolphus), a learned divine and hiſtorian, was born at Munſter in 1680. After being a Jeſuit for ſeveral years, he became a Calviniſt, at Caſſel, in 1715, and ſoon after was made profeſſor of philoſophy and poetry, and in 1722 profeſſor of hiſtory and eloquence at Marpurg, where he died in 1744. The moſt eſteemed of his works are, 1. The ſtate of the ſciences at Heſſe, in German. 2. *Hiſtoria Haſſiaca*, 3 vols. 3. *Præcepta eloquentiæ rationalis*, &c.

He ought not to be confounded with *George Hartman*, a German mathematician, who, in 1540, wrote a book on perſpective; nor with *Wolfgang Hartman*, who, in 1596, compoſed the Annals of Augſburg.

HARUSPICES, pretenders to divination by certain ſigns, or omens, among the Romans.—The Roman haruſpices were at firſt all taken from Hetruria, where their art had moſt credit. Afterwards young Romans were ſent into Hetruria, in order to be brought up in the ſcience. It conſiſted in fortelling future events by attending to various circumſtances of the victims. Firſt, It was an ill omen when the victim would not come to the altar without dragging, when it broke its rope, fled away, avoided the ſtroke, ſtruggled much after it, made a great bellowing, was long a-dying, or bled but little. Secondly, Preſages were drawn from inſpecting the noble parts of the victim when opened; as the heart, lungs, ſpleen, and eſpecially the liver. If all theſe were ſound, if the top of the liver was large and well-made, and if its fibres were ſtrong, it preſaged well for the affair in queſtion. Thirdly, Knowledge was alſo drawn by the haruſpices from the manner in which the fire conſumed the victim. If the flame brightened immediately, was pure and clear, roſe up in a pyramid without noiſe, and did not go out till the victim was conſumed, theſe were happy ſigns. Fourthly, The ſmoke alſo was conſidered, whether it whirled about in curls, or ſpread itſelf to the right or the left, or gave a ſmell different from the common one of broiled meat. Fifthly, it was a lucky omen if the incenſe they burned melted all at once, and gave a moſt agreeable ſmell.

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* See *Stephens's Medicines*.

HARUSPICY. See HARUSPICES and DIVINATION.

HARVEY (Dr William), an eminent Engliſh phyſician in the 17th century, was incorporated Doctor of phyſic in Cambridge, afterwards admitted into the college of phyſicians in London, and was appointed lecturer of anatomy and chirurgery in that college. In theſe lectures he opened his diſcovery relating to the circulation of the blood; which, after a variety of experiments, he communicated to the world in his *Exercitatio anatomica de motu cordis et ſanguinis.* He was phyſician to king James I. and to king Charles I. and adhered to the royal cauſe. His works have eternized his memory. In 1651, he publiſhed his *Exercitationes de generatione animalium,* a very curious work; but it would have been more ſo, had not his papers been deſtroyed during the civil wars. In 1654, he was choſen preſident of the college of phyſicians in his abſence: but his age and weakneſs were ſo great, that he could not diſcharge the duty of that office; and, therefore, deſired them to chooſe Dr Pringle. As he had no children, he ſettled his paternal eſtate upon the college. He had three years before built a combination-room, a library, and a muſeum; and in 1656 he brought the deeds of his eſtate, and preſented them to the college. He was then preſent at the firſt feaſt, inſtituted by himſelf, to be continued annually, together with a commemoration ſpeech in Latin, to be ſpoken on the 18th of October, in honour of the benefactors to the college; he having appointed a handſome ſtipend for the orator, and alſo for the keeper of the library and muſeum, which are ſtill called by his name. He died in 1657.

This great phyſician had the happineſs, in his lifetime, to find the clamours of ignorance, envy, and prejudice, againſt his doctrine, totally ſilenced, and to ſee it univerſally eſtabliſhed. It has, by length of time, been more and more confirmed, and every man now ſees and knows it from his own experience. It appears to be of the utmoſt importance in medicine; as it is perhaps impoſſible to define health and ſickneſs in fewer words, than that the one is a free, and the other an obſtructed, circulation.—Dr Harvey was not only an excellent phyſician, but an excellent man; his modeſty, candour, and piety, were equal to his knowledge; the farther he penetrated into the wonders of nature, the more he was inclined to venerate the Author of it.

HARVEST, the time or ſeaſon of the year in which the corn is ripe, and fit to be taken into barns.

HARVEST-*Fly*, in zoology, a large four-winged fly of the cicada kind, very common in Italy, and erroneouſly ſuppoſed to be a graſshopper. See CICADA.

HARWICH, a town of Eſſex, in England, ſituated in E. Lon. 1. 25. N. Lat. 52. 3. It is not large, but is neat and well-built, and is walled and paved with a ſort of petrified clay that falls from the cliffs in the neighbourhood. The harbour or bay is very large, ſafe, and deep; and is commanded by a ſtrong fort on the Suffolk ſide, though not in that county. Here is a dock belonging to the government, with all conveniencies for building, cleaning, and refitting men of war. A little way from the town, on a high hill called *Beacon-hill,* is a very fine light-houſe, which is ſeen at a very great diſtance, and is very uſeful on this dangerous coaſt. At this place the packet-boats that paſs between England, Holland, and Germany, are ſtationed, and the town is much benefited by the paſſengers. The government, by a charter from king James I. is veſted in a mayor, eight aldermen, 24 capital burgeſſes, the electors, and recorder. The town has alſo an admiralty juriſdiction within its liberties, and the return of all writs, fines, &c.

HASLEMERE, a town of Surry, in England, ſeated on the edge of the county next Hampſhire, and ſends two members to parliament. This borough is governed by a conſtable; has one church, and about 100 low brick houſes in two paved ſtreets. The number of inhabitants is computed at about 4000. W. Lon. 0. 30. N. Lat. 51. 4.

HASSELT, a handſome town of the United Provinces, in Overyſſel, ſeated on the river Wecht, in E. Lon. 6. 5. N. Lat. 23. 46.

HASSELT, a town of Germany, in the circle of Weſtphalia, and in the territory of Liege, ſituated on the river Demer, in E. Lon. 4. 49. N. Lat. 50. 55.

HASSIDEANS, or ASSIDEANS. See ASSIDEANS.

HASSOCK, a baſs made of ruſhes, to kneel or reſt the feet upon in churches.

HASP *and* STAPLE, in Scots law, the ſymbol commonly uſed in burgage tenements for entering and infeſting an heir, by delivering into his hands the haſp and ſtaple of the door.

HASTATED LEAF. See BOTANY, p. 2196.

HASTINGS, a town of Suſſex, in England, ſituated in E. Lon. 0. 36. N. Lat. 50. 50.—This town is remarkable for a battle fought in its neighbourhood, between Harold king of England, and William duke of Normandy, on the 15th of October 1066, in which the former was defeated and killed, and by his death, William, ſurnamed the *Conqueror,* became king of England. See ENGLAND, n° 85.—The night before the battle, the aſpect of things was very different in the two camps. The Engliſh ſpent the time in riot, jollity, and diſorder; the Normans in ſilence and prayer, and in the other duties of religion. The next day both armies prepared for battle. The duke divided his army into three lines: the firſt, headed by Montgomery, conſiſted of archers and light-armed infantry; the ſecond, commanded by Martel, was compoſed of his braveſt battalions, heavy-armed, and ranged in cloſe order: his cavalry, at whoſe head he placed himſelf, formed the third line; and were ſo diſpoſed, that they ſtretched beyond the infantry; and flanked each wing of the army. He ordered the ſignal of battle to ſound; and the whole army, moving at once, and ſinging the hymn or ſong of Roland the famous peer of Charlemagne, advanced, in order and with alacrity, towards the enemy.

Harold had ſeized the advantage of a riſing ground, and having beſides drawn ſome trenches to ſecure his flanks, he reſolved to ſtand upon the defenſive, and to avoid all action with the cavalry, in which he was inferior. The Kentiſh men were placed in the van, a poſt which they had always claimed as their due; the Londoners guarded the ſtandard; and the king himſelf, accompanied by his two valiant brothers, Gurth and Leofwin, diſmounting from horſeback, placed himſelf at the head of his infantry, and expreſſed his reſolution to conquer or to periſh in the action. The firſt attack of the Normans was deſperate, but was received with equal valour by the Engliſh: and after a furious combat, which remained long undecided, the former, overcome by the difficulty of the ground, and hard preſſed by the enemy, began firſt to relax their vigour; then to give ground; and confuſion was ſpreading among the ranks, when William, who found himſelf on the brink of deſtruction, haſtened, with a ſelect band, to the relief of his diſmayed forces. His preſence reſtored the action; the Engliſh were obliged to retreat with loſs; and the duke, ordering his ſecond line to advance, renewed the attack with freſh forces and with redoubled courage. Finding that the enemy, aided by the advantage of ground, and animated by the example of their prince, ſtill made a vigorous reſiſtance, he tried a ſtratagem, which was very delicate in its management, but which ſeemed adviſeable in his deſperate ſituation, when, if he gained not a deciſive victory, he was totally undone: he commanded his troops to make a haſty retreat, and to allure the enemy from their ground by the appearance of flight. The artifice ſucceeded againſt theſe unexperienced troops, who, heated by the action, and ſanguine in their hopes, precipitantly followed the Normans into the plain. William gave orders, that at once the infantry ſhould face about upon their purſuers, and the cavalry make an aſſault upon their wings, and both of them purſue the advantage which the ſurprize and terror of the enemy muſt give them in that critical and deciſive moment. The Engliſh were repulſed with great ſlaughter, and drove back to the hill; where being rallied again by the bravery of Harold, they were able, notwithſtanding their loſs, to maintain the poſt and continue the combat. The duke tried the ſame ſtratagem a ſecond time with the ſame ſucceſs; but even after this double advantage, he ſtill found a great body of the Engliſh, who, maintaining themſelves in firm array, ſeemed determined to diſpute the victory to the laſt extremity. He ordered his heavy-armed infantry to make the aſſault upon them; while his archers, placed behind, ſhould gall the enemy, who were expoſed by the ſituation of the ground, and who were intent in defending themſelves againſt the ſwords and ſpears of the aſſailants. By this diſpoſition he at laſt prevailed; Harold was ſlain by an arrow, while he was combating with great bravery at the head of his men. His two brothers ſhared the ſame fate: and the Engliſh, diſcouraged by the fall of theſe princes, gave ground on all ſides, and were purſued with great ſlaughter by the victorious Normans. A few troops, however, of the vanquiſhed dared ſtill to turn upon their purſuers; and taking them in deep and miry ground, obtained ſome revenge for the ſlaughter and diſhonour of the day. But the appearance of the duke obliged them to ſeek their ſafety by flight, and darkneſs ſaved them from any farther purſuit by the enemy.

Thus was gained by William, duke of Normandy, the great and deciſive victory of Haſtings, after a battle which was fought from morning till ſunſet, and which ſeemed worthy, by the heroic feats of valour diſplayed by both armies, and by both commanders, to decide the fate of a mighty kingdom. William had three horſes killed under him; and there fell near fifteen thouſand men on the ſide of the Normans. The loſs was ſtill more conſiderable on that of the vanquiſhed; beſides the death of the king and his two brothers. The dead body of Harold was brought to William, and was generouſly reſtored without ranſom to his mother.——

The town of Haſtings is the chief of the cinque-ports; and was formerly obliged to find 21 ſhips, within 40 days after the king's ſummons, well furniſhed and armed for ſervice, and to maintain the crews a fortnight at its own charge. It ſends two members to parliament, and ſupplies London with abundance of fiſh. It lies between a high cliff towards the ſea, and a high hill on the land-ſide, having two ſtreets, and two pariſh-churches. About the year 1377 this town was burnt by the French; and, when it was rebuilt, it was divided into two pariſhes. There was a caſtle on the hill which overlooked the town, but it is now in ruins.

HAT, a covering for the head, worn by the men in moſt parts of Europe. Thoſe moſt in eſteem are made of the pure hair of the caſtor or beaver; for they are alſo made of the hair or wool of divers other animals, and that by much the ſame proceſs.

Hats are ſaid to have been firſt ſeen about the year 1400; at which time they became of uſe for country wear, riding, &c.—Father Daniel relates, that when Charles II. made his public entry into Rouen in 1449, he had on a hat lined with red-velvet, and ſurmounted with a plume or tuft of feathers.—He adds, that it is from this entry, at leaſt under this reign, that the uſe of hats and caps is to be dated, which henceforward began to take place of the chaperoons and hoods that had been wore before.

In progreſs of time, from the laity, the clergy likewiſe took the habit; but it was looked on as a crying abuſe, and ſeveral regulations were publiſhed, forbidding any prieſt, or religious perſon, to appear in a hat without cornets; and enjoining them to keep to the uſe of chaperoons, made of black cloth, with decent cornets: if they were poor, they were at leaſt to have cornets faſtened to their hats, and this upon pain of ſuſpenſion and excommunication.—Indeed the uſe of hats is ſaid to have been of a longer ſtanding among the eccleſiaſtics of Brittany by 200 years, and eſpecially among the canons: but theſe were no other than a kind of caps; and it was from hence aroſe the ſquare caps worn in colleges, &c. Lobineau * obſerves, that a biſhop of Dol, in the 12th century, zealous for good order, allowed the canons alone to wear ſuch hats; enjoining, that if any other perſon ſhould come with them to church, divine ſervice ſhould immediately ſtand ſtill.

Method of Making HATS. To make the beaver-hats, they tear off the long and ſhort hair from the ſkin, with knives ſuitable to the occaſion: after which they proportion the quantity of the ſeveral ſorts of beaver-hair, by mixing one third of the dry caſtor to two

thirds

* Tom. I. p. 845.

thirds of *old-coat*, which is a term for a ſkin that has been worn ſome time by the Indians of America, who catch and ſell them to the Europeans. The hair, ſo mixed, is carded and weighed out into parcels, according to the ſize and thickneſs of the hat intended. The ſtuff is now laid on the hurdle, with an inſtrument called a *bow*, reſembling that of a violin, but larger; whoſe ſtring being worked with a ſmall bowſtick, and made to play on the furs, they fly, and mix themſelves together, the duſt and filth at the ſame time paſſing through the chinks. Inſtead of a bow, ſome hat-makers uſe a ſearce of hair, through which they paſs the ſtuff. Thus hats are formed of an oval figure, ending with an acute angle at the top: with what ſtuff remains, they ſtrengthen them where ſlendereſt, yet deſignedly make them thicker in the brim near the crown, than towards the circumference, or in the crown itſelf. They next harden the ſtuff, ſo managed, into more compact flakes, by preſſing down a hardened leather upon it. This done, they are carried to the baſon; upon which laying one of the hardened hats, they ſprinkle it over with water, and mould it; and the heat of the fire, with the water and preſſing, embody the ſtuff into a ſlight hairy ſort of felt: after which, turning up the edges all round over the mould, they lay it by, and proceed with another; which being in like manner reduced to the ſame conſiſtence and form, they are both joined together, ſo as to make them meet in an angle at top, making only one conical cap. The next proceſs is to remove the hat to a trough, reſembling a mill-hopper, which is a copper kettle filled with water and grounds, kept hot for the purpoſe; and, after being dipped in the kettle, the hat is laid on the ſloping ſide, called the *plank*. Here they proceed to work it, by rolling and unrolling it again and again, one part after another, firſt with the hand, and afterwards with a ſmall wooden roller, taking care to dip it from time to time; till at length, by thus fulling and thickening it four or five hours, it is brought to the dimenſions intended. In this violent labour, the workmen uſually guard their hands with thick leather, which they call *gloves*. The hat thus wrought into the form of a conical cap, is reduced into proper ſhape on a block of the ſize of the intended crown, by tying it round with a ſtring, called a *commander;* after which, with a bent iron called a *ſtamper*, they gradually beat down the commander all round, till it has reached the bottom of the block, and what remains at the bottom below the ſtring forms the brim. In this ſtation it is ſet to dry; and is afterwards ſinged, by holding it over the blaze of a fire made of ſtraw or ſhavings: it is then rubbed with pumice-ſtone, to take off the coarſer nap; then rubbed over with ſeal-ſkin, to lay the nap ſtill finer; and, laſtly, carded with a fine card, to raiſe the fine cotton with which the hat is to appear when finiſhed: then fitting it to the block, they tie it, cut round the edges, and deliver it to the dyers. The dye being completed, the hat is dyed by being hung in the roof of a ſtove heated with a charcoal-fire: and, when dry, it is ſtiffened with melted glue, or rather gum ſenega, which is ſmeared over the hat with a bruſh, and rubbed in with the hand. Then, having ſpread a cloth over the ſteaming baſon, which is a little fire-place raiſed about three feet high, with an iron plate laid over it, exactly covering the fire, the hat is laid upon the cloth, with the brim downwards, the cloth being firſt ſprinkled with water, to raiſe a ſtrong ſteam, to force in the ſtiffening. When it is moderately hot, the workman ſtrikes gently on the brim, with the flat of his hand, to make the joinings incorporate and bind ſo as not to appear, turning it from time to time, and at laſt ſetting it on the crown. And when it has been ſufficiently ſteamed and dried, it is put again on the block, bruſhed, ironed, well ſmoothed, and fitted for lining.

Hats make a conſiderable article in commerce: England ſupplies Spain, Portugal, Italy, and Germany, with extraordinary quantities of them; and as our manufacturers have the reputation of making the beſt hats in Europe, their importation is prohibited.

HATS are alſo made for womens wear, of chips, ſtraw, or cane, by platting, and ſewing the plats together; beginning with the centre of the crown, and working round till the whole is finiſhed. Hats for the ſame purpoſe are alſo wove and made of horſe-hair, ſilk, &c.

HAT is alſo figuratively uſed for the dignity of cardinal, or a promotion to that dignity. In this ſenſe they ſay, "to expect the hat; to claim, or have pretenſions to, the hat," &c.

Pope Innocent IV. firſt made the hat the ſymbol or cognizance of the cardinals, enjoining them to wear a red hat at the ceremonies and proceſſions, in token of their being ready to ſpill their blood for Jeſus Chriſt.

Dyeing of HATS. The inſtructions of Mr Colbert direct hats to be firſt ſtrongly galled, by boiling them a long time in a decoction of galls with a little logwood, that the dye may penetrate the better into their ſubſtance; after which a proper quantity of vitriol, and decoction of logwood, with a little verdigreaſe, are added, and the hats continued in this mixture alſo for a conſiderable time. They are afterwards to be put in a freſh liquor of logwood, galls, vitriol, and verdigreaſe; and where the hats are of great price, or of a hair which difficultly takes the dye, the ſame proceſs is to be repeated a third time. For obtaining the moſt perfect colour, the hair or wool is to be dyed blue, previouſly to its being formed into hats.—The preſent practice is more compendious, and affords, as we may daily ſee, a very good black. According to Dr Lewis, it does not materially differ from that of the *Encyclopédie*, which is as follows.

An hundred pounds of logwood, 12 pounds of gum, and ſix pounds of galls, are boiled in a proper quantity of water for ſome hours; after which, about ſix pounds of verdigreaſe, and ten of green vitriol, are added, and the liquor kept juſt ſimmering, or of a heat a little below boiling. Ten or twelve dozen of hats are immediately put in, each on its block, and kept down by croſs bars for about an hour and an half: they are then taken out and aired, and the ſame number of others put in their room. The two ſets of hats are thus dipped and aired alternately, eight times each; the liquor being refreſhed each time with more of the ingredients, but in leſs quantity than at firſt.

This proceſs (ſays Dr Lewis) affords a very good black on woollen and ſilk ſtuffs as well as on hats, as we may ſee in the ſmall pieces of both kinds which are ſometimes dyed by the hatters. The workmen lay great ſtreſs upon the verdigreaſe, and affirm that they cannot dye a black hat without it: it were to be wiſhed that the uſe of this ingredient were more common in the other branches of the black dye; for the hatters dye, both on ſilk and woollen, is reckoned a finer black than what is commonly produced by the woollen and ſilk dyer.

HATCH, or Hatchway, a ſquare or oblong opening in the Deck of a ſhip, of which there are ſeveral, forming the paſſages from one deck to another, and into the hold, or lower apartments. See Plate LXXXVIII. where A repreſents the main hatchway of the lower deck; NN the fore-hatchway; and OO the after-hatchway.—There are likewiſe hatches of a ſmaller kind, called *ſcuttles*. See UU in the ſame figure; as alſo the article Scuttle.—Hatches is alſo, though improperly, a name applied by ſailors to the covers or lids of the hatchway.

HATCHES, in mining, a term uſed in Cornwal, to expreſs any of the openings of the earth either into mines or in ſearch of them. The fruitleſs openings are called *eſſay-hatches*; the real mouths of the veins, *tin hatches*; and the places where they wind up the buckets of ore, *wind hatches*.

Hatches alſo denote flood-gates ſet in a river, &c. to ſtop the current of the water, particularly certain dams or mounds made of rubbiſh, clay, or earth, to prevent the water that iſſues from the ſtream-works and tin-waſhes in Cornwal from running into the freſh rivers.

HATCHET, a ſmall light ſort of an axe, with a baſil-edge on its left ſide, and a ſhort handle, as being to be uſed with one hand.—Hatchets are uſed by various artificers, and more particularly in hewing of wood.

HATCHING, the maturating fecundated eggs, whether by the incubation and warmth of the parent bird, or by artificial heat, ſo as to produce young chickens alive.

The art of hatching chickens by means of ovens has long been practiſed in Egypt; but it is there only known to the inhabitants of a ſingle village named *Berme*, and to thoſe that live at a ſmall diſtance from it. Towards the beginning of autumn they ſcatter themſelves all over the country; where each perſon among them is ready to undertake the management of an oven, each of which is of a different ſize; but, in general, they are capable of containing from forty to fourſcore thouſand eggs. The number of theſe ovens placed up and down the country is about 386, and they uſually keep them working for about ſix months: as, therefore, each brood takes up in an oven, as under a hen, only 21 days, it is eaſy in every one of them to hatch eight different broods of chickens. Every Bermean is under the obligation of delivering to the perſon who intruſts him with an oven, only two thirds of as many chickens as there have been eggs put under his care; and he is a gainer by this bargain, as more than two thirds of the eggs uſually produce chickens. In order to make a calculation of the number of chickens yearly ſo hatched in Egypt, it has been ſuppoſed that only two thirds of the eggs are hatched, and that each brood conſiſts of at leaſt 30,000 chickens; and thus it would appear, that the ovens of Egypt give life yearly to at leaſt 92,640,000 of theſe animals.

This uſeful and advantageous method of hatching eggs has been lately diſcovered in France, by the ingenious Mr Reaumur; who, by a number of experiments, has reduced the art to certain principles. He found by experience, that the heat neceſſary for this purpoſe is nearly the ſame with that marked 32 on his thermometer, or that marked 96 on Farenheit's. This degree of heat is nearly that of the ſkin of the hen, and, what is remarkable, of the ſkin of all other domeſtic fowls, and probably of all other kinds of birds. The degree of heat which brings about the developement of the cygnet, the goſling, and the turkey-pout, is the ſame as that which fits for hatching the canary-ſongſter, and, in all probability, the ſmalleſt humming-bird: the difference is only in the time during which this heat ought to be communicated to the eggs of different birds; it will bring the canary bird to perfection in 11 or 12 days, while the turkey-pout will require 27 or 28.

After many experiments, Mr Reaumur found, that ſtoves heated by means of a baker's oven, ſucceeded better than thoſe made hot by layers of dung: and the furnaces of glaſs-houſes and thoſe of the melters of metals, by means of pipes to convey heat into a room, might, no doubt, be made to anſwer the ſame purpoſe. As to the form of the ſtoves, no great nicety is required. A chamber over an oven will do very well. Nothing more will be neceſſary but to aſcertain the degree of heat; which may be done by melting a lump of butter of the ſize of a walnut, with half as much tallow, and putting it into a phial. This will ſerve to indicate the heat with ſufficient exactneſs: for when it is too great, this mixture will become as liquid as oil; and when the heat is too ſmall, it will remain fixed in a lump: but it will flow like a thick ſyrup, upon inclining the bottle, if the ſtove be of a right temper. Great attention therefore ſhould be given to keep the heat always at this degree, by letting in freſh air if it be too great, or ſhutting the ſtove more cloſe if it be too ſmall: and that all the eggs in the ſtove may equally ſhare the irregularities of the heat, it will be neceſſary to ſhift them from the ſides to the centre; thereby imitating the hens, who are frequently ſeen to make uſe of their bills, to puſh to the outer parts thoſe eggs that were neareſt to the middle of their neſts, and to bring into the middle ſuch as lay neareſt the ſides.

Mr Reaumur has invented a ſort of low boxes, without bottoms, and lined with furs. Theſe, which he calls *artificial-parents*, not only ſhelter the chickens from the injuries of the air, but afford a kindly warmth, ſo that they preſently take the benefit of their ſhelter as readily as they would have done under the wings of a hen. After hatching, it will be neceſſary to keep the chickens, for ſome time, in a room artfully heated and furniſhed with theſe boxes; but afterwards they may be ſafely expoſed to the air in the court-yard, in which it may not be amiſs to place one of theſe artificial-parents to ſhelter them if there ſhould be occaſion for it.

As to the manner of feeding the young brood, they are generally a whole day after being hatched, before they take any food at all; and then a few crumbs of bread may be given them for a day or two, after which they will begin to pick up inſects and graſs for themſelves.

But to ſave the trouble of attending them, capons may be taught to watch them in the ſame manner as hens do. Mr Reaumur aſſures us, that he has ſeen above 200 chickens at once, all led about and defended only by three or four ſuch capons. Nay, cocks may be taught to perform the ſame office; which they, as well as the capons, will continue to do all their lives after.

Hatching, or **Haching**, in deſigning, &c. the making of lines with a pen, pencil, graver, or the like; and the interſecting or going acroſs thoſe lines with others drawn a contrary way, is called *counter-hatching*. The depths and ſhadows of draughts are uſually formed by hatching.

Hatching is of ſingular uſe in heraldry, to diſtinguiſh the ſeveral colours of a ſhield, without being illumined: thus, gules or red is hatched by lines drawn from the top to the bottom; azure, by lines drawn acroſs the ſhield; and ſo of other colours.

HATCHMENT, in heraldry, the coat-of-arms of a perſon dead, uſually placed on the front of a houſe, whereby may be known what rank the deceaſed perſon was of when living: the whole diſtinguiſhed in ſuch a manner as to enable the beholder to know, whether he was a bachelor, married man, or widower; with the like diſtinctions for women.

HATFIELD, a town in Hartfordſhire in England. The kings of England had formerly a royal palace here, where Edward VI. was educated. King James I. exchanged the manor with Sir Robert Cecil, afterwards earl of Saliſbury, for Theobalds, in the pariſh of Cheſhunt in this country; and the lordſhip ſtill remains in that noble family, who have a very fine ſeat here. The rectory, which is in that earl's gift, is reckoned worth 800 pounds a-year. W. Long. 0. 12. N. Lat. 51. 42.

Hatfield-broad-oak, a town of Eſſex in England, ſeated on a branch of the river Lea, in E. Long. 0. 13. N. Lat. 51. 58.

HATTEM, a town of the United Provinces in the duchy of Guelderland, ſeated on the river Uſſol, in E. Lon. 6. 0. N. Lat. 53. 30.

HATTOCK, a ſhock of corn containing twelve ſheaves; others make it only three ſheaves laid together.

HATUAN, a town and fort of Upper Hungary in the county of Novigrod. It was taken by the Imperialiſts in 1685. It is ſeated on a mountain, in E. Long. 19. 48. N. Lat. 47. 52.

HAVANNA, a ſea-port town of America, in the iſland of Cuba, and on the north-weſt part of it, oppoſite to Florida. It is famous for its harbour, which is ſo large that it may hold 1000 veſſels; and yet the mouth is ſo narrow, that only one ſhip can enter at a time. This is the place where all the ſhips that come from the Spaniſh ſettlements rendezvous on their return to Spain. It is near two miles in circumference; and contains about 10,000 inhabitants, conſiſting of Spaniards, Mulattoes, and Negroes. The entrance into the harbour is well defended by forts and platforms of great guns; and the biſhop of St Jago reſides here, as well as moſt men of faſhion and fortune belonging to the iſland. It was taken by the Britiſh in 1762; but reſtored to the Spaniards by the treaty of peace in 1763. W. Long. 84. 10. N. Lat. 23. 0.

HAVEL, a river of Brandenburg, which proceeds from a lake in the duchy of Mecklenburg, and running thro' the middle Marche, and thro' Brandenburg and other towns, runs north, and falls into the Elbe.

HAVELBERG, a town of Germany, in the circle of Lower Saxony, and in the electorate of Brandenburg, with a biſhop's ſee, ſecularized in favour of the houſe of Brandenburg. It is ſeated on the river Havel, in E. Long. 12. 43. N. Lat. 53. 4.

HAVEN, a ſea-port or harbour. See Harbour.

HAVERCAMP (Sigibert), a celebrated Dutch ſcholar and critic, profeſſor of hiſtory, eloquence, and the Greek tongue, at Leyden. He was particularly ſkilled in medals; and was the author of ſome eſteemed works in that way, beſide giving good and elegant editions of ſeveral Greek and Latin authors. He died at Leyden in 1742, aged 58.

HAVERFORD-west, a town of Pembrokeſhire in South Wales, ſeated in W. Long. 5. N. Lat. 51. 50. It is a town and county of itſelf; and ſtands commodiouſly on the ſide of a hill, and on a creek of Milford-haven, over which there is a ſtone bridge. It is a large handſome place, with ſeveral good houſes, and contains three pariſh-churches. It has alſo a conſiderable trade, with ſeveral veſſels belonging to it; and ſends one member to parliament. The aſſizes and county-gaol are kept here; and it had once a wall and caſtle, now demoliſhed.

HAVERILL, a town of England, in the county of Suffolk, where there is a conſiderable manufactory of checks, cottons, and fuſtians. By the ruins of a church and caſtle ſtill to be ſeen, it appears to have been formerly a place of much greater conſequence than at preſent. It has now only about 300 poor clay-houſes, and one wide ſtreet not paved.

HAUL, an expreſſion peculiar to ſeamen, implying to pull a ſingle rope, without the aſſiſtance of blocks or other ſuch mechanical powers. When a rope is otherwiſe pulled, as by the application of tackles, or the connection with blocks, &c. the term is changed into *bowſing*.

To **Haul** *the Wind*, is to direct the ſhip's courſe nearer to that point of the compaſs from which the wind ariſes. Thus, ſuppoſing a ſhip to ſail ſouth-weſt, with the wind northerly, and ſome particular occaſion requires to haul the wind more weſtward; to perform this operation, it is neceſſary to arrange the ſails more obliquely with her keel; to brace the yards more forward, by ſlackening the ſtarboard, and pulling in the larboard braces, and to haul the lower ſheets further aft; and finally, to put the helm a-port, i. e. over to the larboard ſide of the veſſel. As ſoon as her head is turned directly to the weſtward, and her ſails are trimmed accordingly, ſhe is ſaid to have hauled the wind four points; that is to ſay, from ſouth-weſt to weſt. She may ſtill go two points nearer to the direction of the wind, by diſpoſing her ſails according to their greateſt obliquity, or, in the ſea-phraſe, by *trimming all ſharp*; and in this ſituation ſhe is ſaid to be cloſe hauled, as ſailing weſt north-weſt.

HAUNCH, or **Hanch**, the *Hip*, or that part of the body between the laſt ribs and the thigh.

The haunches of a horſe are too long, if when ſtanding in the ſtable he limps, with his hind-legs farther back than he ought; and when the top or onſet of his tail is not in a perpendicular line to the tip of his hocks, as it always does in horſes whoſe haunches are of a juſt length. There are ſome horſes, which though they have too long haunches, yet commonly walk well: ſuch are good to climb hills, but are not at all ſure upon a deſcent; for they cannot ply their hams, and never gallop ſlowly, but always nearly upon a full ſpeed. The art of riding the great horſe has not a more neceſſary leſſon than that of putting a horſe upon his haunches; which, in other words, is called *coupling him well*, or putting him well together, or compact. A horſe that cannot bend or lower his haunches, throws himſelf too much upon his ſhoulder, and lies heavy upon the bridle.

HAVRE *de* GRACE, a ſea-port town of France, and capital of a diſtrict of the ſame name, is ſeated in the province of Normandy, on the Engliſh channel, in a large plain at the mouth of the river Seine. It is a ſmall fortified town, nearly of a ſquare figure, divided into two parts by the harbour, ſurrounded with a wall and other works, and defended by a very ſtrong citadel. It is one of the moſt important places in France, on account of its foreign trade and convenient harbour; for which reaſon it was made a diſtinct government from the reſt of Normandy. It was ſurpriſed in 1562, by the Proteſtants, who delivered it to queen Elizabeth; but it was loſt next year. In 1694 it was bombarded by the Engliſh, and alſo in the year 1758. E. Long. 0. 11. N. Lat. 49. 29.

HAURIANT, in heraldry, a term peculiar to fiſhes; and ſignifies their ſtanding upright, as if they were refreſhing themſelves by ſucking in the air.

HAUTE FEUILLE (John), an ingenious mechanic born at Orleans in 1647. Though he embraced the ſtate of an eccleſiaſtic, and enjoyed ſeveral benefices, he applied almoſt his whole life to mechanics, in which he made a great progreſs. He had a particular taſte for clock-work, and made ſeveral diſcoveries in it that were of ſingular uſe. It was he who found out the ſecret of moderating the vibration of the balance by means of a ſmall ſteel-ſpring, which has ſince been made uſe of. This diſcovery he laid before the members of the Academy of Sciences in 1674; and theſe watches are, by way of eminence, called *pendulum-watches*; not that they have real pendulums, but becauſe they nearly approach to the juſtneſs of pendulums. M. Huygens perfected this happy invention; but having declared himſelf the inventor, and obtained from Lewis XIV. a patent for making watches with ſpiral ſprings, the abbé Feuille oppoſed the regiſtering of this privilege, and publiſhed a piece on the ſubject againſt M. Huygens. He wrote a great number of other pieces, moſt of which are ſmall pamphlets conſiſting of a few pages, but very curious; as, 1. His perpetual pendulum, quarto. 2. New inventions, quarto. 3. The art of breathing under water, and the means of preſerving a flame ſhut up in a ſmall place. 4. Reflections on machines for raiſing water. 5. His opinion on the different ſentiments of Mallebranche and Regis relating to the appearance of the moon when ſeen in the horizon. 6. The magnetic balance. 7. A placet to the king on the longitude. 8. Letter on the ſecret of the longitude. 9. A new ſyſtem on the flux and reflux of the ſea. 10. The means of making ſenſible experiments that prove the motion of the earth; and many other pieces. He died in 1724.

HAUTBOY, a muſical inſtrument of the wind kind, ſhaped much like the lute; only that it ſpreads and widens towards the bottom, and is ſounded thro' a reed. The treble is two feet long; the tenor goes a fifth lower, when blown open: it has only eight holes; but the baſs, which is five feet long, has eleven.

The word is French, *haut bois*, q. d. *high wood*; and is given to this inſtrument becauſe the tone of it is higher than that of the violin.

HAW, a ſort of berry, the fruit of ſeveral ſpecies of meſpilus, thence denominated *hawthorns*. See MESPILUS.

HAW, among farriers, an excreſcence reſembling a griſtle, growing under the nether eye-lid and eye of a horſe, which, if not timely removed, will put it quite out. See FARRIERY, § xi. 15.

HAW, a ſmall parcel of land ſo called in Kent, as a *Hemphaw*, or *Beanhaw*, lying near the houſe, and incloſed for theſe uſes. But Sir Edward Coke, in an ancient plea concerning Feverſham in Kent, ſays *Hawes* are houſes.

HAW-*Finch*. See LOXIA.

HAWGH, or HOWGH, ſignifies a green plot in a valley, as they uſe it in the north of England.

HAWK, in ornithology. See FALCO.

HAWKERS, anciently were fraudulent perſons, who went about from place to place buying and ſelling braſs, pewter, and other merchandiſe, which ought to be uttered in open market. In this ſenſe the word is mentioned *anno* 25 Hen. VIII. *c.* 6. and 33 *ejuſdem*, *c.* 4.—The appellation *hawkers* ſeems to have ariſen from their uncertain wandering, like thoſe who with hawks ſeek their game where they can find it.

HAWKERS, is alſo now applied to thoſe who go up and down London ſtreets crying new books, and ſelling them by retail. The women who furniſh the hawkers, i. e. ſell the papers by wholeſale from the preſs, are called *mercuries*.

HAWKING, the exerciſe of taking wild-fowl by means of hawks. The method of reclaiming, manning, and bringing up a hawk to this exerciſe, is called *falconry*. See FALCONRY.

There are only two countries in the world where we have any evidence that the exerciſe of hawking was very anciently in vogue. Theſe are, Thrace and Britain. In the former, it was purſued merely as the diverſion of a particular diſtrict, if we may believe Pliny †, whoſe account is rendered obſcure by the darkneſs of his own ideas of the matter. The primæval Britons, with a fondneſs for the exerciſe of hunting, had alſo a taſte for that of hawking; and every chief among them maintained a conſiderable number of birds for that ſport. It appears alſo from a curious paſſage in the poems of Oſſian *, that the ſame diverſion was faſhionable at a very early period in Scotland. The poet tells us, that a peace was endeavoured to be gained by the proffer of 100 managed ſteeds, 100 foreign captives, and "100 hawks with fluttering wings, that fly "acroſs the ſky." To the Romans this diverſion was ſcarce known in the days of Veſpaſian; yet it was introduced immediately afterwards. Moſt probably they adopted it from the Britons; but we certainly know that they greatly improved it by the introduction of ſpaniels into the iſland. In this ſtate it appears among the Roman Britons in the ſixth century. Gildas, in a remarkable paſſage in his firſt epiſtle, ſpeaks of Maglocunus, on his relinquiſhing the ſphere of ambition, and taking refuge in a monaſtery; and proverbially compares him to a dove, that haſtens away at the noiſy approach of the dogs, and with various turns and windings takes her flight from the talons of the hawk.

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† *l.* x. 8.

* *Vol.* I. *p.* 115.

In after-times, hawking was the principal amuſement of the Engliſh: a perſon of rank ſcarce ſtirred out without his hawk on his hand; which, in old paintings, is the criterion of nobility. Harold, afterwards king of England, when he went on a moſt important embaſſy into Normandy, is painted embarking with a bird on his fiſt, and a dog under his arm: and in an ancient picture of the nuptials of Henry VI. a nobleman is repreſented in much the ſame manner; for in thoſe days, *it was thought ſufficient for noblemen to winde their horn, and to carry their hawk fair, and leave ſtudy and learning to the children of mean people.* The former were the accompliſhments of the times; Spenſer makes his gallant Sir Triſtram boaſt,

Biogr. Brit. art. Caxton.

> Ne is there hawk which mantleth her on pearch,
> Whether high towring, or accoaſting low,
> But I the meaſure of her flight doe ſearch,
> And all her prey, and all her diet know. B. vi. Canto 2.

In ſhort, this diverſion was, among the old Engliſh, the pride of the rich, and the privilege of the poor; no rank of men ſeems to have been excluded the amuſement: we learn from the book of St Alban's, that every degree had its peculiar hawk, from the *emperor* down to the *holy-water clerk*. Vaſt was the expence that ſometimes attended this ſport. In the reign of James I. Sir Thomas Monſon is ſaid to have given 1000l. for a caſt of hawks: we are not then to wonder at the rigour of the laws that tended to preſerve a pleaſure that was carried to ſuch an extravagant pitch. In the 34th of Edward III. it was made felony to ſteal a hawk; to take its eggs, even in a perſon's own ground, was puniſhable with impriſonment for a year and a day, beſides a fine at the king's pleaſure: in queen Elizabeth's reign, the impriſonment was reduced to three months; but the offender was to find ſecurity for his good behaviour for ſeven years, or lie in priſon till he did. Such was the enviable ſtate of the times of *old* England: during the whole day the gentry were given to the fowls of the air, and the beaſts of the field; in the evening, they celebrated their exploits with the moſt abandoned and brutiſh ſottiſhneſs; at the ſame time, the inferior rank of people, by the moſt unjuſt and arbitrary laws, were liable to capital puniſhments, to fines, and loſs of liberty, for deſtroying the moſt noxious of the feathered tribe.

According to Olearius, the diverſion of hawking is more followed by the Tartars and Perſians, than ever it was in any part of Europe. *Il n'y avoit point de hutte* (ſays he) *qui n'euſt ſon aigle ou ſon faucon.*

The falcons or hawks that were in uſe in theſe kingdoms, are now found to breed in Wales, and in North-Britain and its iſles. The peregrine falcon inhabits the rocks of Caernarvonſhire. The ſame ſpecies, with the gyrfalcon, the gentil, and the goſhawk, are found in Scotland, and the lanner in Ireland.

We may here take notice, that the Norwegian breed was, in old times, in high eſteem in England: they were thought bribes worthy a king. Jeoffrey Fitzpierre gave two good Norway hawks to king John, to obtain for his friend the liberty of exporting 100 wt. of cheeſe; and Nicholas the Dane was to give the king a hawk every time he came into England, that he might have free liberty to traffic throughout the king's dominions.

Maddox Antiquit. Exchequer. I. 469, 470.

They were alſo made the tenures that ſome of the nobility held their eſtates by, from the crown. Thus Sir John Stanley had a grant of the Iſle of Man from Henry IV. to be held of the king, his heirs and ſucceſſors, by homage and the ſervice of two falcons, payable on the day of his or their coronation. And Philip de Haſtang held his manor of Combertoun in Cambridgeſhire, by the ſervice of keeping the king's falcons.

Blunt's Anc. Tenures. 20.

Hawking, though an exerciſe now much diſuſed among us, in compariſon of what it anciently was, does yet furniſh a great variety of ſignificant terms, which ſtill obtain in our language. Thus, the parts of a hawk have their proper names.—The legs, from the thigh to the foot, are called *arms*; the toes, the *petty-ſingles*; the claws, the *pounces*.—The wings are called the *ſails*; the long feathers thereof, the *beams*; the two longeſt, the *principal feathers*; thoſe next thereto, the *flags*.—The tail is called the *train*; the breaſt-feathers, the *mails*; thoſe behind the thigh, the *pendant feathers*.—When the feathers are not yet full grown, ſhe is ſaid to be *unſummed*; when they are complete, ſhe is *ſummed*:—The craw, or crop, is called the *gorge*:—The pipe next the fundament, where the fæces are drawn down, is called the *pannel*:—The ſlimy ſubſtance lying in the pannel, is called the *glut*:—The upper and crooked part of the bill is called the *beak*; the nether-part, the *clap*; the yellow part between the beak and the eyes, the *ſear* or *ſere*; the two ſmall holes therein, the *nares*.

As to her furniture:—The leathers, with bells buttoned on her legs, are called *bewits*.—The leathern thong, whereby the falconer holds the hawk, is called the *leaſe*, or *leaſh*; the little ſtraps, by which the leaſe is faſtened to the legs, *jeſſes*; and a line or pack-thread faſtened to the leaſe, in diſciplining her, a *creance*.—A cover for her head, to keep her in the dark, is called a *hood*; a large wide hood, open behind, to be wore at firſt, is called a *ruſter hood*: To draw the ſtrings, that the hood may be in readineſs to be pulled off, is called *unſtriking the hood*.—The blinding a hawk juſt taken, by running a thread through her eye-lids, and thus drawing them over the eyes, to prepare her for being hooded, is called *ſeeling*.—A figure or reſemblance of a fowl, made of leather and feathers, is called a *lure*.—Her reſting-place, when off the falconer's fiſt, is called the *pearch*.—The place where her meat is laid, is called the *hack*; and that wherein ſhe is ſet, while her feathers fall and come again, the *mew*.

Something given a hawk, to cleanſe and purge her gorge, is called *caſting*.—Small feathers given her to make her caſt, are called *plumage*:—Gravel given her to help to bring down her ſtomach, is called *rangle*:—Her throwing up filth from the gorge after caſting, is called *gleaming*.—The purging of her greaſe, &c. *enſeaming*.—A being ſtuffed is called *gurgiting*.—The inſerting a feather in her wing, in lieu of a broken one, is called *imping*.—The giving her a leg, wing, or pinion of a fowl to pull at, is called *tiring*:—The neck of a bird the hawk preys on, is called the *inke*:——What the hawk leaves of her prey, is called the *pill*, or *pelf*.

There are alſo proper terms for her ſeveral actions. —When ſhe flutters with her wings, as if ſtriving to get away, either from perch or fiſt, ſhe is ſaid to *bate*. —When, ſtanding too near, they fight with each other, it is called *crabbing*:—When the young ones quiver, and ſhake their wings in obedience to the elder, it is called *cowring*:—When ſhe wipes her beak after feeding, ſhe is ſaid to *ſeak*:—When ſhe ſleeps, ſhe is ſaid to *jouk*:—From the time of exchanging her coat, till ſhe turn white again, is called her *intermewing*:—Treading is called *cawking*:—When ſhe ſtretches one of her wings after her legs, and then the other, it is called *mantling*:—Her dung is called *muting*; when ſhe mutes a good way from her, ſhe is ſaid to *ſlice*; when ſhe does it directly down, inſtead of yerking backwards, ſhe is ſaid to *ſlime*; and if it be in drops, it is called *dropping*.—When ſhe as it were ſneezes, it is called *ſniting*.—When ſhe raiſes and ſhakes herſelf, ſhe is ſaid to *rouze*:——When, after mantling, ſhe croſſes her wings together over her back, ſhe is ſaid to *warble*.

When a hawk ſeizes, ſhe is ſaid to *bind*:—When, after ſeizing, ſhe pulls off the feathers, ſhe is ſaid to *plume*.—When ſhe raiſes a fowl aloft, and at length deſcends with it to the ground, it is called *truſſing*.—When, being aloft, ſhe deſcends to ſtrike her prey, it is called *ſtooping*.—When ſhe flies out too far from the game, ſhe is ſaid to *rake*.—When, forſaking her proper game, ſhe flies at pyes, crows, &c. that chance to croſs her, it is called *check*.—When, miſſing the fowl, ſhe betakes herſelf to the next check, ſhe is ſaid to *fly on head*.——The fowl or game ſhe flies at is called the *quarry*.—The dead body of a fowl killed by the hawk, is called a *pelt*.—When ſhe flies away with the quarry, ſhe is ſaid to *carry*.---When in ſtooping ſhe turns two or three times on the wing, to recover herſelf ere ſhe ſeizes, it is called *canceliering*.---When ſhe hits the prey, yet does not truſs it, it is called *ruff*.----The making a hawk tame and gentle, is called *reclaiming*. ---The bringing her to endure company, *manning* her. ---An old ſtaunch hawk, uſed to fly and ſet example to a young one, is called a *make-hawk*.

The reclaiming, manning, and bringing up a hawk to the ſport, is not eaſy to be brought to any preciſe ſet of rules.---It conſiſts in a number of little practices and obſervances, calculated to familiarize the falconer to his bird, to procure the love thereof, &c. See the article FALCONRY.

When your hawk comes readily to the lure, a large pair of luring-bells are to be put upon her; and the more giddy-headed and apt to rake out your hawk is, the larger muſt the bells be. Having done this, and ſhe being ſharp-ſet, ride out in a fair morning, into ſome large field, unencumbered with trees or wood, with your hawk on your fiſt; then having looſened her hood, whiſtle ſoftly, to provoke her to fly; unhood her, and let her fly with her head into the wind; for by that means ſhe will be the better able to get upon the wing, and will naturally climb upwards, flying a circle. After ſhe has flown three or four turns, then lure her with your voice, caſting the lure about your head, having firſt tied a pullet to it; and if your falcon come in, and approach near you, caſt out the lure into the wind, and, if ſhe ſtoop to it, reward her.

You will often find, that when ſhe flies from the fiſt, ſhe will take ſtand on the ground: this is a fault which is very common with ſoar-falcons. To remedy this, fright her up with your wand; and when you have forced her to take a turn or two, take her down to the lure, and feed her. But if this does not do, then you muſt have in readineſs a duck ſealed, ſo that ſhe may ſee no way but backwards, and that will make her mount the higher. Hold this duck in your hand, by one of the wings near the body; then lure with the voice, to make the falcon turn her head; and when ſhe is at a reaſonable pitch, caſt your duck up juſt under her; when, if ſhe ſtrike, ſtoop, or truſs the duck, permit her to kill it, and reward her by giving her a reaſonable gorge. After you have practiſed this two or three times, your hawk will leave the ſtand, and, delighted to be on the wing, will be very obedient.

It is not convenient, for the firſt or ſecond time, to ſhew your hawk a large fowl; for it frequently happens, that they eſcape from the hawk, and ſhe, not recovering them, rakes after them: this gives the falconer trouble, and frequently occaſions the loſs of the hawk. But if ſhe happens to purſue a fowl, and, being unable to recover it, gives it over, and comes in again directly, then caſt out a ſealed duck; and if ſhe ſtoop and truſs it acroſs the wings, permit her to take her pleaſure, rewarding her alſo with the heart, brains, tongue, and liver. But if you have not a quick duck, take her down with a dry lure, and let her plume a pullet and feed upon it. By this means a hawk will learn to give over a fowl that rakes out, and, on hearing the falconer's lure, will make back again, and know the better how to hold in the head.

Some hawks have a diſdainful coyneſs, proceeding from their being high fed: ſuch a hawk muſt not be rewarded, though ſhe ſhould kill: but you may give her leave to plume a little; and then taking a ſheep's heart cold, or the leg of a pullet, when the hawk is buſy in pluming, let either of them be conveyed into the body of the fowl, that it may ſavour of it; and when the hawk has eaten the heart, brains, and tongue of the fowl, take out what is incloſed, call her to your fiſt, and feed her with it: afterwards give her ſome of the feathers of the fowl's neck, to ſcower her, and make her caſt.

If your hawk be a ſtately high-flying one, ſhe ought not to take more than one flight in a morning; and if ſhe be made for the river, let her not fly more than twice: when ſhe is at the higheſt, take her down with your lure; and when ſhe has plumed and broken the fowl a little, feed her, by which means you will keep her a high-flyer, and fond of the lure.

HAWKWOOD (Sir John), a famous Engliſh general, was the ſon of a tanner at Heddingham-Sibil in Eſſex, where he was born in the reign of Edward III. He was bound apprentice to a taylor in London; but being fortunately preſſed into the army, was ſent abroad, where his genius ſoon expanded itſelf, and ſurmounted the narrow prejudices which adhered to his birth and occupation. He ſignalized himſelf as a ſoldier in France and Italy, and particularly at Piſa and Florence. He commanded with great ability and ſucceſs in the army of Galeacia duke of Milan; and was in ſuch high eſteem with Barnabas his brother, that he gave him Domitia his natural daughter in marriage, with an ample fortune. He died at Florence, full of years and military fame, in 1394. See (Hiſtory of) Italy.

HAWSE, or Hause, is generally underſtood to imply the ſituation of the cables before the ſhip's ſtem, when ſhe is moored with two anchors out from forward, viz. one on the ſtarboard, and the other on the larboard-bow. Hence it is uſual to ſay, *ſhe has a clear hawſe*, or *a foul hawſe*. It alſo denotes any ſmall diſtance *a-head* of a ſhip, or between her head and the anchors employed to ride her; as, "He has "anchored in our hawſe, The brig fell athwart our "hawſe," &c.

A ſhip is ſaid to ride with a clear hawſe, when the cables are directed to their anchors, without lying athwart the ſtem; or croſſing, or being twiſted round each other by the ſhip's winding about, according to the change of the wind, tide, or current.

A foul hauſe, on the contrary, implies that the cables lie acroſs the ſtem, or bear upon each other, ſo as to be rubbed and chafed by the motion of the veſſel.—The hawſe accordingly is foul, by having either a croſs, an elbow, or a round turn. If the larboard cable, lying acroſs the ſtem, points out on the ſtarboard ſide, while the ſtarboard cable at the ſame time grows out on the larboard ſide, there is a croſs in the hawſe. If, after this, the ſhip, without returning to her former poſition, continues to wind about the ſame way, ſo as to perform an entire revolution, each of the cables will be twiſted round the other, and then directed out from the oppoſite bow, forming what is called a round turn. An elbow is produced when the ſhip ſtops in the middle of that revolution, after having had a croſs: or, in other words, if ſhe rides with her head northward with a clear hawſe, and afterwards turns quite round ſo as to direct her head northward again, ſhe will have an elbow.

Hause-*Holes*, certain cylindrical holes cut through the bows of a ſhip on each ſide of the ſtem, through which the cables paſs in order to be drawn into or let out of the veſſel as occaſion requires. They are fortified on each ſide by the

Hawse-*Pieces*, a name given to the foremoſt timbers of a ſhip, whoſe lower ends reſt on the knuckle-timber, or the foremoſt of the cant-timbers. They are generally parallel to the ſtem, having their upper ends ſometimes terminated by the lower part of the beak-head; and otherwiſe, by the top of the bow, particularly in ſmall ſhips and merchantmen.

HAWSER, a large rope which holds the middle degree between the *cable* and *tow-line*, in any ſhip whereto it belongs, being a ſize ſmaller than the former, and as much larger than the latter.

HAY, any kind of graſs cut and dried for the food of cattle.

The time of mowing graſs for hay muſt be regulated according to its growth and ripeneſs; nothing being more prejudicial to the crop than mowing it too ſoon; becauſe the ſap is not then fully come out of the root, and when made into hay the graſs ſhrinks away to nothing. It muſt not, however, be let ſtand too long till it have ſhed its ſeeds. When the tops of the graſs look brown, and begin to bend down, and the red honeyſuckle flowers begin to wither, you may conclude it ripe for mowing.

Sain-Foin Hay, is of ſeveral ſorts, which may be diſtinguiſhed by the following terms, viz. 1. The virgin. 2. The bloſſomed. 3. The full-grown. And, 4. The threſhed hay. The firſt of theſe is beyond compariſon the beſt. It muſt be cut before the bloſſoms generally appear; for when it ſtands till it is full blown, the moſt ſpirituous and nouriſhing parts of its juice are ſpent, the ſap is much impoveriſhed, and the ſaint-foin can never recover that richneſs it had in its virgin-ſtate. But this fine hay cannot well be had of uncultivated ſain-foin, becauſe that may not be much above an handful high when it is in a condition to be cut; it would then make a very light crop, and would be a great while before it ſprang up again: but the rich will have two or three tuns to an acre, and ſpring again immediately for a ſecond crop; ſo that little or none in quantity would be loſt by ſo great an improvement of its quality.

The ſecond ſort is that cut in the flower, which, though much inferior to the virgin-hay, far exceeds any other kind as yet commonly propagated in Britain; and if it be a full crop, it may amount to three tuns an acre. This is that ſain-foin which is commonly made; and the larger it is, the more nouriſhing it is for horſes.

The next ſort of ſain-foin is the full grown, cut when the bloſſoms are gone or going off: this alſo is good hay, though it falls ſhort by many degrees of the goodneſs of the other two ſorts; but it makes a greater crop than either of them, becauſe it grows to its full bulk, and ſhrinks little in drying.

The laſt ſort is the threſhed hay; which, when not damaged by wet weather, has been found more nouriſhing to horſes than coarſe water-meadow hay; and, when it is cut ſmall by an engine, is good for cattle, and much better than the chaff of corn. The beſt time to cut it, is when the greateſt part of the ſeed is well filled; the firſt-blown ripe, and the laſt-blown beginning to be full.

The goodneſs of the hay depends greatly upon the manner of ordering it. The beſt hay in all England is made of ſain-foin, without ever ſpreading it. This method, though it be longer before it be finiſhed, coſts leſs labour than the other. If ſain-foin be laid up pretty green, it will take no damage, provided it be ſet in ſmall round ricks, with a large baſket drawn up in the middle of each, to have a vent-hole through which the ſuperfluous moiſture of the hay may tranſpire. As ſoon as its heating is over, theſe ricks ought to be thatched; and all ſain-foin ricks, that are made when the hay is full dried in the cocks, ought to be thatched immediately after the making them. That which is laid up moſt dried, will come out of the rick of a green colour; but that which has been much heated in the rick, will be brown.

The ſeed affords the owner another opportunity of making a profit of his ſain-foin: but this, if the hoeing huſbandry were general, would not be vendible in great quantities for planting; becauſe the ordinary crop of an acre will produce ſeed enough to drill an hundred acres, which would not want planting for a long time. The other uſe then of this ſeed is for provender; and it has been affirmed by ſome who have made trials of it, that three buſhels of good ſain-foin ſeed given to horſes, will nouriſh them as much as four buſhels of oats; and when well ordered, it is ſo ſweet, that moſt ſorts of cattle are greedy of it.

HAY-*Making*. Se AGRICULTURE, n° 152, *et ſeq.*

HAY, a town in Brecknockſhire, in Wales, ſeated near the confluence of the rivers Wye and Dulas. It was a town of good note in the time of the Romans; it being then fortified with a caſtle and a wall, which were ruined in the rebellion of Owen Glendower. It is at preſent a pretty good town; and the market is large for corn, cattle, and proviſions. W. Long. 0. 56. N. Lat. 52. 10.

HAYNAULT. See HAINAULT.

HAYS, particular nets for taking rabbits, hares, &c. common to be bought in ſhops that ſell nets, and they may be had larger or ſhorter as you think fit; from 15 to 20 fathom is a good length, and for depth a fathom.

As rabbits often ſtraggle abroad about mid-day for freſh graſs, where you perceive a number gone forth to any remote brakes or thickets, pitch two or three of theſe hays about their burrows; lie cloſe there: but in caſe you have not nets enough to encloſe all their burrows, ſome may be ſtopped up with ſtones, &c. Then ſet out with the coney dog to hunt up and down at a good diſtance, and draw on by degrees to the man who is with you, and lies cloſe by the hay, who may take them as they bolt into it.

HAYWARD, the perſon who keeps the common herd or cattle of a town. He is appointed by the lord's court; and his office is to ſee that the cattle neither break nor crop the hedges of incloſed grounds.

HAYWARD (Sir John), an eminent Engliſh hiſtorian and biographer, in the beginning of the 17th century, was educated in the univerſity of Cambridge, where he took the degree of doctor of laws. In 1610, he was appointed one of the hiſtoriographers of a college then at Chelſea; and, in 1619, received the honour of knighthood. He wrote, 1. The lives of the three Norman kings of England, William I. and II. and Henry I.. 2. The firſt part of the life and reign of king Henry IV. 3. The life and reign of king Edward VI.; and ſeveral theological works. He died in 1627.

HAZAEL, an officer belonging to Benhadad king of Syria, cauſed that prince to be put to death, and reigned in his ſtead. He defeated Joram, Jehu, and Jehoahaz, kings of Iſrael; and, after his death, was ſucceeded by Benhadad his ſon, 852 B. C.

HAZARD, a game on dice, without tables, is very properly ſo called; ſince it ſpeedily makes a man, or undoes him.

It is played with only two dice; and as many may play at it as can ſtand round the largeſt round table.

Two things are chiefly to be obſerved, viz. main and chance; the latter belonging to the caſtor, and the former, or main, to the other gameſters. There can be no main thrown above nine, nor under five; ſo that five, ſix, ſeven, eight, and nine, are the only mains flung at hazard. Chances and nicks are from four to ten: thus four is a chance to nine, five to eight, ſix to ſeven, ſeven to ſix, eight to five; and nine and ten a chance to five, ſix, ſeven, and eight: in ſhort, four, five, ſix, ſeven, eight, nine, and ten, are chances to any main, if any of theſe nick it not. Now nicks are either when the chance is the ſame with the main, as five and five, or the like; or ſix and twelve, ſeven and eleven, eight and twelve. Here obſerve, that twelve is out to nine, ſeven, and five; eleven is out to nine, eight, ſix, and five: and ames-ace and duce-ace, are out to all mains whatever.

HAZLE, or HAZEL, in botany. See CORYLUS.

The kernels of the fruit have a mild, farinaceous, oily taſte, agreeable to moſt palates. Squirrels and mice are fond of them, as well as ſome birds, ſuch as jays, nutcrackers. &c. A kind of chocolate has been prepared from them, and there are inſtances of their having been formed into bread. The oil expreſſed from them is little inferior to the oil of almonds; and is uſed by painters, and by chemiſts, for receiving and retaining odours. The charcoal made of the wood is uſed by painters in drawing.—Some of the Highlanders, where ſuperſtition is not totally ſubſided, look upon the tree itſelf as unlucky; but are glad to get two of the nuts naturally conjoined, which is a good omen. Theſe they call *cno-chomhlaich*, and carry them as an efficacious charm againſt witchcraft.

Evelyn tells us, that no plant is more proper for thickening of copſes than the hazle, for which he directs the following expeditious method. Take a pole of hazle (aſh or poplar may alſo be uſed) of 20 or 30 feet in length, the head a little lopped, into the ground, giving it a chop near the ground to make it ſuccumb; this faſtened to the earth with a hook or two, and covered with ſome freſh mould at a competent depth, (as gardeners lay their carnations), will produce a great number of ſuckers, and thicken and furniſh a copſe ſpeedily.

HAZLE-*Earth*, or *Hazley-earth*, a kind of red loam, which is ſaid to be an excellent mixture with other ſorts of earth; uniting what is too looſe, cooling what is too hot, and gently entertaining the moiſture.

HEAD, in anatomy. See ANATOMY, Part I. chap. ii.

HEAD-*Ach*, a moſt troubleſome ſenſation in the head, produced by various cauſes, and attended with different ſymptoms, according to its different degrees and the place where it is ſeated. See (the *Index* ſubjoined to) MEDICINE.

Dragon's **HEAD**, in aſtronomy, is the aſcending node of the moon or other planet.

HEAD *of a Ship*, an ornamental figure erected on the continuation of a ſhip's ſtem, as being expreſſive of her name, and emblamatical of war, navigation, commerce, &c.

HEAD, is alſo uſed in a more enlarged ſenſe to ſignify the whole front or forepart of the ſhip including the bows on each ſide: the head threefore opens the column of water through which the ſhip paſſes when advancing. Hence we ſay, head-ſails, head-ſea, head-way, &c.

Thus, fig. 1. Plate CLIX. repreſents one ſide of the fore-part or head of a 74 four gun-ſhip, together with part of the bow, keel, and gunnel. The names of the ſeveral pieces, exhibited therein, are as follow:

A A Fore-part of the keel, with *a a* the two falſe keels beneath it.

A C the ſtem.

a a The cat-head.

b b The ſupporter of the cat-head.

c c The knight-head, or bollard-timber, of which there is one on each ſide, to ſecure the inner end of the bowſprit.

d d The hauſe-holes.

e e The naval-hoods, *i. e.* thick pieces of plank laid upon the bow to ſtrengthen the edges of the hauſe-holes.

f The davit-chock, by which the *davit* is firmly wedged while employed to fiſh the anchor.

g The bulk-head, which terminates the forecaſtle on the fore-ſide, being called the *beak-head bulk-head* by ſhipwrights.

H The gun-ports of the lower deck.

h The gun-ports of the upper deck and forecaſtle.

I, I, The channels, with their dead-eyes and chain-plates.

i The gripe, or fore-foot, which unites the keel with the ſtem, forming a part of either.

k k Theſe dotted lines repreſent the thickneſs and deſcent of the different decks from the fore-part of the ſhip towards the middle. The loweſt of the three dotted lines *l* expreſſes the convexity of the beams, or the difference between the height of the deck in the middle of its breadth, and at the ſhip's ſide. This is alſo exhibited more clearly in the MIDSHIP-*Frame;* where the red curve of the beam is delineated. N. B. Theſe lines muſt be always parallel to the lines which terminate the gun-ports above and below.

m m The timbers of the head, and part of the bowſprit.

X The rails of the head which lie acroſs the timbers.

Q Z Fore-part of the main-wale.

R X Fore-part of the channel-wale.

U C The load water-line.

Fig. 2. repreſents a head-view of a ſhip, with the projection of her principal timbers, and all her planks laid on one ſide.

It is evident that the fore-part of a ſhip is called its *head*, from the affinity of motion and poſition it bears to a fiſh, and in general to the horizontal ſituation of all animals whilſt ſwimming.

By the HEAD; the ſtate of a ſhip, which is laden deeper at the fore-end than the after-end.

HEAD-*Faſt*, a rope employed to faſten a ſhip to a wharf, chain, or buoy, or to ſome other veſſel alongſide.

HEAD-*Land*, a name frequently given to a cape, or promontory.

HEADMOST, the ſituation of any ſhip or ſhips which are the moſt advanced in a fleet, or line of battle.

HEAD-*Rope*, that part of the bolt-rope which terminates any of the principal ſails on the upper edge, which is accordingly ſewed thereto. See the article BOLT-ROPE.

HEAD-*Sails*, a general name for all thoſe ſails which are extended on the fore-maſt and bowſprit, and employed to command the fore-part of the ſhip: ſuch are the fore-ſail, fore-top-ſail, fore-top-gallant-ſail, jib, fore-ſtay-ſail, and the ſprit-ſail with its top-ſail. This term is uſed in oppoſition to *after-ſails*, *viz.* all thoſe which are extended on the mizen-maſt, and on the ſtays between the mizen and main maſts.

HEAD *To-wind;* the ſituation of a ſhip or boat, when her head is turned to windward.

HEAD-*Way*, the motion of advancing at ſea. It is generally uſed when a ſhip firſt begins to advance; or when it is doubtful whether ſhe is in a ſtate of reſt or motion. It is in both ſenſes oppoſed to retreating, or moving with the ſtern foremoſt. See the article STERN-WAY.

HEALTH, is a right diſpoſition of the body, and of all its parts; conſiſting in a due temperature, a right conformation, juſt connection, and ready and free exerciſe of the ſeveral vital functions.

Health admits of latitude, as not being the ſame in all ſubjects, who may yet be ſaid to enjoy health.

That part of medicine, which ſhews the means of preſerving health, is termed *hygieine*. See MEDICINE.

The Greeks and Romans deified Health, repreſenting it under the figure of a woman, whom they ſuppoſed to be the daughter of Æſculapius. We find the name of the goddeſs *Salus*, or Health, on many medals of the Roman emperors, with different inſcriptions; as, SALUS PUBLICA, SALUS REPUBLICÆ, SALUS AUGUSTI, &c.

Methods of preſerving the HEALTH *of Mariners.* See MARINER.

HEAM, in beaſts, is the ſame with the ſecundines or after-birth in women.

HEARING. See ANATOMY, n° 405.

HEARNE (Thomas), a celebrated antiquarian, eminent for his writings and editions of MSS. His father was pariſh-clerk of Little Waltham in Berkſhire, where he was born in 1680. He had a liberal education by the patronage of a neighbouring gentleman; and even from a boy diſcovered a ſtrong propenſity to the ſtudy of antiquities. He did great ſervices to the Bodleian library, and died in 1735.

HEARSE, among ſportſmen, a hind of the ſecond year of her age.

HEART, in anatomy. See there, n° 382 [385].

Several ingenious perſons have from time to time attempted to make eſtimates of the force of the blood in the heart and arteries; who have as widely differed from each other, as they have from the truth, for want of a ſufficient number of data to argue upon. This ſet the truly ingenious Dr Hales upon making proper experiments, in order to aſcertain the force of the blood in the veins and arteries of ſeveral animals.

If, according to Dr Keil's eſtimate, the left ventricle of a man's heart throws out in each ſyſtole an ounce or 1.638 cubic inches of blood, and the area of the orifice of the aorta be =0.4187, then dividing the former by this, the quotient 3.9 is the length of the cylinder of blood which is formed in paſſing through the aorta in each ſyſtole of the ventricle; and in the ſeventy-five pulſes of a minute, a cylinder of 292.5 inches in length will paſs: this is at the rate of 1462 feet in an hour. But the ſyſtole of the heart being performed in one third of this time, the velocity of the blood in that inſtant will be thrice as much, viz. at the rate of 4386 feet in an hour, or 73 feet in a minute. And if the ventricle throws out one ounce in a pulſe, then in the ſeventy-five pulſes of a minute, the quantity of blood will be equal to 4.4℔ 11 oz. and, in thirty-four minutes, a quantity equal to a middle-ſized man, viz. 158 ℔. will paſs through the heart. But if, with Dr Harvey and Dr Lower, we ſuppoſe two ounces of blood, that is, 3.276 cubic inches, to be thrown out at each ſyſtole of the ventricle, then the velocity of the blood in entering the orifice of the aorta will be double the former, viz. at the rate of 146 feet in a minute, and a quantity of blood equal to the weight of a man's body will paſs in half the time, viz. 17 minutes.

If we ſuppoſe, what is probable, that the blood will riſe 7+½ feet high in a tube fixed to the carotide artery of a man, and that the inward area of the left ventricle of his heart is equal to fifteen ſquare inches; theſe multiplied into 7+½ feet, give 1350 cubic inches of blood, which preſſes on that ventricle, when it firſt begins to contract, a weight equal to 15.5 pounds.

What the doctor thus calculates, from ſuppoſition, with regard to mankind, he actually experimented upon horſes, dogs, fallow-does, &c. by fixing tubes in orifices opened in their veins and arteries; by obſerving the ſeveral heights, to which the blood roſe in theſe tubes, as they lay on the ground; and by meaſuring the capacities of the ventricles of the heart, and orifices of the arteries. And, that the reader may the more readily compare the ſaid eſtimates together, he has given a table of them, ranged in the following order.

The ſeveral animals.		Weight of each.		Height of the blood in the tube from the jugular vein.		Height of the blood in tubes fixed to arteries.		Capacity of the left ventricle of the heart.	Area of the orifice of the aorta.	Velocity of the blood in the aorta.	Quantities of blood equal to the weight of the animal, in what time.	How much in a minute.	Weight of the blood ſuſtained by the left ventricle contracting.	N° of pulſes in a minute.	Area of tranſverſe ſection of deſcending aorta.	Area of the tranſverſe ſection of aſcending aorta.	
		Pounds.	Ounces.	Inches.		Feet.	Inches	Cubic inches.	Square inches.	Feet and inches in a minute.	Minutes.	Pounds.	Pounds.		Square inches.	Square inches.	
Man		160		On ſtraining.		7	6	1.659 3.318	0.4187	56.55 113.3	34.18 17.5	4.38 9.36	51.5	75			
Horſe	1ſt.					8	3										
	2d.					9	8										
	3d.	825		12	52	9	6	10	1.036	86.85	60	13.75	113.22	86	0.677	0.369	
Ox		1600						12.5	1.539	76.95	88	18.14		38	0.912	0.84	
																right.	left.
Sheep		91		5½	9	6	5½	1 85	0.172	174.5	20	4.593	36.56	65	0.094	0.07	0.012
Doe						4	2	9	0.476						0.383	0.246	
																right.	left.
Dogs	1ſt.	52		0	6	6	8	1.172	0.196	144.77	11.9	4.34	33.61	97	0.106	0.041	0.034
	2d.	24		5	7	2	8	1	0.185	130.9	6.48	3.7			0.102	0.031	0.009
	3d.	18		5		4	8	0.633	0.118	130	7.8	2.3	19.8		0.07	0.022	0.009
	4th.	12	8	4		3	3	0 5	0.101	120	6.7	1.85	11.1		0.061	0.015	0.007

HEARTBURNING, or PYROSIS. See (the *Index* ſubjoined to) MEDICINE.

HEARTH, that part of the pavement of a room on which the fire is immediately placed.

HEARTH-*Money*. See CHIMNEY-*Money*.

HEAT, in phyſiology, is uſed in a double ſenſe, either as that peculiar ſenſation which is felt on the approach of burning bodies; or the cauſe of that ſenſation, in which laſt ſenſe it is ſynonymous with FIRE.

1
t owing
e action
fluid.

The diſputes which were formerly carried on with regard to the nature of heat, namely, whether we were to account it merely an effect of motion in the parts of terreſtrial bodies, or of a fluid *per ſe*, ſeem now to be generally determined in favour of the latter opinion. The electric fluid and elementary fire are commonly thought to be the ſame, for which opinion ſome proofs are adduced under the article ELECTRICITY. The diſcovery made by Dr Black that heat is capable of remaining in many bodies in a *latent* ſtate, alſo confirms this opinion conſiderably *. The conſequence of this diſcovery, however, undoubtedly is, That what we call *heat* or *fire*, depends not on the *preſence* or *abſence* of that fluid diſtinguiſhed by the name of *elementary fire*, but on its action; juſt as the phenomena of electricity depend not on the preſence or abſence of the electric fluid, which is equally preſent at all times and in all places, but on its action.—Another inference, eaſily deducible from this principle is, That as the electric fluid is by its different manner of action capable of producing two different and ſeemingly oppoſite effects, diſtinguiſhed by the names of *poſitive* and *negative* electricity; ſo doth the ſame fluid, acting as elementary fire, produce two different and ſeemingly oppoſite effects, called *heat* and *cold*.—This aſſertion will

* See *Evaporation*, *Cold*, and *Congelation*.

See Evaporation, nº 9.

will not be thought paradoxical, when we conſider that ocular demonſtration may be given us, that a ſubſtance (namely, vapour), exceedingly cold to the touch, ſhall yet contain as much heat, as would be ſufficient to heat the water of which it is compoſed, red hot, did the nature of water permit it to endure an heat of this kind.

2 Dr Martin's opinions concerning heat.

The philoſophers of this country who have moſt recently treated the ſubject of heat ſcientifically are, Dr Martin of St Andrews, Dr Black of Edinburgh, and Dr Irvin of Glaſgow. Dr Martin, in an eſſay on the various degrees of heat in bodies, endeavours to ſhew, that what we call *heat*, depends not entirely upon the quantity of elementary fire which is poured upon the body *ab extra;* but upon certain circumſtances ariſing from the conſtitution of the body itſelf, and its ſituation with regard to others. "We all find (ſays he) our great heats to be in theſe places that lie low, and have a great height of atmoſphere above them, and ſurrounded by eminences and riſing grounds. If you aſcend on high to the tops of very elevated mountains, you are chilled with cold, and you find everlaſting ſnows, that after thouſands of ſummers have ſcarce ever been thawed, though every day expoſed to the direct rays of the ſun, which in ſome places are darted perpendicularly upon them. So neceſſary, it ſeems, is a long and direct paſſage through all or the greateſt part of the depth of our atmoſphere, or the aſſiſtance of its preſſure, or the reflections of rays from the earth's own ſurface, to invigorate thoſe rays, and to give them ſtrength for warming terreſtrial bodies. To which too the particular ſulphureous nature of the low parts of the atmoſphere may not a little contribute.

"But what if the real ſolar heat, both in itſelf, and what it can communicate to us and other planetary bodies (while it is not concentrated by burning-glaſſes, or ſtrengthened by other aſſiſtances), be vaſtly leſs than is commonly reckoned? All the natural heat we meet with here on the earth we are ready to aſcribe to the heat of the ſun, which perhaps has but a ſmall ſhare in it, overlooking a ſource of heat, which, though often ſpoke of by the theoriſts of the earth, is ſeldom conſidered in that advantageous light I would chooſe to take it. Every body has felt or heard, that the temperature of the air in mines or other places deep under ground is warm, or at leaſt very tolerable; and we know from the niceſt obſervations, that in the cave of the Obſervatory at Paris, only about 90 feet under ground, the heat keeps the thermometer at 53°; and that without any aſſiſtance from the ſun, it being never ſenſibly increaſed by the moſt ſcorching ſeaſons beyond its heat in the moſt ſevere winters that have been felt there.—And the ſame conſtant and unalterable degree of heat was obſerved by Mr Boyle, in a cave cut deep into the earth. And great and even troubleſome heats are ſaid to be obſerved at greater depths, and increaſing in proportion to theſe depths; though I could wiſh that theſe heats had been more regularly meaſured and aſcertained than what I find they have yet been. So that it would ſeem the body of the earth has a very great proper internal heat independent on the ſun, and very much beyond what he without the intervention of our atmoſphere could communicate to it; ſo great as, within 90 feet of its ſurface, to raiſe the thermometer 93 diviſions above Fahreinheit's cold mixture (of ſnow and ſpirit of nitre), or 453 diviſions above what Mr Amontons reckoned the loweſt degree of heat *. This heat of the earth at its ſurface is ſomething leſs; and beyond that, its force decreaſes indeed very faſt, ſo as to leave the air at a ſmall height above it a good deal colder; and which we find on the very high hills to be exceſſively cold, and not to be much warmed by the additional heat of the ſun's direct rays, if they be but little altered by the earth's ſurface and atmoſphere.—So then the ſun, though it be not the ſole or chief fountain, is as it were the great regulator of motion, heat, and life, to the inhabitants of this ſyſtem."

3 Objections to which they are liable.

This opinion hath alſo been adopted by others, but will probably never come into general credit. We certainly perceive the ſun to be the ſource and fountain of heat to the ſurface of the earth at leaſt, as much as we perceive a common fire to be the ſource of heat to a perſon who ſtands before it. Nor is the ſun's heat increaſed or diminiſhed, except by thoſe very circumſtances which increaſe or diminiſh the heat of a common fire. Though a perſon ſhould ſtand directly before the fire, yet if a ſtrong blaſt of air ruſhes into the room at the ſame time, he will not find himſelf warm; but it would be a very erroneous concluſion to infer from thence, that the heat of the fire was leſs than what people commonly ſuppoſed. If he excludes the blaſt of air by ſhutting the room-door, he will find the heat greatly increaſed, though he comes no nearer the fire than before; and if he cauſes any ſubſtance capable of reflecting the light ſtrongly to be placed at a ſmall diſtance behind him, ſuch as a large piece of tinned iron, he will then very probably feel the heat intolerable in that very place where it was diſagreeably cold before. Now the circumſtances which increaſe or diminiſh the heat of the ſun are quite ſimilar to thoſe above-mentioned. On the top of an high mountain the air has free acceſs on all ſides, except the ſmall point of earth where the perſon ſtands; the reſt of the earth alſo is at too great a diſtance to have any effect in diminiſhing the cold by its reflective power; and as in theſe high regions there are commonly violent winds, the cold is thereby greatly increaſed. But when we deſcend into the plain, the air has much leſs acceſs. The immenſe body of the earth effectually ſhelters us from the air on one ſide, at the ſame time that by its reflection it acts like the piece of metal abovementioned; while its inequalities in a great meaſure ſhelter us from the winds all around; and hence the heat at the foot of a mountain may be intolerable, while the cold is equally ſo at the top. It will now follow, that *heat* is not properly ſpeaking the mere preſence of the rays of the ſun, but their action after a certain manner, without interruption from any other ſubſtance; and that *cold* is not any privation or abſence of theſe rays, but is occaſioned by whatever prevents them from acting in the manner abovementioned; and if there is any ſubſtance in nature which conſtantly tends to prevent that action, ſuch a ſubſtance is *cold* in the abſtract. A ſubſtance of this kind is our atmoſphere, or ſome principle in it *; tho' very poſſibly that principle, as already hinted, may be no other than elementary fire itſelf acting in a different manner.

With regard to the opinions of Dr Black and Irvine vin upon this ſubject, it is impoſſible to give ſuch a full account as could be wiſhed; becauſe the gentlemen have not thought proper to publiſh their ſentiments to the world. From what we have been able to collect, however, and which is authenticated by Dr Black himſelf, his general opinion is, that heat is a ſubſtance *per ſe:* that when this ſubſtance is preſent in any terreſtrial body, in a certain degree, that body is ſenſibly hot; when a leſſer quantity of heat is preſent, the ſubſtance is cold: but there is no ſuch thing as a poſitive cold; and all thoſe degrees of cold known to us, even the moſt violent, are only ſmaller degrees of heat; and of this heat the ſun is to us the only ſource and fountain. For his opinions concerning ſenſible and latent heat, ſee the articles CONGELATION, EVAPORATION, and FLUIDITY.

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* See *Internal* Heat *of the Earth, infra.*

* See *Cold*, nº 4.

5
r Cleg-
orn's ac-
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vin's opi-
ons.

Dr Irvin hath attempted to give a ſolution of the phenomena of latent heat; and though he hath not yet publiſhed this explanation himſelf, an account of it hath appeared in an inaugural diſſertation *De igne*, publiſhed at Edinburgh, by Dr Cleghorn, in 1779. The ſubſtance of what this gentleman hath delivered, is as follows:

"Heat is occaſioned by a certain fluid, and not by motion alone, as ſome eminent writers have imagined: becauſe, 1. Thoſe who have adopted the hypotheſis of motion, could never even prove the exiſtence of that motion for which they contended; and though it ſhould be granted, the phenomena could not from it be explained. 2. If heat depended on motion, it would inſtantaneouſly paſs through an elaſtic body; but we ſee that heat paſſes through bodies ſlowly like a fluid. 3. If heat depended on vibration, it ought to be communicated from a given vibration in proportion to the quantity of matter, which is found not to hold true in fact. On the other hand, there are numberleſs arguments in favour of the opinion that heat proceeds from elementary fire. 1. Mr Locke hath obſerved, that when we perceive a number of qualities always exiſting together, we may gather from thence, that there is really ſome ſubſtance which produces theſe qualities. 2. The hypotheſis of elementary fire is ſimple, and agreeable to the phænomena. 3. From ſome experiments made by Sir Iſaac Newton it appears, that bodies acquire heat and cold *in vacuo*, until they become of the ſame temperature with the atmoſphere; ſo that heat exiſts in the abſence of all other matter, and is therefore a ſubſtance by itſelf.

Cold,

"Our ſenſes are no juſt meaſures of the degrees of heat and cold *:—but the thermometer truly ſhews the increaſe or diminution of heat in the ſame body, *while it preſerves the ſame form*; but this it will only do within certain limits. For when fluids are on the point of freezing, they contract irregularly, and expand in the ſame manner when brought near the boiling point. The thermometer, however, cannot ſhew the abſolute quantity of heat contained in any body, becauſe the beginning of the thermometrical ſcale by no means denotes the total abſence of heat. For the ſame reaſon, it cannot even ſhew us the proportion between the quantities of heat contained in two different bodies; but Dr Black hath diſcovered a very ingenious and accurate method of ſhewing this laſt.

"It is univerſally known, that when two ſubſtances of different temperatures are mixed together, the one loſes and the other acquires heat, till they both appear of the ſame temperature. Let, therefore, any quantity of water be mixed with an equal bulk of any other ſubſtance, either hotter or colder than itſelf, and obſerve what happens on the mixture. If the one gains as much as the other loſes, both of them contain the ſame quantity of heat, when in their natural ſtate; but if the one gains more than the other loſes, then their natural quantities of heat differ in the ſame proportion.

"If any body, heated beyond the common temperature of the air, is expoſed to it, the heat flows out from it into the atmoſphere, and diſpoſes itſelf equally around, till the air becomes of the ſame temperature with itſelf. The ſame happens to bodies ſuſpended *in vacuo*. Hence it is juſtly concluded, there exiſts between the particles of heat a repulſive power, by which they mutually recede from each other.

"Notwithſtanding this repulſive power, however, the quantities of heat contained in different ſubſtances even of the ſame temperature, are found to be altogether different. This is ſufficiently proved by ſome experiments made by Fahreinheit and Boerhaave, and ſtill further confirmed by others made by the learned Dr Black. He took equal bulks of water and mercury; and having heated the mercury 50° above the other, mixed them together as quick as poſſible. The temperature of the mixture was 20 degrees above the original temperature of the water. Again, having made the water 50° hotter than the mercury, the temperature of the mixture was 30° above the original temperature of the mercury. Hence it appears that the quantity of heat in water is to that in mercury when both are of an equal temperature, as 3 to 2. By ſimilar experiments he hath alſo determined the quantities of heat contained in a great many different bodies; ſo that now it appears that the quantity of heat is ſcarce ever the ſame in any two different bodies; and hence we may conclude, that terreſtrial bodies have a power of attracting heat, and that this power is different in different ſubſtances.

"From theſe principles it evidently follows, that heat is diſtributed among bodies directly in proportion to their attracting powers, and inverſely according to the repulſive power between the particles of heat themſelves.—Such is the diſtribution of heat among bodies in the neighbourhood of each other; and which is called the equilibrium of heat, becauſe the thermometer ſhews no difference of temperature among them. For, ſeeing the heat is diſtributed according to the attracting power of each, the thermometer having alſo a proper attractive power of its own, can ſhew no difference in the quantity of heat contained in each; for which reaſon, all bodies in the neighbourhood of each other are ſoon reduced to the ſame temperature. Hence we can neither aſſent to the opinion of Boerhaave, who ſuppoſed that heat was diſtributed among bodies in proportion to their bulks; nor to the hypotheſes of others, who imagined that they were heated in proportion to their denſities. For the thermometer ſhews only the quantity of heat *going out* of a body, not that which is really contained in it; and both the abovementioned hypotheſes are overturned by the experiments already recited.

"This equilibrium of heat may be broken while the quantity of heat in the different bodies remains the ſame. For ſeeing the heat is diſtributed through all bodies directly in proportion to their attraction of it, and inverſely in proportion to the repulſion of the igneous particles; if in any body the former is diminiſhed, or the latter augmented, the fire will flow out of the body until the equilibrium is again reſtored, and then the heat is ſaid to be *generated*. On the contrary, if the attraction of any body towards heat is augmented, or the repulſion between its particles diminiſhed, then heat will flow into the body, and cold is ſaid to be generated.—This is explained by an experiment of Dr Cullen's. A thermometer ſuſpended in the receiver of an air-pump, deſcended ſome degrees while the air was exhauſting, but quickly recovered the temperature of the external atmoſphere; and when the air was again admitted, it aſcended beyond the temperature of the external air. While the air was exhauſting, the thermometer deſcended, becauſe the air which remained being rarified, the repulſion between the particles of fire contained in it was diminiſhed, and therefore the heat flowed out from the thermometer; but being allowed to remain for a ſhort time *in vacuo*, it acquired the temperature of the extrrnal air, and the equilibrium was reſtored. When the external air was admitted, then that which had remained in the receiver, and acquired the temperature of the external air, being ſuddenly compreſſed, the repulſion between the igneous particles was increaſed, and the heat entering into the thermometer cauſed it riſe. From other experiments alſo it appears, that the temperature of the air becomes hotter by condenſation, and colder by rarefaction; the reaſon of which is maniſeſt from the principles already laid down.

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* See C nº 4.

“ Fluidity and evaporation are juſtly reckoned general effects of heat; for there is ſcarce any body which cannot be liquefied, and even carried off into vapour by an intenſe heat. The fluidity of water is univerſally known to depend on heat. Mercury likewiſe, by an intenſe cold, may be deprived of its fluidity *. Air is a kind of vapour which always becomes denſer by a diminution of its heat; and it is not improbable, that by a very great diminution of its heat the air itſelf might become ſolid; and this concluſion is confirmed by the analogy of other vapours.

“ Theſe phænomena may be explained from the principles already laid down. For the particles of all ſolids are connected by the attraction of coheſion; of which, as well as of every other attraction, the nature is ſuch, that if any new attraction is induced, the former is weakened. As much heat, therefore, may be added to a body as may increaſe its power of attracting heat to ſuch a degree, that the attraction of coheſion will be totally diſſolved, and the particles will eaſily ſlide over one another, in which caſe the body becomes fluid. If the fire is ſtill kept up, that fluid becomes rarer, the heat communicates the repulſion between its own particles to thoſe of the fluid, which is now raiſed in vapour. Again, this vapour by a diminution of the heat is converted into a fluid, and by a ſtill farther diminution remains perpetually contracted into the form of a ſolid.

“ If indeed ſuch is the power of bodies to attract heat, and ſuch the nature of heat as has been already laid down, we might conclude *à priori*, that the force by which any ſubſtance attracts heat would be increaſed while it was melting, or going off in vapour; that is, that liquefaction or evaporation would produce cold: and on the other hand, that when vapour was reduced into a liquid, or any fluid congealed into a ſolid, its power of attracting heat would be diminiſhed; and therefore heat, according to the common phraſe, would be *generated*. For when, by the ſolution of the body, the attraction of coheſion is taken away, the attraction of the body for heat is increaſed. And when evaporation takes place, the body, and therefore the heat which is in it, becomes more rare; the conſequence of which is, that the repulſive power between the particles of fire is diminiſhed, the equilibrium is taken off, and the heat enters the vapour on all ſides.

“ The learned philoſopher Dr Black was the firſt who demonſtrated experimentally that heat entered bodies in great quantity while they liquefy or are converted into vapour; and that the ſame quantity flowed out of them again while they were condenſing into fluids, or congealing into ſolids; and from this principle he hath explained a great number of phænomena, in which heat or cold were formerly ſaid to be *generated*. The heat, as long as it is inherent in theſe bodies, he calls *latent;* becauſe, while it enters the body, it does not change its ſenſible temperature; nor, after it has entered, does it affect the thermometer: and he was of opinion, that upon a certain quantity of latent heat the ſtates of fluidity and vapour principally depended.

“ But an ingenious phyſician (Dr Irvin, profeſſor of chemiſtry at Glaſgow,) having made many experiments in order to find out the quantity of heat contained in different bodies, according to Dr Black's method, hath obſerved, that the ſame body, under different forms, ſhews different diſpoſitions with reſpect to heat; that ice, for inſtance, mixed with mercury 20 degrees colder than itſelf, leſſened the cold of the mixture in a ſmaller degree, or imparted to it a ſmaller quantity of heat than water mixed with mercury 20 degrees colder than itſelf. Hence that learned gentleman hath concluded, that the great quantity of heat which is found to enter into bodies while they evaporate, or are reduced to a fluid ſtate, is abſorbed by them becauſe of their change of form, and conſequently of their diſpoſition towards heat; and hence that the entrance of the heat is not to be accounted the *cauſe*, but the *effect* or *conſequence*, of fluidity or vapour. This opinion indeed ſeems more probable, and agreeable to the principles already laid down, than the other. But we muſt carefully remember, that the thermometer can only meaſure that quantity of heat which flows out from bodies, not that which enters into them. If, therefore, a quantity of heat in vapour affects the thermometer leſs than an equal quantity in water, we are thence to conclude, that vapour has a ſtronger attraction for heat than water, and therefore the thermometer attracts a ſmaller quantity of heat from it than from water. When melting ice abſorbs a great quantity of heat, which yet does not affect the thermometer; and when water converted into ice, throws out a great quantity of heat upon the thermometer or other bodies around it; theſe phænomena are eaſily explained from the greater attraction which water has for heat.

“ The increaſe of the attraction which water has

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* See *Congelation*, nº 2. and *Cold*, nº 8.

for heat, ariſes from the ſolution of its attraction of coheſion, as appears probable from analogy. But heat ruſhes into vapour, becauſe it is diſtributed among bodies directly in proportion to their attractive powers, and inverſely in proportion to the repulſive power between its own particles. When water is converted into vapour, its parts are removed to a diſtance from each other, and conſequently the particles of heat. The repulſion between the latter, therefore, is diminiſhed; the heat flows into the vapour, until the repulſion between its particles with reſpect to the attracting power of the body becomes the ſame as before; whence we plainly ſee the reaſon why vapour abſorbs the greater quantity of heat in proportion as it is more expanded.

"That heat accompanies the rays of the ſun, is beyond all doubt; but whether the ſun communicates heat to the rays of light, or whether they attract it from the air, is with me a matter of uncertainty. If heat is derived from the ſun, how comes it to paſs that the earth is no hotter after having received ſuch an immenſe quantity of heat for ſo many ages? If the heat is communicated from the earth to the air, and is not again carried off from thence, why is the atmoſphere ſo cold in its upper parts; or why has not the equilibrium of heat yet pervaded the whole atmoſphere? If the rays of light have received heat from the ſun himſelf, why does not an equal quantity of heat accompany the ſame quantity of light at all different diſtances from the earth?—Theſe, and other objections, ſhew, that heat does not flow from the ſun; and ſome of them plainly ſhew, that heat is attracted from the atmoſphere; which thought we ſhall now proſecute a little farther.

"Heat is of ſuch a nature, as I have already ſhewn, that, when accumulated, it diffuſes itſelf all around, and joins with bodies in proportion to their attractive powers; but if the rays of light are collected into a focus in the air, and no more heat is added to the air, the quantity of heat in the collected rays is not increaſed in proportion to their own attraction, more than of the air in proportion to its attraction. But if they are *in equilibrio* as to their heat, before the collection by the focus, this ſhews, that heat has entered the rays of light from the atmoſphere, ſeeing their temperature increaſes by condenſation. But that the rays of the ſun really do attract heat from the atmoſphere, ſeems to be proved by the obſervations of De Luc; who hath obſerved, that the heat is very much, and very ſuddenly, decreaſed before ſun-riſing; which ſhews, that the rays of the ſun, ſweeping along at a ſmall diſtance above the earth, abſtracted the heat from that part of the atmoſphere, which therefore flowed from the lower parts to ſupply the place of that which was taken away."

7 tions Cleg. s doc.

From this laſt paragraph it ſeems natural to conclude, that the ſun, inſtead of being the ſource of heat, is really a ſource of cold; and the atmoſphere the only reſervoir of heat to us. But, on this ſuppoſition, it ſeems difficult to conceive how the heat of the atmoſphere could remain the ſame in quantity, even for a ſingle moment. The rays of the ſun, it is ſaid, cool the atmoſphere, and carry off its heat; while they ſweep along it at a little diſtance from the ſurface of the earth. But this they are perpetually doing. While the ſun, for inſtance, is ſhining directly upon Britain, his rays are cooling the atmoſphere above America. But theſe rays which thus paſs through the atmoſphere without touching the earth's ſurface, fly into the moſt remote regions of ſpace, and conſequently muſt carry the heat of our atmoſphere along with them, where it muſt be for ever loſt to us. Thus the general quantity of heat would be perpetually diminiſhing; and in ſuch a number of ages as have intervened from the beginning of the world, it muſt have been totally diſſipated, or diffuſed through ſpaces to which our earth and its atmoſphere bear not the proportion of 1 to 10,000,000,000.

His explanation of Dr Black's principle of latent heat is, perhaps, equally liable to objection. We ſhall for a moment allow, that the abſorption of heat is the *conſequence*, and not the *cauſe*, of fluidity and vapour: but what then is the cauſe? It ſeems undeniable, that the cauſe is a quantity of heat, greater than what the body is naturally fitted to contain, forced upon it *ab extra:* but this heat, the moment it enters the body, is to appearance loſt and annihilated, while the body changes its form. How is it poſſible, then, to aſſign another cauſe for the change of form in the body, than its abſorption of the quantity of heat which was forced upon it *ab extra?*—To ſay that the body now attracts heat from the atmoſphere in greater quantity than it did before, and which enters it copiouſly, cannot be admitted. The body did not originally *attract* the heat; it was plainly forced upon it; a quantity of heat entered it, and changed its form. This quantity therefore remains within the body, and neither attracts nor repels that which is in the atmoſphere. The body can attract no more, unleſs that which has already entered was to be thrown out; and therefore the coldneſs of vapour cannot be owing to its attraction of heat from the atmoſphere: neither is it owing to its attracting heat more than water does; for vapour may be heated in ſuch a manner, that it will part with heat as readily as water, or any other ſubſtance whatever.——Nor does the experiment adduced in favour of this doctrine ſeem concluſive. Ice communicates leſs heat to mercury 20 degrees colder than itſelf, than water does; but for this two reaſons may be aſſigned. 1. When bodies are intenſely heated, they part with their heat very readily, and in great quantity; but as the heat decreaſes, it alſo flies off, or is communicated to ſurrounding bodies more ſlowly and with more difficulty than before. Water always contains a greater quantity of heat than ice, and therefore ought to part with an equal quantity of heat more readily and eaſily than ice does. 2. When water is cooled to 32 degrees, it freezes; when juſt above 32 degrees, it becomes fluid; and, with every degree of heat ſuperior to that, evaporates. If water heated to 212 degrees, or near it, is placed within the receiver of an air-pump, and the air exhauſted, a great quantity of ſteam iſſues from it, and the heat of the water ſuddenly decreaſes to 98 or 100 degrees. Hence it is plain, that 112 degrees of the heat of boiling water is contained, not in the water itſelf, but in the ſteam detained among its particles by the preſſure of the atmoſphere. Had this water, therefore, been mixed with mercury much colder than itſelf, a quantity of the ſteam would have been condenſed by the coldneſs of the metal. But ſteam cannot be condenſed without giving out, not only its ſenſible heat, but that which is *latent* alſo; and hence we may eaſily ſee why water communicates degrees of heat ſo much greater in proportion than ice does.

Laſtly, The principle on which the whole doctrine is founded, does not ſeem to agree either with the phænomena of nature, or with the concluſions which muſt be drawn from itſelf. It is ſaid, that fire tends to diffuſe itſelf equally on all bodies in the neighbourhood of one another. But does this hold in fact? Heat has a diſpoſition to aſcend: and that not only in the atmoſphere, but *in vacuo*, and through ſolid bodies. If a bar of iron, red-hot at one end, is ſet to cool with its red part undermoſt, the heat will aſcend farther and quicker through it, than it will deſcend if the iron is placed the contrary way. The argument, therefore, for the repulſive power between the particles of heat does not hold, nor that for the attraction between the particles of heat and thoſe of other matter. Though different bodies contain different quantities of heat, this difference may be occaſioned otherwiſe than by attraction. We have already ſeen, that a certain quantity of heat abſorbed by water in the ſtate of ice, is the *cauſe* of its fluidity. The ſame is the caſe with mercury; but the latter can remain fluid with much leſs heat than water can. It muſt, however, be admitted, that the ſubſtances we call *water* and *mercury* are only ſo in conſequence of the action of heat. Thus, water deprived of a certain quantity of heat, is no longer *water*, but a kind of glaſs; and mercury is no longer *mercury*, but a ſolid metal. Now, let us ſuppoſe, that ice at 32 degrees is applied to a quantity of mercury at 32; we know that the ice is only water deprived of a quantity of its natural heat, and of conſequence it ought to have a violent attraction for that quantity which has been forced from it. The mercury has a great deal of heat to ſpare, yet the ice attracts none from it; neither will the fluid water attract heat from mercury of the ſame temperature, though the one is ſaid to attract it more ſtrongly than the other. That water ſhould be heated by mercury hotter than itſelf, is not wonderful; nor can we account this an effect of attraction, becauſe the ſuperfluous quantity of heat would not remain in the mercury, though the water was not applied to it.

9
Explanation of the phenomena of heat on other principles.

From theſe, and a multitude of other conſiderations, we would conclude, that heat itſelf, and not the attractive and repulſive power ſuppoſed by Dr Cleghorn and others, is the active principle which has ſo great a ſhare in the operations of nature. The principles on which the actions of heat depend, may perhaps be explained in a leſs exceptionable manner, from the following propoſitions.

1. It is in all caſes obſerved, That when light proceeds in conſiderable quantity from a point, diverging as the radii of a circle from its centre, there a conſiderable degree of heat is found to exiſt, if an opaque body, having no great reflective power, is brought near that point.

2. This action of the light, therefore, may be accounted the ultimate cauſe of heat, without having recourſe to any farther ſuppoſitions; becauſe nothing elſe beſides this action is evident to our ſenſes.

3. If the point from which the rays are emitted is placed in a tranſparent medium, ſuch as air or water, that medium, without the preſence of an opaque body, will not be heated.

4. Another cauſe of heat, therefore, is the reſiſtance of the parts of that body on which which the light falls, to the action mentioned in Prop. 1. Where this reſiſtance is weak, as in the caſes juſt mentioned, the heat is either nothing, or very little.

5. If a body capable of reflecting light very copiouſly is brought near the lucid point, it will not be heated*.

6. A penetration of the light, therefore, into the ſubſtance of the body, and likewiſe a conſiderable degree of reſiſtance on the part of that body to the action of the light, are the requiſites to produce heat.

7. Thoſe bodies ought to conceive the greateſt degrees of heat, into whoſe ſubſtance the light can beſt penetrate, *i. e.* which have the leaſt reflective power, and which moſt ſtrongly reſiſt its action; which is evidently the caſe with black and ſolid ſubſtances.

8. By heat all bodies are expanded in their dimenſions every way, and that in proportion to their bulk and the quantity of heat communicated to them.

9. This expanſion takes place not only by an addition of *ſenſible* heat, but likewiſe of that which is *latent*. Of this laſt we have a remarkable inſtance in the caſe of ſnow mixed with ſpirit of nitre. The ſpirit of nitre contains a certain quantity of latent heat, which cannot be ſeparated from it without effecting a change on the ſpirit itſelf; ſo that, if deprived of this heat, it would no longer be ſpirit of nitre.—Beſides this, it contains a quantity of ſenſible heat, of a great part of which it may be deprived, and yet retain its characteriſtic properties as nitrous acid. When it is poured upon ſnow, the latter is immediately melted by the action of the latent heat in the acid. The ſnow cannot be melted or converted into water, without imbibing a quantity of latent heat, which it receives immediately from the acid which melts it. But the acid cannot part with this heat without decompoſition; to prevent which, its ſenſible heat occupies the place of that which has entered the ſnow and liquefied it. The mixture then becomes exceedingly cold, and the heat forces into it from all the bodies in the neighbourhood; ſo that, by the time it has recovered that quantity of ſenſible heat which was loſt, or arrived at the temperature of the atmoſphere around it, it will contain a conſiderably larger quantity of heat than it originally did, and is therefore obſerved to be expanded in bulk. Another inſtance of this expanſive power of latent heat is in the caſe of ſteam, which always occupies a much larger ſpace than the ſubſtance from which it was produced; and this whether its temperature is greater or leſs than the ſurrounding atmoſphere.

10. The difference between latent and ſenſible heat, then, as far as we can perceive, is, that the expanſive power of the firſt is directed only againſt the particles of which the body is compoſed; but that of the ſecond is directed alſo againſt other bodies. Neither doth there ſeem to be any difference at all between them farther than in quantity. If water, for inſtance, hath but a ſmall quantity of heat, its parts are brought near each other, it contracts in bulk, and feels cold. Still, however, ſome part of the heat is detained among the aqueous particles, which prevents the fluid

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* See the article BURNING-Glaſs.

from congealing into a ſolid maſs. But, by a continuation of the contracting power of the cold, the particles of water are at laſt brought ſo near each other that the internal or *latent* heat is forced out. By this diſcharge a quantity of air is alſo produced, the water is congealed, and the ice occupies a greater ſpace than the water did; but then it is full of air-bubles, which are evidently the cauſe of its expanſion. The heat then becomes *ſenſible*, or, as it were, lies on the outſide of the matter; and conſequently is eaſily diſſipated into the air, or communicated to other bodies. Another way in which the latent heat may be extricated is by a conſtant addition of ſenſible heat. In this caſe the body is firſt raiſed into vapour, which for ſome time carries off the redundant quantity of heat. But as the quantity of this heat is continually increaſed, the texture of the vapour itſelf is at laſt totally deſtroyed. It becomes too much expanded to contain the heat, which is therefore violently thrown out on all ſides into the atmoſphere, and the body is ſaid to burn, or be on fire. See FLAME and IGNITION.

11. Hence it follows, that thoſe bodies which have the leaſt ſhare of latent heat, appear to have the greateſt quantity of ſenſible heat; but this is only in appearance, for the great quantity they ſeem to contain is owing really to their inability to contain it. Thus, if we can ſuppoſe a ſubſtance capable of tranſmitting heat through it as faſt as it received it; if ſuch a ſubſtance was ſet over a fire, it would be as hot as the fire itſelf, and yet the moment it was taken off, it would be perfectly cool, on account of its incapacity to detain the heat among the particles of which it was compoſed.

12. The heat, therefore, in all bodies, conſiſts in a certain violent action of the elementary fire within them tending from a centre to a circumference, and thus making an effort to ſeparate the particles of the body from each other, and thereby to change its form or mode of exiſtence. When this change is effected, bodies are ſaid to be diſſipated in vapour, calcined, vitrified, or burnt, according to their different natures.

13. Inflammable bodies are ſuch as are eaſily raiſed in vapours; that is, the fire eaſily penetrates their parts, and combines with them in ſuch quantity, that, becoming exceedingly light, they are carried up by the atmoſphere. Every ſucceeding addition of heat to the body increaſes alſo the quantity of latent heat in the vapour, till at laſt, being unable to reſiſt its action, the heat breaks out all at once, the vapour is converted into flame, and is totally decompoſed. See the article FLAME, and Prop. 10.

14. Uninflammable bodies are thoſe which have their parts more firmly connected, or otherwiſe diſpoſed in ſuch a manner, that the particles of heat cannot eaſily combine with them or raiſe them into vapour.

15. Heat therefore being only a certain mode of the action of elementary fire, it follows, that the capacity of a body for containing it, is only a certain conſtitution of the body itſelf, or a diſpoſition of its parts which can allow the elementary fire contained in it to exert its expanſive power upon them without being diſſipated on other bodies. Thoſe ſubſtances which allow the expanſive power of the fire to operate on their own particles are ſaid to contain a great deal of heat; but thoſe which throw it away from themſelves upon other bodies, though they feel very hot, yet philoſophically ſpeaking they contain very little.

16. What is called the *quantity* of heat contained in any ſubſtance, if we would ſpeak with the ſtricteſt propriety, is only the apparent force of its action either upon the parts of the body itſelf, or upon other bodies in its neighbourhood. The expanſive force of the elementary fire contained in any body upon the parts of that body is the *quantity of latent heat* contained in it; and the expanſive force of the fire exerted upon other bodies which touch or come near it, is the *quantity of ſenſible heat* it contains.

17. If what we call *heat* conſiſts only in a certain action of that fluid called *elementary fire*, namely, its expanſion, or acting from a centre to a circumference, it follows, that if the ſame fluid act in a manner directly oppoſite to the former, or preſs upon the particles of a body as from a circumference to a centre, it will then produce effects directly oppoſite to thoſe of heat, i. e. it will then be abſolute *cold*, and produce all the effects already attributed to COLD. See that article.

18. If heat and cold then are only two different modifications of the ſame fluid, it follows, that if a hot body and a cold one are ſuddenly brought near each other, the heat of the one ought to drive before it a part of the cold contained in the other, *i. e.* the two portions of elementary fire acting in two oppoſite ways, ought in ſome meaſure to operate upon one another as any two different bodies would when driven againſt each other. When a hot and a cold body therefore are brought near each other, that part of the cold body fartheſt from the hot one ought to become colder than before, and that part of the hot body fartheſt from the cold one ought to become hotter than before.

19. For the ſame reaſon, the greateſt degree of cold in any body ought to be no obſtacle, or at leaſt very little, to its conceiving heat, when put in a proper ſituation. Cold air, cold fuel, &c. ought to become as intenſely heated, and very nearly as ſoon, as that which is hotter.

The two laſt propoſitions are of great importance. When the firſt of them is thoroughly eſtabliſhed, it will confirm beyond a doubt, that cold is a *poſitive* as well as heat; and that each of them has a ſeparate and diſtinct power, of which the action of its antagoniſt is the only proper limit; *i. e.* that heat can only limit the power of cold, and *vice verſa*. A ſtrong confirmation of this propoſition is the experiment related by M. Geoffroy; an account of which is given under the article COLD, n° 5. Another, but not ſo well authenticated, is related under the article CONGELATION, n° 11.—De Luc's obſervation alſo, mentioned by Dr Cleghorn affords a pretty ſtrong proof of it; for if the lower parts of the atmoſphere are cooled by the paſſage of the ſun's rays at ſome diſtance above, and it hath been already ſhewn that they do not *attract* the heat from the lower parts, it follows, that they muſt *expel* part of the cold from the upper regions.—The other propoſition, when fully eſtabliſhed, will prove, that heat and cold are really convertible into one another; which indeed ſeems not improbable, as we ſee that fires will burn with the greateſt fierceneſs during the time of intenſe froſts, when the coldeſt air is admitted

mitted to them; and even in thoſe diſmal regions of Siberia, when the intenſe cold of the atmoſphere is ſufficient to congeal quickſilver, it cannot be doubted that fires will burn as well as in this country; which could not happen if heat was a fluid *per ſe*, and capable of being carried off, or abſolutely diminiſhed in quantity, either in any part of the atmoſphere itſelf, or in ſuch terreſtrial bodies as are uſed for fuel.

This theory of heat, if found admiſſible by philoſophers, would introduce a greater ſimplicity into natural philoſophy, and explain the phenomena of nature in a manner much more eaſy and leſs liable to objection, than hath yet been done: we would then ſee the phenomena of attraction, repulſion, electricity, fire, light, ignition, &c. &c. to be only as many different effects of one etherial fluid, which the Deity hath appointed to be the firſt of all ſecondary cauſes, and to alter, modify, compound, and ſeparate, the different parts of terreſtrial ſubſtances, as we daily ſee done by the different natural agents.

HEAT *of Burning Bodies*. See IGNITION.

HEAT *of Chemical Mixtures*. This is a phenomenon neceſſarily reſulting from the change of form produced in the different ſubſtances which are mixed together; and the manner in which it happens may be eaſily underſtood from the example of oil of vitriol and water. If equal quantities of concentrated vitriolic acid and water are mixed together, a very great degree of heat immediately takes place; inſomuch, that if the veſſel which contains the mixture is made of glaſs, it will probably break; and after it is cold, the mixture will be found to have ſhrunk in its dimenſions, or will occupy leſs ſpace than the bulk of the water and acid taken ſeparately. In this caſe we know that the water, while in its fluid ſtate, hath as much latent heat as it can contain; *i. e.* the elementary fire within it expands, or ſeparates its parts from each other, as much as is conſiſtent with the conſtitution of the body. If any more is added, it cannot be abſorbed, or direct its force upon the particles of the water without raiſing them in vapour: of conſequence, part of this additional expanſive power will be employed in the formation of vapour, and the reſt will be diſcharged upon the neighbouring bodies; *i. e.* will be converted into *ſenſible* heat. The vitriolic acid, in its concentrated ſtate, contains a great quantity of latent heat which is neceſſary to preſerve its fluidity. But when it is mixed with the fluid water, the latent heat contained in the latter is abundantly ſufficient for both: of conſequence, the great expanſive power in the oil of vitriol itſelf becomes now totally uſeleſs, and therefore exerts its force upon the neighbouring bodies; and when the mixture returns to the original temperature of the oil of vitriol and water, it ſhews a loſs of ſubſtance by its diminution in bulk. This may ſerve to explain all caſes in chemiſtry where heat or cold is produced: and it will generally be found, that where bodies, by being mixed together, produce heat, they ſhrink in their dimenſions; but when they produce cold, they are enlarged.

HEAT *of Climates*. See HEAT, n° 2; and AMERICA, n° 3---24.

Methods of Meaſuring HEAT. See THERMOMETER.

Expanſion of Metals by HEAT. See PYROMETER.

Degrees of HEAT *which Animals are capable of bearing*. The ancients were of opinion that all countries lying within the tropics were uninhabitable by reaſon of their heat; but time has diſcovered their miſtake, and it is now found that no part of the world is too hot for mankind to live in. The learned profeſſor Boerhaave, in his chemiſtry, relates certain experiments made with great accuracy by the celebrated Fahrenheit, and others, at his deſire, on this ſubject, in a ſugar-baker's office; where the heat, at the time of making the experiments, was up to 146 degrees of Fahrenheit's thermometer. A ſparrow, ſubjected to air thus heated, died, after breathing very laboriouſly, in leſs than ſeven minutes. A cat reſiſted this great heat ſomewhat above a quarter of an hour; and a dog about 28 minutes, diſcharging, before his death, a conſiderable quantity of a ruddy-coloured foam, and exhaled a ſtench ſo peculiarly offenſive, as to throw one of the aſſiſtants into a fainting fit. This diſſolution of the humours, or great change from a natural ſtate, the profeſſor attributes not to the heat of the ſtove alone, which would not have produced any ſuch effect on the fleſh of a dead animal; but likewiſe to the vital motion, by which a ſtill greater degree of heat, he ſuppoſes, was produced in the fluids circulating through the lungs, in conſequence of which the oils, ſalts, and ſpirits of the animal became ſo highly exalted.

Meſſieurs Du-Hamel and Tillet having been ſent into the province of Augomois, in the years 1760 and 1761, with a view of endeavouring to deſtroy an inſect which conſumed the grain of that province, effected the ſame in the manner related in the Memoirs for 1761, by expoſing the affected corn, with the the inſects included in it, in an oven, where the heat was ſufficient to kill them without injuring the grain. This operation was performed at Rochefoucalt, in a large public oven, where, for œconomical views, their firſt ſtep was to aſſure themſelves of the heat remaining in it, on the day after bread had been baked in it. This they did, by conveying in a thermometer on the end of a ſhovel, which, on its being withdrawn, indicated a degree of heat conſiderably above that of boiling water: but M. Tillet, convinced that the thermometer had fallen ſeveral degrees in drawing to the mouth of the oven, and appearing under ſome embarraſſment on that head, a girl, one of the attendants on the oven, offered to enter, and mark with a pencil the height at which the thermometer ſtood within the oven. The girl ſmiled on M. Tillet's appearing to heſitate at this ſtrange propoſition; and entering the oven, with a pencil given her for that purpoſe, marked the thermometer, after ſtaying two or three minutes, ſtanding at 100 degrees of Reaumur's ſcale, or, to make uſe of a ſcale better known in this country, at near 260 degrees of Fahrenheit's. M. Tillet began to expreſs an anxiety for the welfare of his female aſſiſtant, and to preſs her return. This female ſalamander, however, aſſuring him that ſhe felt no inconvenience from her ſituation, remained there 10 minutes longer; that is, near the time when Boerhaave's cat parted with her nine lives, under a much leſs degree of heat; when the thermometer ſtanding at 288 degrees, or 76 degrees above that of boiling water, ſhe came out of the oven, her complexion indeed conſiderably heightened, but her reſpiration by

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means quick or laborious. After M. Tillet's return to Paris, theſe experiments were repeated by Monſ. Marantin, commiſſaire de guerre, at Rochefoucault, an intelligent and accurate obſerver, on a ſecond girl belonging to the oven; who remained in it, without much inconvenience, under the ſame degree of heat, as long as her predeceſſor; and even breathed in air heated to about 325 degrees, for the ſpace of five minutes.

M. Tillet endeavoured to clear up the very apparent contrariety between theſe experiments and thoſe made under the direction of Boerhaave, by ſubjecting various animals, under different circumſtances, to great degrees of heat. From his experiments, in ſome of which the animals were ſwaddled with clothes, and were thereby enabled to reſiſt for a much longer time the effects of the extraordinary heat, he infers, that the heat of the air received into the lungs was not, as was ſuppoſed by Boerhaave, the only or principal cauſe of the anxiety, laborious breathing, and death, of the animals on whom his experiments were made; but that the hot air, which had free and immediate acceſs to every part of the ſurface of their bodies, penetrated the ſubſtance on all ſides, and brought on a fever, from whence proceeded all the ſymptoms: on the contrary, the girls at Rochefoucault, having their bodies in great meaſure protected from this action by their clothes, were enabled to breathe the air, thus violently heated, for a long time without great inconvenience. In fact, we ſhould think too, that the bulk of their bodies, though not thought of much conſequence by M. Tillet, appears to have contributed not a little to their ſecurity. In common reſpiration, the blood, in its paſſage through the lungs, is cooled by being brought into contact with the external inſpired air: In the preſent experiments, on the contrary, the veſicles and veſſels of the lungs receiving at each inſpiration an air heated to 300 degrees, muſt have been continually cooled and refreſhed, as well as the ſubcutaneous veſſels, by the ſucceſſive arrival of the whole maſs of blood contained in the interior parts of the body, whoſe heat might be ſuppoſed at the beginning of the experiment not to exceed 100 degrees. Not to mention, that M. Tillet's two girls may not poſſibly have been ſubjected to ſo great a degree of heat as that indicated by the thermometer; which appears to us to have always remained on the ſhovel, in contact with the earth.

Theſe experiments ſoon excited other philoſophers to make ſimilar ones, of which ſome very remarkable ones are thoſe of Dr Dobſon at Liverpool, who gives the following account of them in the Philoſophical Tranſactions, vol. lxv.

" I. The ſweating-room of our public hoſpital at Liverpool, which is nearly a cube of nine feet, lighted from the top, was heated till the quickſilver ſtood at 224° on Fahrenheit's ſcale, nor would the tube of the thermometer indeed admit the heat to be raiſed higher. The thermometer was ſuſpended by a ſtring fixed to the wooden frame of the ſky-light, and hung down about the centre of the room. Myſelf and ſeveral others were at this time incloſed in the ſtove, without experiencing any oppreſſive or painful ſenſation of heat proportioned to the degree pointed out by the thermometer. Every metallic about us ſoon became very hot.

" II. My friend Mr Park, an ingenious ſurgeon of this place, went into the ſtove heated to 202°. After ten minutes, I found the pulſe quickened to 120. And to determine the increaſe of the animal-heat, another thermometer was handed to him, in which the quickſilver already ſtood at 98°; but it roſe only to 99½, whether the bulb of the thermometer was incloſed in the palms of the hands, or received in the the mouth (A). The natural ſtate of this gentleman's pulſe is about 65.

" III. Another gentleman went through the ſame experiment in the ſame circumſtances, and with the ſame effects.

" IV. One of the porters to the hoſpital, a healthy young man, and the pulſe 75, was incloſed in the ſtove when the quickſilver ſtood at 210°; and he remained there, with little inconvenience, for 20 minutes. The pulſe, now 164, and the animal-heat, determined by another thermometer as in the former experiments, was 101½.

" V. A young gentleman of a delicate and irritable habit, whoſe natural pulſe is about 80, remained in the ſtove ten minutes when heated to 224°. The pulſe roſe to 145, and the animal-heat to 102°. This gentleman, who had been frequently in the ſtove during the courſe of the day, found himſelf feeble, and diſpoſed to break out into ſweats for 24 hours after the experiment.

" VI. Two ſmall tin veſſels, containing each the white of an egg, were put into the ſtove heated to 224°. One of them was placed on a wooden ſeat near the wall, and the other ſuſpended by a ſtring about the middle of the ſtove. After ten minutes, they began to coagulate; but the congulation was ſenſibly quicker and firmer in that which was ſuſpended, than in that which was placed on the wooden ſeat. The progreſs of the coagulation was as follows: it was firſt formed on the ſides, and gradually extended itſelf; the whole of the bottom was next coagulated; and laſt of all, the middle part of the top.

" VII. Part of the ſhell of an egg was peeled away, leaving only the film which ſurrounds the white; and part of the white being drawn out, the film ſunk ſo as to form a little cup. This cup was filled with ſome of the *albumen ovi*, which was conſequently detached as much as poſſible from every thing but the contact of the air and of the film which formed the cup. The lower part of the egg ſtood upon ſome light tow in a common gallipot, and was placed on the wooden ſeat in the ſtove. The quickſilver in the thermometer ſtill continued at 224°. After remaining in the ſtove for an hour, the lower part of the egg which was covered with the ſhell, was firmly coagulated; but that which was in the little cup, was fluid and tranſparent. At the end of another hour it was ſtill fluid, except on the edges where it was thinneſt; and here it was ſtill tranſparent; a ſufficient proof that it

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(A) The ſcale of the thermometer, which was ſuſpended by the ſtring about the middle of the room, was of metal; this was the only one I could then procure, on which the degrees ran ſo high as to give any ſcope to the experiment. The ſcale of the other thermometer, which was employed for aſcertaining the variations in the animal-heat, was of ivory.

it was dried, not coagulated.

"VIII. A piece of bees-wax, placed in the ſame ſituation with the *albumen ovi* of the preceding experiment, and expoſed to the ſame degree of heat in the ſtove, began to melt in five minutes: another piece ſuſpended by a ſtring, and a third piece put into the tin veſſel and ſuſpended, began likewiſe to liquefy in five minutes."

Even theſe experiments, though more accurate than the former, do not ſhew the utmoſt degrees of heat which the human body is capable of enduring. Some others, ſtill more remarkable, (as in them the body was expoſed to the heat without clothes), by Drs Fordyce and Blagden, are alſo recorded in the Philoſophical Tranſactions. They were made in rooms heated by flues in the floor, and by pouring upon it boiling water. There was no chimney in them, nor any vent for the air, excepting through crevices at the door. In the firſt room were placed three thermometers, one in the hotteſt part of it, another in the cooleſt part, and a third on the table, to be uſed occaſionally in the courſe of the experiment. Of theſe experiments, the two following may be taken as a ſpecimen.

"About three hours after breakfaſt, Dr Fordyce having taken off all his clothes, except his ſhirt, and being furniſhed with wooden ſhoes tied on with liſt, went into one of the rooms, where he ſtaid five minutes in a heat of 90°, and begun to ſweat gently. He then entered another room, and ſtood in a part of it heated to 110°. In about half a minute his ſhirt became ſo wet, that he was obliged to throw it aſide, and then the water poured down in ſtreams over his whole body. Having remained in this heat for ten minutes, he removed to a part of the room heated 120°; and after ſtaying there 20 minutes, found that the thermometer placed under his tongue, and held in his hand, ſtood juſt at 100°, and that his urine was of the ſame temperature. His pulſe had gradually riſen to 145 pulſations in a minute. The external circulation was greatly increaſed, the veins had become very large, and an univerſal redneſs had diffuſed itſelf all over the body, attended with a ſtrong feeling of heat; his reſpiration, however, was little affected. He concluded this experiment by plunging in water heated to 100°; and after being wiped dry, was carried home in a chair; but the circulation did not ſubſide for two hours.

"Dr Blagden took off his coat, waiſtcoat, and ſhirt, and went into one of the rooms, as ſoon as the thermometer had indicated a degree of heat above that of boiling water. The firſt impreſſion of this hot air upon his body was exceedingly diſagreeable, but in a few minutes all his uneaſineſs was removed by the breaking out of a ſweat. At the end of 12 minutes he left the room very much fatigued, but no otherwiſe diſordered. His pulſe beat 136 in a minute, and the thermometer had riſen to 220 degrees."

In others of theſe experiments it was found, that a heat even of 260° of Fahreinheit's thermometer could be ſubmitted to with tolerable eaſe. But it muſt be obſerved, that in theſe great heats every piece of metal they carried about with them become intolerably hot. Small quantities of water placed in metalline veſſels quickly boiled; but in a common earthen veſſel it required an hour and an half to arrive at a temperature of 140°, nor could it ever be brought near the boiling point. Neither durſt the people, who with impunity breathed the air of this very hot room at 264 degrees, bear to put their fingers into the boiling water which indicated only a heat of 212°. So far from this, they could not bear the touch of quickſilver heated only to 120°, and could but juſt bear ſpirit of wine at 130°.

Animal-HEAT. Of this there are various degrees; ſome animals preſerving a heat of 100° or more in all the different temperatures of the atmoſphere; others keep only a few degrees warmer than the medium which ſurrounds them; and in ſome of the more imperfect animals, the heat is ſcarcely one degree above the air or water in which they live.

The phenomenon of animal-heat hath, from the earlieſt ages, been the ſubject of philoſophical diſcuſſion; and, like moſt other ſubjects of this nature, its cauſe is not yet aſcertained. The beſt treatiſes that have appeared on the ſubject are thoſe of Dr Dugud Leſlie, publiſhed in 1778; and Mr Adair Crawford, in 1779. From the firſt of theſe performances, the following account of the different opinions on this ſubject is extracted.

1
Opinions the ancie concernin animal-heat.

"The ancients poſſeſſed not the requiſites for minutely inveſtigating the ſcience of nature; and, prone to ſuperſtition, attributed every phenomenon which eluded their inveſtigation, to the influence of a ſupernatural power. Hippocrates, the father and founder of medicine, accounted animal-heat a myſtery, and beſtowed on it many attributes of the deity. In treating of that ſubject, he ſays in expreſs terms, "what we call heat, appears to me to be ſomething immortal, which underſtands, ſees, hears, and knows every thing preſent and to come."—Ariſtotle ſeems to have conſidered the ſubject particularly, but nothing is to be met with in his works that can be ſaid to throw light upon it.—Galen tells us that the diſpute between the philoſophers and phyſicians of his time was, "whether animal-heat depended on the motion of the heart and arteries; or whether, as the motion of the heart and arteries was innate, the heat was not alſo innate." Both theſe opinions, however, he rejects; and attempts a ſolution of the queſtion on his favourite ſyſtem, namely, the peripatetic philoſophy: but his leading principles being erroneous, his deductions are of courſe inadmiſſible.

2
Of the derns.

"To enter into a minute detail of all the opinions offered by the moderns on the cauſe of animal-heat, would far exceed our limits. Moſt of them, however, may be referred to one or other of the three general cauſes of heat, viz. mixture, fermentation, and mechanical means, each of which we ſhall particularly conſider.

"1. *Chemical mixture.* When chemical philoſophy firſt came into vogue, and prevailed in the theory as well as practice of medicine, almoſt every operation in the animal machine was ſaid to be the effect of ferment or mixture. From obſerving, that on the mixing of certain bodies far below the temperature of the human body, a degree of heat ſometimes riſing to actual inflammation was produced; they, without further inveſtigation, pronounced mixture the ſole cauſe of animal heat. Various, however, were the opinions, not only reſpecting the place where the mixture happened, but alſo concerning the nature of the fluids of which it conſiſted. Van Helmont, Sylvius, and ſeveral others, ſuppoſed that the mixture took place in the inteſtinal tube; and aſcribed it to an efferveſcence between the pancreatic juice and the bile. Others diſcovered acids in one place, and alkalies in another; but the general opinion for near two centuries was, That aceſcent fluids taken in, meeting with others of an alkaline nature already prepared in the body, gave riſe to the degree of heat peculiar to animals. But thoſe who are in the leaſt acquainted with the laws of the animal œconomy, need not be told that theſe opinions are mere conjectures, founded on facts gratuitouſly aſſumed. No experiments have ſhewn either an aceſcency or alkaleſcency in the bile that is ſufficient to unite with the other animal juices, and generate the heat of animals. But though we ſhould admit the ſuppoſition in its full extent, ſtill it would by no means be ſufficient to account for the ſtability of animal heat in different climates and ſeaſons; its equability all over the body when in health; its partial increaſe in topical inflammations; or hardly indeed for any one phænomenon attending its production.

“ Since, then, it appears that the fluids ſuppoſed to be mixed, the place in which the mixture is made, and every other circumſtance relating to it, are neither aſcertained nor ſeconded by analogy, none will, we preſume, heſitate to reject every hypotheſis of the cauſe of animal-heat founded on the effects of mixture.

“ 2. *Fermentation.* When a more accurate and extenſive knowledge of the various operations of nature had convinced phyſiologiſts of the abſurdity of explaining the vital functions of animals, and the ſeveral changes which take place in the living body by the effects of chemical mixture, fermentation was ſubſtituted in its ſtead. All had obſerved, that fermentation was generally accompanied by heat; and few were ignorant, that that identical proceſs, or one extremely ſimilar to it, was conſtantly going forward in living animals; and it was not without ſome appearance of truth, that phyſiologiſts attributed animal-heat to that cauſe.

“ Formerly there were various modifications of this opinion; but of late it has been chiefly confined to one ſpecies of fermentation, viz. the putrefactive, which indeed is more conſentaneous to experience and ſound philoſophy. For although animal-ſubſtances are either directly or indirectly produced from vegetables, as all animals live on vegetables, or on animals that have lived on them; and though they may be ultimately reſolved into the ſame principles; yet they are certainly combined in a different manner: for they conſtitute compounds, the natures of which are eſſentially different; and of the three ſtages of fermentation, the vinous, acetous, and putrid, the laſt is the only one to which they ſhew a tendency. Milk indeed tends to the acetous, and even to the vinous fermentation; but as it can hardly be conſidered as perfectly animalized, it ought not to be conſidered as an exception to the general poſition. And though it be readily admitted, that animal matter is extremely apt to putrefy, and that even in the living body there is a tendency to that proceſs; yet it may be ſhewn, that the degree to which it takes place can have little or no ſhare in generating the heat of animals. In the firſt place, the effect of any degree of putrefaction in producing heat, is to this day ſo ill aſcertained, that, with many ingenious philoſophers it is altogether problematical, whether or not animal ſubſtances, during the putrefactive proceſs, do ever generate heat. Neither M. Beaume nor Dr Pearſon, who made ſeveral accurate experiments with a view to aſcertain this point, could, by the aſſiſtance of the moſt ſenſible thermometers, diſcover the leaſt difference betwixt the temperature of the putrefying mixtures, and the ſurrounding medium; and were the putrefaction of animal-ſubſtances really attended with the generation of heat, we might expect to find it greater in proportion to the bulk of the putrefying maſs. This, however, is not the caſe; for it has often been found, that the largeſt maſſes of animal matter, ſuch as the carcaſe of a large whale, laid out and expoſed to the air in ſuch a putrid condition as to affect all the neighbourhood with an intolerable ſtench, did not to the perſons handling it feel ſenſibly hotter than the circumambient air. But what at once overturns every thing that can be advanced in favour of the generation of animal-heat on the principles of putrefaction is, that heat is far more conſiderable in a living than in a dead body; and no rational phyſiologiſt will deny, that the putrid fermentation is going forward more rapidly in the latter than in the former.

“ 3. *The mechanical generation of heat.* This opinion firſt took its riſe from an obſervation, that animal-heat generally keeps pace with the ſtate of the circulation: while the action of the heart and arteries continues unimpaired, a high degree of animal-heat is produced; but when that action becomes more languid, the heat of the animal is diminiſhed alſo. This, till very lately, was the favourite opinion of phyſicians, and was introduced immediately after Harvey had diſcovered the circulation of the blood, and indeed ſeems to be ſupported by many ſtriking facts. Phyſiologiſts looked upon it as a matter almoſt capable of mathematical demonſtration; yet they could not agree whether the heat of animals is occaſioned by the friction of the blood againſt the veſſels which contain it, or by the internal friction and agitation of the particles among one another. Various hypotheſes accordingly were framed, and many ingenious arguments brought in ſupport of them: but all ſuppoſitions of the mechanical kind are overthrown by ſome thermometrical obſervations of De Haen and others, from which it appeared, that the heat of the body was ſometimes greater than is uſual with healthy people, at the time the perſon was juſt expiring, when the action of the veſſels was very weak; nay, even after he was dead, when it had entirely ceaſed. The abovementioned phyſician relates two very remarkable caſes of this kind. In the one, he found that the temperature of his patient, which during the courſe of an inflammatory fever had never exceeded 103 degrees, at the time he expired, and for two minutes after, ſtood at 106. From the other it appeared, that the heat of a perſon who was dying of a lingering diſtemper, roſe in the laſt agony from 100 to 101, and continued there ſtationary for two hours; and, even at the expiration of 15 hours, had only fallen to 85°, though the ſurrounding medium did not exceed 60°. The examples alſo of thoſe who are ſuffocated by fixed air, entirely overturn not only the mechanical ſyſtem, but almoſt every other which hath yet appeared on the ſubject. [See the article Blood, n° 31.]

3
Dr Cullen's opinion, with objections.

Inſtit. of Medicine, p. 224.

“ One or other of the abovementioned hypotheſes continued to be adopted by phyſicians, till Dr Cullen attempted a ſolution on a new ſet of principles; but, attentive to the diffidence with which novel opinions ought to be broached, he delivered his as little more than a mere conjecture. ‘ May it not (ſays he) be ſuppoſed, That there is ſome circumſtance in the vital principle of animals, which is in common to thoſe of the ſame claſs, and of like œconomy; and which determines the effect of motion upon the vital principle to be the ſame, though the motion acting upon it may be in different circumſtances?’——The doctor was driven to this ſuppoſition from the difficulty he found in explaining how ſo many animals of a different age, ſize, and temperament, ſhould poſſeſs very nearly the ſame degree of heat; and in which it is impoſſible to ſhew, that the motion of the blood in all its circumſtances, is exactly the ſame; or that in the different animals in which the degree of heat is conſiderably different, the motion of the circulating maſs is, in each, correſpondent to the difference of temperature. But, granting that the degree of heat does not always obtain in an exact ratio with the motion of the blood, and that this is an inſuperable objection to its mechanical generation, yet there appear no plauſible grounds for ſuppoſing that the effect of motion may be the ſame, while the motion acting upon it is in different circumſtances. By this Dr Cullen means, That the different temperature of different animals is owing to a difference of the vital principle, inſomuch that the velocity of the blood may be the ſame in a frog as in a man; and yet, in conſequence of the different vital principle, the heat produced may be different. The facts upon which he ſeems to lay the greateſt ſtreſs are, That neither where the ſurrounding medium conſiderably ſurpaſſes the temperature of the living body, nor where it is far below it, is there any ſenſible change in the heat of animals. Theſe, and ſome ſimilar facts, in appearance countenance his hypotheſis; yet we have no ſolid reaſon for imagining the principle of life to be different in different animals. And how are we to conceive, that the ſame degree of motion ſhould in one claſs of animals always produce a certain degree of heat, and in another claſs as regularly a different one? A propoſition of ſuch a nature ſhould, no doubt, require the moſt obvious facts and concluſive arguments to eſtabliſh it; but, in the preſent inſtance, we do not perceive any probable reaſon, even from analogy. Beſides, to ſay that the principle of life can generate heat or cold, independent of chemical or mechanical means, is contrary to experience, and ſeems in itſelf abſurd.

“ In the 66th volume of the Philoſophical Tranſactions, Dr Hunter, after reciting ſome experiments concerning animal-heat, aſſerts, That certain animals entirely deſtitute of nerves, are endowed with a power of generating their own heat; and this he brings as an *argumentum crucis* againſt thoſe who account the nervous ſyſtem the ſeat of animal-heat. If this is really a fact, it muſt, no doubt, have all the weight he aſcribes to it; but it is plain that no ſtreſs can be laid upon it, unleſs it was better aſcertained, which it is evident it never can be. For though we can poſitively aſſert that nerves exiſt where we ſee them, yet we cannot affirm with equal certainty that they do not alſo exiſt where we are not able to diſcover them. For all anatomiſts allow, that there are thouſands of nervous filaments ſo finely interwoven into the compoſition of the more perfect animals of every ſize, that they elude not only the knife and naked eye, but even the beſt optical inſtruments hitherto invented. Since then we admit the preſence of nerves in one tribe of animals, though we can only perceive them in their effects; what ſolid reaſon have we to deny them in another, in which we have the very ſame evidence, viz. certain indications of ſenſe and motion?

4
Dr Black's opinion.

“ Another theory, and perhaps the beſt ſupported which hath yet appeared on the ſubject, is that of Dr Black. That excellent chemiſt having obſerved, That not only breathing animals are of all others the warmeſt, but alſo that there ſubſiſts ſuch a cloſe and ſtriking connexion between the ſtate of reſpiration and the degree of heat in animals, that they appear to be in an exact proportion to one another, was led to believe, that animal-heat depends on the ſtate of reſpiration; that it is all generated in the lungs by the action of the air upon the principle of inflammability, in a manner little diſſimilar to what he ſuppoſed to occur in actual inflammation; and that it is thence diffuſed by means of the circulation over the reſt of the vital ſyſtem.

“ This opinion is ſupported by many forcible arguments. 1. It is pretty generally known to naturaliſts, that a quantity of mephitic phlogiſticated air is conſtantly exhaling from the lungs of living animals.—Since, therefore, atmoſpherical air, by paſſing through the lungs, acquires the very ſame properties as by paſſing through burning fuel, or by being expoſed to any other proceſs of phlogiſtication, it is obvious, that the change which the common air undergoes in both caſes, muſt be attributed to one and the ſame cauſe, viz. its combination with phlogiſton. 2. It has likewiſe been urged in favour of the ſame hypotheſis, That the celerity with which the principle of inflammability is ſeparated in reſpiration, is very cloſely connected with the degree of heat peculiar to each animal. Thus, man, birds, and quadrupeds, vitiate air very faſt; ſerpents, and all the amphibious kind, very ſlowly; and the latter are of a temperature inferior to the former, and breathe leſs frequently. 3. The moſt cogent arguments that have been brought in ſupport of this opinion are, That no heat is generated till the function of reſpiration is eſtabliſhed; and that the fœtus *in utero* derives all its heat from the mother.”

Upon this theory our author makes the following obſervations, which we ſhall give in his own words.

5
Objection to it.

“ Theſe arguments may, perhaps, on a ſuperficial view of the queſtion, appear concluſive; but a ſound reaſoner, who ſhall coolly and impartially weigh every circumſtance, will, I am confident, allow that they only afford a very ambiguous and imperfect evidence of the doctrine they are meant to eſtabliſh: and the ſubſequent animadverſions on Dr Black's theory at large, will, it is hoped, ſuffice to ſhew, that it is not only founded on dubious and controvertible principles, but that it is, in every point of light, clogged with unſurmountable difficulties.

"I. Many and various are the proofs which evince the improbability of the lungs being the ſource or elaboratory of animal-heat: for, though it be granted, that there ſubſiſts a very ſtriking connexion between the ſtate of reſpiration and the degree of heat in animals, and that they are even in proportion to one another; yet it by no means enſues, that the former is poſitively the cauſe of the latter. For, were that really the caſe, it is obvious, that thoſe animals which are deſtitute of the organs of reſpiration would generate no heat. That, however, is not true in fact: for thoſe fiſhes which are even deſtitute of gills, appear from various experiments to be warmer than the ordinary temperature of the element in which they live; an irrefragable proof that the function of reſpiration is not abſolutely neceſſary to the production of heat in animals.

"II. If the heat of living animals be generated ſolely in the lungs, two things neceſſarily follow: the firſt, That it can only be communicated to the other parts of the body through the channel of the arterial ſyſtem; the ſecond, That the heat muſt decreaſe as it recedes from its ſuppoſed centre. And a clear and ſatisfactory evidence of both theſe points will, no doubt, be deemed requiſite to render Dr Black's opinion in any degree probable. So far, however, are we from meeting with thoſe poſitive and convincing proofs which we had reaſon to expect, that we are not preſented with a ſingle plauſible argument in favour of either of the points. On the contrary, it is more conformable to facts, that the venal blood is, if not warmer, at leaſt as warm as the arterial. Dr Stevenſon, an ingenious and accurate phyſiologiſt, with a view to aſcertain this matter, laid bare the jugular vein and carotid artery of a calf, and then tied and cut them off at once, in order to let equal quantities of blood flow, in a given time, into veſſels of an equal capacity, in each of which he had placed a well-adjuſted thermometer; the reſult of the experiment was, That the thermometer immerſed in the venous blood roſe ſeveral degrees above that placed in the arterial. But though it is probable that there is not ſuch a difference as that experiment ſeems to make, yet ſeveral reaſons incline me to think, that the venous blood, inſtead of being colder, as Dr Black maintains, is in fact ſomewhat warmer, than the arterial; and what entirely overturns his opinion is, That no experiment, though many have been made, has ever ſhewn that the temperature of the blood is higher in the left ventricle of the heart than in the right, which muſt neceſſarily be the caſe, were all the heat of the animal-body generated in the lungs.

"III. Having thus rendered it improbable that the generation of animal-heat ſhould be entirely confined to the lungs, we ſhall venture a ſtep farther, and endeavour to ſhew, that the vital fluid, ſo far from acquiring all its heat in the pulmonary ſyſtem, communicates no inconſiderable portion of what it had received in the courſe of the circulation to the air alternately entering into that organ and iſſuing from it. Various are the arguments which tend to evince this opinion. Were the blood heated in the lungs, we ſhould certainly need leſs of their function in a warm than in a cold atmoſphere: but we are taught by experience, that when the air is extremely hot, and we wiſh to be cooled, we breathe full and quick; and that when it is intenſely cold, our reſpiration is ſlow and languid; which, were the blood heated in the lungs by the action of the air upon it, ſurely ſhould not be the caſe. It is therefore more conſonant with reaſon and experience, that the air which we inſpire, by carrying off a quantity of evolved phlogiſton from the lungs, rather contributes to diminiſh than increaſe the heat of breathing animals. Reſpiration, for this reaſon, has been very properly compared, by an ingenious phyſiologiſt, Dr Duncan of Edinburgh, to the blowing of bellows on a hot body. In both caſes a conſiderable degree of heat is communicated to the air: but in neither can the air be ſaid to generate any heat; for if it did, the heat of breathing animals ſhould increaſe in proportion to the quantity of air inhaled, and a piece of inert matter heated to a certain degree ſhould become hotter by ventilation.

"IV. The fœtus *in utero*, according to Dr Black's hypotheſis, generates no heat. The arguments by which he ſupports that poſition, how ingenious ſoever they may be, ſeem not ſufficiently cogent to produce conviction; and as the queſtion from its nature hardly admits of any direct experiment, our reaſoning upon it muſt neceſſarily be analogical. Hence ariſes our embarraſſment; for, as the diſcovering of analogies depends on the quickneſs and fertility of fancy, and the truth of all analogical ratiocination on the acuteneſs and nicety of judgment, two powers of the ſoul ſeldom united in an eminent degree, we cannot wonder that arguments of this kind, which to one man ſeem unanſwerable, ſhould to another appear futile.

"The only plauſible objection to the generation of heat in the fœtus, is, the ſuppoſition that it would in a ſhort time accumulate in ſuch a manner as to become incompatible with life.

"This argument, however, is more ſpecious than ſolid; for, granting that the circulation which is carried on between the fœtus and the mother, tranſmits very nearly the temperature of her blood, that by no means entirely ſuperſedes the neceſſity of heat being generated in it. Various reaſons lead to this opinion.—It is an axiom, that heat decreaſes as it recedes from the ſource from which it ſprang. Now, if we admit for a moment Dr Black's opinion, and believe the heat of animals to be generated ſolely in the lungs, is it not obvious, that before it reaches the uterus, paſſes through the very minute tubes by which that organ is connected to the placenta, circulates through the umbilical veſſels, and pervades the extreme parts of the fœtus, it muſt be too much diminiſhed to ſupport that equilibrium which obtains in every part of the living ſyſtem. Beſides, as the fœtus *in utero* may properly enough be accounted a part of the mother, the ſame objections that are brought againſt the generation of heat in it would hold equally good againſt the production of heat in any part or organ of her body, except the lungs. But ſuch a multitude of accurate thermometrical obſervations have evinced the partial increaſe of heat in local inflammations, that no room is left to doubt, that in every individual part of the vital frame heat is generated; and if the fœtus be, from any cauſe whatever, liable to topical inflammation,

mation, a thing which no phyſiologiſt has ever pretended to deny, what ſhadow of reaſon is there for doubting that ſuch affections are accompanied with the ſame effects before as after birth, and conſequently with a partial increaſe of heat?"

6 Dr Dugud's theory.

Our author having now, as he ſuppoſes, refuted the opinions of others, after ſhewing that heat though *generated* cannot *accumulate* in the fœtus, proceeds to lay down his own theory, which depends on the following principles.

1. That the blood does contain phlogiſton.

2. That this phlogiſton is evolved, extricated, or brought into a ſtate of activity and motion by the action of the blood-veſſels to which it is ſubjected in the courſe of circulation.

3. That the evolution of phlogiſton is a cauſe which throughout nature produces heat, whether that heat be apparently excited by mixture, fermentation, percuſſion, friction, inflammation, ignition, or any ſimilar cauſe.

4. That this heat, which muſt be produced in conſequence of the evolution of the phlogiſton from the blood of different animals, is in all probability equal to the higheſt degree of heat which theſe animals in any caſe poſſeſs.

7 Objections to it.

The firſt and ſecond of theſe propoſitions will readily be granted: but the third is liable to a very great objection, namely, that from putrefying bodies, phlogiſton is evolved in quantity ſufficient to reduce to their metallic form the calces of ſome metals expoſed to the vapour, as Dr Dugud hath acknowledged; yet he himſelf affirms, that no ſenſible heat is produced by putrefying animal-ſubſtances. To this he is obliged to reply, that phlogiſton is extricated more ſlowly from mixtures undergoing the putrid fermentation, than from ſuch as are undergoing the vinous and acetous ones; and that the volatile alkali produced from putrefying ſubſtances likewiſe hinders the action of the phlogiſton. But the firſt part of this anſwer is not proved, and is what he himſelf calls only a *probable conjecture*. Neither doth the ſecond appear to be well founded: for putrefying ſubſtances, urine excepted, afford but little volatile alkali; and even putrid urine itſelf, which affords ſuch a large portion, is not colder than other putrid matters.

It is however needleſs to inſiſt farther on this theory, ſince his fundamental principle, namely, That the venous blood is warmer than the arterial, hath been ſhewn to be falſe by Mr Adair Crawford, of whoſe hypotheſis we muſt now give an account.

8 Mr Crawford's theory.

This gentleman, who, in his general doctrine of heat, ſeems to agree with Dr Irvin of Glaſgow, begins with an explanation of his terms. The words *heat* and *fire*, he tells us, are ambiguous. *Heat* in common language has a double ſignification. It is uſed indiſcriminately to expreſs a ſenſation of the mind, and an unknown principle, whether we call it a *quality* or a *ſubſtance*, which is the exciting cauſe of that ſenſation. The latter, he, with Dr Irvin, calls *abſolute heat*; the former, *ſenſible heat*. The following are the general facts upon which his experiments are founded.

1. Heat is contained in great quantities in all bodies when at the common temperature of the atmoſphere.

2. Heat has a conſtant tendency to diffuſe itſelf over all bodies, till they are brought to the ſame degree of ſenſible heat.

3. If the parts of the ſame homogeneous body have the ſame degree of ſenſible heat, the quantities of abſolute heat will be proportionable to the bulk or quantity of matter. Thus the quantity of abſolute heat contained in two pounds of water, muſt be conceived to be double of that which is contained in one pound, when at the ſame temperature.

4. The mercurial thermometer is an accurate meaſure of the comparative quantities of abſolute heat which are communicated to the ſame homogeneous bodies or ſeparated from them, as long as ſuch bodies continue in the ſame form. If therefore the ſenſible heat of a body, as meaſured by the mercurial thermometer, were to be diminiſhed the one half, or the one third, or in any given proportion, the abſolute heat would be diminiſhed in the ſame proportion.

5. The comparative quantities of abſolute heat which are communicated to different bodies, or ſeparated from them, cannot be determined in a direct man. by the thermometer. Thus, if the temperature of a pound of mercury be raiſed one degree, and that of a pound of water one degree, as indicated by the thermometer, it does not by any means follow, that equal quantities of abſolute heat have been communicated to the water and the mercury. [See HEAT and THERMOMETER.]—If a pint of mercury at 100° be mixed with an equal bulk of water at 50°, the change produced in the heat of the mercury will be to that produced in the water, as three to two: from which it may be inferred, that the abſolute heat of a pint of mercury is to that of an equal bulk of water, as two to three; or, in other words, that the comparative quantities of their abſolute heats are reciprocally proportionable to the changes which are produced in their ſenſible heats, when they are mixed together at different temperatures. This rule, however, does not apply to thoſe mixtures which generate ſenſible heat or cold by chemical action.

From the above poſition, ſays Mr Crawford, it follows, that equal weights of heterogeneous ſubſtances, as air and water, having the ſame temperature, may contain unequal quantities of abſolute heat. There muſt, therefore, be certain eſſential differences in the nature of bodies, in conſequence of which ſome have the power of collecting and retaining the element of fire in greater quantities than others, and theſe differences he calls throughout his treatiſe the *capacities* of bodies for containing heat.

Having premiſed theſe general facts, our author gives an account of a number of experiments made, in order to aſcertain the quantity of abſolute heat contained in different bodies. Theſe experiments were made by mixing the bodies to be examined with water, heated to different degrees; and by the temperature of the mixture, he found the proportion of the capacity of the bodies for containing heat, to water, and, of conſequence, to one another. Thus he found the capacity of wheat for containing heat to be to that of water, as 1 to 2.9; and, of conſequence, the abſolute heats of the two ſubſtances to be in the ſame proportion. The abſolute heat of oats to that of water he found as 1 to $2\frac{1}{3}$; of barley, as 1 to 2.4; of beans, as 1 to 1.6; of fleſh, as 1 to 1.3; of milk, as 1 to 1.1; and of a mixture of venous and arterial blood from a ſheep, as 25.4 to 24.4. By other experiments he determined, that the abſolute heat of venous blood was to that of water, only as 100 to 112, whereas the abſolute heat of arterial blood was to that of water, as 100 to 97.08.

By experiments made with air of different kinds contained in bladders, and immerſed in water, he found that the abſolute heat of atmoſpherical air was exceedingly great, being to that of water as 18.6 to 1; that of dephlogiſticated air was ſtill greater, being to the heat of common atmoſpherical air as 4.6 to 1. The heat of phlogiſticated and fixed air was much leſs; that of the latter, particularly, being to the heat of atmoſpherical air only as 1 to 67.

From other experiments made on metals, Mr Crawford concludes, that the abſolute heat of tin, in its metallic ſtate, is to that of water as 1 to 14.7; but the heat of calcined tin is to that of water as 1 to 10.4. In like manner, the heat of iron was to that of water only as 1 to 8; but that of the calx of iron was to the heat of water as 1 to 3.1, &c. And from theſe experiments he is of opinion, that the more phlogiſton that is added to any body, the leſs is its capacity for containing heat.

From theſe experiments our author deduces the following theory of animal-heat.—"It has been proved, that the air, which is exſpired from the lungs of animals, contains leſs abſolute heat than that which is inhaled in inſpiration. It has been ſhown, particularly, that, in the proceſs of reſpiration, atmoſpherical air is converted into fixed air; and that the abſolute heat of the former is to that of the latter, as 67 to 1.

"Since, therefore, the fixed air which is exhaled by exſpiration is found to contain only the one ſixty-ſeventh part of the heat which was contained in the atmoſpherical air previous to inſpiration, it follows, that the latter muſt neceſſarily depoſit a very great proportion of its abſolute heat in the lungs. It has moreover been ſhown, that the abſolute heat of florid arterial blood is to that of venous as 11½ to 10. And hence, as the blood, which is returned by the pulmonary vein to the heart, has the quantity of its abſolute heat increaſed, it is evident that it muſt have acquired this heat in its paſſage through the lungs. We may conclude, therefore, that in the proceſs of reſpiration, a quantity of abſolute heat is ſeparated from the air and abſorbed by the blood.

"That heat is ſeparated from the air in reſpiration, is farther confirmed by the experiment with phlogiſticated air; from which, compared with Dr Prieſtley's diſcoveries, it is manifeſt, that the power of any ſpecies of air in ſupporting animal-life, is nearly in proportion to the quantity of abſolute heat which it contains, and is conſequently proportionable to the quantity which it is capable of depoſiting in the lungs.

"The truth of this concluſion will perhaps appear in a clearer light from the following calculation, by which we may form ſome idea of the quantity of heat yielded by atmoſpherical air when it is converted into fixed air, and alſo of that which is abſorbed during the converſion of venous into arterial blood.

"We have ſeen, that the ſame heat, which raiſes atmoſperical air one degree, will raiſe fixed air nearly 67 degrees; and conſequently, that the ſame heat, which raiſes atmoſpherical air any given number of degrees, will raiſe fixed air the ſame number of degrees multiplied by 67. In the Peterſburgh experiment of freezing quickſilver, the heat was diminiſhed 200 degrees below the common temperature of the atmoſphere. We are therefore certain, that atmoſpherical air, when at the common temperature of the atmoſphere, contains at leaſt 200 degrees of heat. Hence, if a certain quantity of atmoſpherical air, not in contact with any body that would immediately carry off the heat, ſhould ſuddenly be converted into fixed air, the heat which was contained in the former would raiſe the latter 200 degrees multiplied by 67, or 13400 degrees. And the heat of red hot iron being 1050, it follows that the quantity of heat, which is yielded by atmoſpherical air when it is converted into fixed air, is ſuch, (if it were not diſſipated), as would raiſe the air ſo changed to more than 12 times the heat of red-hot iron.

"If, therefore, the abſolute heat which is diſengaged from the air in reſpiration, were not abſorbed by the blood, a very great degree of ſenſible heat would be produced in the lungs.

"Again, it has been proved, that the ſame heat which raiſes venous blood 115 degrees, will raiſe arterial only 100 degrees; and conſequently, that the ſame heat, which raiſes venous blood any given number of degrees, will raiſe arterial a leſs number, in the proportion of 100 to 115, or 20 to 23. But we know that venous blood contains at leaſt 230 degrees of heat. Hence, if a certain quantity of venous blood, not in contact with any body that would immediately ſupply it with heat, ſhould ſuddenly be converted into arterial, the heat which was contained in the former would raiſe the latter only $\frac{20}{23}$ of 230 degrees, or 200 degrees; and conſequently the ſenſible heat would ſuffer a diminution, equal to the difference between 230 and 200, or 30 degrees. But the common temperature of blood is 96: when, therefore, venous blood is converted into arterial in the lungs, if it were not ſupplied by the air with a quantity of heat proportionable to the change which it undergoes, its ſenſible heat would be diminiſhed 30 degrees, or it would fall from 96 to 66.

"That a quantity of heat is detached from the air, and communicated to the blood, in reſpiration, is moreover ſupported by the experiments with metals and their calces: from which it appears, that when bodies are joined to phlogiſton, they loſe a portion of their abſolute heat; and that, when the phlogiſton is again diſengaged, they reabſorb an equal portion of heat from the ſurrounding bodies.

"Now it has been demonſtrated by Dr Prieſtley, that in reſpiration, phlogiſton is ſeparated from the blood and combined with the air. During this proceſs, therefore, a quantity of abſolute heat muſt neceſſarily be diſengaged from the air, by the action of the phlogiſton; the blood, at the ſame moment, being left at liberty to unite with that portion of heat which the air had depoſited.

"And hence animal-heat ſeems to depend upon a proceſs ſimilar to a chemical elective attraction. The air is received into the lungs, containing a great quantity of abſolute heat. The blood is returned from the extremities, highly impregnated with phlogiſton. The attraction of the air to the phlogiſton, is greater than that of the blood. This principle will, therefore, leave the blood to combine with the air. By the addition of the phlogiſton, the air is obliged to depoſit a part of its abſolute heat; and as the capacity of the blood is at the ſame moment increaſed by the ſeparation of the phlogiſton, it will inſtantly unite with that portion of heat which had been detached from the air.

"We learn from Dr Prieſtley's experiments with reſpect to reſpiration, that arterial blood has a ſtrong attraction to phlogiſton: it will conſequently, during the circulation, imbibe this principle from thoſe parts which retain it with leaſt force, or from the putreſcent parts of the ſyſtem: and hence the venous blood, when it returns to the lungs, is found to be highly impregnated with phlogiſton. By this impregnation, its capacity for containing heat is diminiſhed. In proportion, therefore, as the blood, which had been dephlogiſticated by the proceſs of reſpiration, becomes again combined with phlogiſton in the courſe of the circulation, it will gradually give out that heat which it had received in the lungs, and diffuſe it over the whole ſyſtem.

"Thus it appears, that, in reſpiration, the blood is continually diſcharging phlogiſton and abſorbing heat; and that, in the courſe of the circulation, it is continually imbibing phlogiſton and emitting heat.

"It may be proper to add, that as the blood, by its impregnation with phlogiſton, has its capacity for containing heat diminiſhed; ſo on the contrary, thoſe parts of the ſyſtem from which it receives this principle, will have their capacity for containing heat increaſed, and will conſequently abſorb heat.

"Now if the changes in the capacities, and the quantities of matter changed in a given time, were ſuch, that the whole of the abſolute heat ſeparated from the blood were abſorbed, it is manifeſt that no part of the heat which is received in the lungs would become ſenſible in the courſe of the circulation.

"That this, however, is not the caſe, will, I think, be evident from the following conſiderations:

"We know that ſenſible heat is produced by the circulation of the blood; and we have proved by experiment, that a quantity of abſolute heat is communicated to that fluid in the lungs, and is again diſengaged from it in its progreſs through the ſyſtem. If, therefore, the whole of the abſolute heat, which is ſeparated from the blood, were abſorbed by thoſe parts of the ſyſtem from which it receives the phlogiſton, it would be neceſſary to have recourſe to ſome other cauſe, to account for the ſenſible heat which is produced in the circulation. But, by the rules of philoſophiſing, we are to admit no more cauſes of natural things than ſuch as are both true and ſufficient to explain the appearances; for nature delights in ſimplicity, and affects not the pomp of ſuperfluous cauſes.

"We may, therefore, ſafely conclude, that the abſolute heat which is ſeparated from the air in reſpiration, and abſorbed by the blood, is the true cauſe of animal-heat.

"It muſt nevertheleſs be granted, that thoſe parts of the ſyſtem which communicate phogiſton to the blood, will have their capacity for containing heat increaſed; and therefore, that a part of the abſolute heat which is ſeparated from the blood will be abſorbed.

"But from the quantity of heat, which becomes ſenſible in the courſe of the circulation, it is manifeſt that the portion of heat which is thus abſorbed is very inconſiderable.

"It appears, therefore, that the blood, in its progreſs through the ſyſtem, gives out the heat which it had received from the air in the lungs: a ſmall portion of this heat is abſorbed by thoſe particles which impart the phlogiſton to the blood; the reſt becomes redundant, or is converted into moving and ſenſible heat."

9
The ſubje ſtill uncer tain.

Mr Crawford's theory, which doth not eſſentially differ from Dr Black's, ſeems to be the beſt that hath yet appeared. There is, however, one difficulty which ſeems common to them all, and which, even on Mr Crawford's principles, ſeems not to admit of ſolution. If animal-heat entirely depends on ſomething peculiar to a living body, why doth it ſometimes continue after life hath ceaſed? If heat depends on the evolution of phlogiſton by the action of the blood-veſſels, according to Dr Dugud, why ſhould it remain when theſe veſſels ceaſe to act, as, according to Dr Dugud himſelf, it ſometimes doth? If, according to Mr Crawford, it is every moment attracted from the air, why is it not always in proportion to the reſpiration? Or, if fixed air contains ſuch a ſmall proportion of abſolute heat as, by Mr Crawford's experiments, it ſeems to do, why doth it impart ſuch a ſtrong and laſting degree of heat to the bodies of thoſe who are killed by it? See the article Blood, n° 31. The conjecture mentioned under that article, n° 32, is therefore ſtill probable, namely, that animal-heat is occaſioned by the elaſtic principle of fixed air; tho' in what manner it is occaſioned, ſeems to be problematical.

Internal Heat *of the Earth.* That there is a very conſiderable degree of heat always felt in digging to great depths in the earth, is agreed upon by all naturaliſts: but the quantity of this heat hath ſeldom been meaſured in any part; much leſs is it known, whether, in digging to an equal depth in different parts of the earth, the heat is found always the ſame. In digging mines, wells, &c. they find that at a little depth below the ſurface it feels cold. A little lower it is colder ſtill, as being beyond any immediate influence of the ſun's rays; inſomuch, that water will freeze almoſt at any ſeaſon of the year: but when we go to the depth of 40 or 50 feet, it begins to grow warm, ſo that no ice can bear it; and then the deeper we go, ſtill the greater the heat, until at laſt reſpiration grows difficult, and the candles go out.

This heat of the earth hath been variouſly explained. Some have had recourſe to an immenſe body of fire lodged in the centre of the earth, which they conſider as a central ſun, and the great principle of the generation, vegetation, nutrition, &c. of foſſil and vegetable bodies. But Mr Boyle, who had been at the bottom of ſome mines himſelf, ſuſpects that this degree of heat, at leaſt in ſome of them, may ariſe from the peculiar nature of the minerals generated therein. To confirm this, he inſtances a mineral of a vitriolic kind, dug up in large quantities in many parts of England, which by the bare affuſion of common water will grow ſo hot, that it will almoſt take fire.—Theſe hypotheſes are liable to the following objections. 1. If there is within the earth a body of actual fire, it ſeems difficult to ſhew why that fire ſhould not conſume and moulder away the outer ſhell of earth, till either the earth was totally deſtroyed, or the fire extinguiſhed. 2. If the internal heat of the earth is owing to the action of water upon mineral ſubſtances, that action thro' time muſt have ceaſed, and the heat have totally vaniſhed; but we have no reaſon to think, that the heat of the earth is any thing leſs juſt now than it was a thouſand years ago. The phenomenon is eaſily explained by the propoſitions laid down under the article Heat. If heat is nothing elſe than a certain mode of action in the ethereal fluid, or the matter of light, by which it flows out from a body in all directions as radii drawn from the centre to the circumference of a circle; it will then follow, that if an opaque body abſorbs any conſiderable quantity of light, it muſt neceſſarily grow hot. The reaſon of this is plain. The body can hold no more than a certain quantity of ethereal matter; if more is continually forcing itſelf in, that which has already entered muſt go out. But it cannot eaſily get out, becauſe it is hindered by the particles of the body among which it is detained. It makes an effort therefore in all directions to ſeparate theſe particles from each other; and hence the body expands, and the effort of the fluid to eſcape is felt when we put our hands on the body, which we then ſay is *hot*. Now as the earth is perpetually abſorbing the ethereal matter, which comes from the ſun in an immenſe ſtream, and which we call his *light*, it is plain, that every pore of it muſt have been filled with this matter long ago. The quantity that is lodged in the earth, therefore, muſt be continually endeavouring to ſeparate its particles from each other, and conſequently muſt make it hot. The atmoſphere, which is perpetually receiving that portion of the ethereal matter which iſſues from the earth, counteracts the force of the internal heat, and cools the external ſurface of the earth, and for a conſiderable way down; and hence the earth for 20 or 30 feet down, ſhews none of that heat which is felt at greater depths. See Heat.

Heat, in medicine. Great heats are not ſo much the immediate, as the remote, cauſe of a general ſickneſs, by relaxing the fibres, and diſpoſing the juices to putrefaction; eſpecially among ſoldiers and perſons expoſed the whole day to the ſun: for the greateſt heats are ſeldom found to produce epidemic diſeaſes, till the perſpiration is ſtopped by wet clothes, fogs, dews, damps, &c.; and then ſome bilious or putrid diſtemper is the certain conſequence, as fluxes and ardent intermitting fevers. Nevertheleſs, it muſt be allowed, that heats have ſometimes been ſo great as to prove the more immediate cauſe of particular diſorders; as when centinels have been placed without cover, or frequent reliefs in ſcorching heats; or when troops march or are exerciſed in the heat of the day; or when people imprudently lie down and ſleep in the ſun. All theſe circumſtances are apt to bring on diſtempers, varying according to the ſeaſon of the year. In the beginning of ſummer, theſe errors produce inflammatory fevers; and in autumn, a remitting fever or dyſentery. To prevent, therefore, the effects of immoderate heats, commanders have found it expedient ſo to order the marches, that the men come to their ground before the heat of the day; and to give ſtrict orders, that none of them ſleep out of their tents, which, in fixed encampments, may be covered with boughs to ſhade them from the ſun. It is likewiſe a rule of great importance to have the ſoldiers exerciſed before the cool of the morning is over; for by that means not only the ſultry heats are avoided, but the blood being cooled, and the fibres braced, the body will be better prepared to bear the heat of the day. Laſtly, in very hot weather, it has often been found proper to ſhorten the centinels duty, when obliged to ſtand in the ſun.

HEATH, in botany. See Erica.

Berry-bearing Heath. See Empetrum.

HEATHENS, in matters of religion. See Pagans.

HEAVEN, literally ſignifies the expanſe of the firmament, ſurrounding our earth, and extended every way to an immenſe diſtance.

The Hebrews acknowledged three heavens: the firſt the aërial heaven, in which the birds fly, the winds blow, and the ſhowers are formed; the ſecond, the firmament, in which the ſtars are placed; the third, the heaven of heavens, the reſidence of the Almighty, and the abode of ſaints and angels.

Heaven is conſidered by Chriſtian divines and philoſophers, as a place in ſome remote part of infinite ſpace, in which the omnipreſent Deity is ſaid to afford a nearer and more immediate view of himſelf, and a more ſenſible manifeſtation of his glory, than in the other parts of the univerſe. This is often called the *empyrean*, from that ſplendor with which it is ſuppoſed to be inveſted; and of this place the inſpired writers give us the moſt noble and magnificent deſcriptions.

The Pagans conſidered heaven as the reſidence only of the celeſtial gods, into which no mortals were admitted after death, unleſs they were deified. As for the ſouls of good men, they were conſigned to the elyſian fields. See Elysian-*Fields*.

HEBDOMARY, a ſolemnity of the ancient Greeks, in honour of Apollo, in which the Athenians ſung hymns to his praiſe, and carried in their hands branches of laurel. The word ſignifies the *ſeventh day*, this ſolemnity being obſerved on the ſeventh day of every lunar month.

HEBE, in fabulous hiſtory, the daughter of Juno without a father, was the goddeſs of Youth, and cupbearer to Jupiter; who afterwards diſplaced her, and put Ganymede in her room. When Hercules was made a god, ſhe was married to him, and then ſhe reſtored Iolaus to his former youth. See Iolaus.

HEBER, the ſon of Salah, and father of Peleg, from whom the Hebrews derived their name, according to Joſephus, Euſebius, Jerome, Bede, and moſt of the interpreters of the ſacred writings; but Huet biſhop of Avranches, in his Evangelical Demonſtration, has attempted to prove, that the Hebrews took their name from the word *heber*, which ſignifies *beyond*, becauſe they came from beyond the Euphrates. Heber is ſuppoſed to have been born 2281 years B. C. and to have lived 464 years.

HEBRAISM, an idiom, or manner of ſpeaking, peculiar to the Hebrew language. See the next article.

HEBREW, or Hebrew *Language*, that ſpoken by the ancient Jews, and wherein the old Teſtament is wrote.

This appears to be the moſt ancient of all the languages in the world, at leaſt we know of none older; and ſome learned men are of opinion, that this is the language in which God ſpoke to Adam in Paradiſe.

The books of the Old Teſtament are the only pieces to be found, in all antiquity, written in pure Hebrew; and the language of many of theſe is extremely ſublime: it appears perfectly regular, and particularly ſo in its conjugations. Indeed, properly ſpeaking, it has but one conjugation; but this is varied in each ſeven or eight different ways, which has the effect of ſo many different conjugations, and affords a great variety of expreſſions to repreſent by a ſingle word the different modifications of a verb, and many ideas which in the modern and in many of the ancient and learned languages cannot be expreſſed without a periphraſis.

The primitive words, which are called *roots*, have ſeldom more than three letters or two ſyllables.

In this language there are 22 letters, only five of which are uſually reckoned vowels, which are the ſame with ours, viz. *a, e, i, o, u;* but then each vowel is divided into two, a long and a ſhort, the ſound of the former being ſomewhat grave and long, and that of the latter ſhort and acute: it muſt however be remarked, that the two laſt vowels have ſounds that differ in other reſpects beſides quantity and a greater or leſs elevation. To theſe 10 or 12 vowels may be added others, called *ſemi-vowels*, which ſerve to connect the conſonants, and to make the eaſier tranſitions from one to another. The number of accents in this language are, indeed, prodigious: of theſe there are near 40, the uſe of ſome of which, notwithſtanding all the inquiries of the learned, are not yet perfectly known. We know, in general, that they ſerve to diſtinguiſh the ſentences like the points called *commas*, *ſemicolons*, &c. in our language; to determine the quantity of the ſyllables; and to mark the tone with which they are to be ſpoken or ſung. It is no wonder, then, that there are more accents in the Hebrew than in other languages, ſince they perform the office of three different things, which in other languages are called by different names.

HEBREWS, the deſcendants of Heber, commonly called *Jews*. See Heber and Jews.

Hebrews, or *Epiſtle to the* Hebrews, a canonical book of the New Teſtament.

Though St Paul did not prefix his name to this epiſtle, the concurrent teſtimony of the beſt authors ancient and modern afford ſuch evidence of his being the author of it, that the objections to the contrary are of little or no weight.

The Hebrews, to whom this epiſtle was wrote, were the believing Jews of Paleſtine; and its deſign was to convince them, and by their means all the Jewiſh converts wheresoever diſperſed, of the inſufficiency and aboliſhment of the ceremonial and ritual law.

HEBRIDES, the general name of ſome iſlands lying to the north-weſt of Scotland, of which kingdom they conſtitute a part. They are ſituated between the 55th and 59th degrees of latitude, are ſuppoſed to be about 300 in number, and to contain 48,000 inhabitants. The names of the largeſt are Skie, Mulk, Ilay, and Arran. Of theſe iſlands Mr Pennant hath given the following hiſtory.

Tour in Scotland, ii. 200.

"The leiſure of a calm gave ample time for reflection on the hiſtory and great events of the iſlands now in view, and of the others the objects of the voyage. In juſtice to that able and learned writer, the rev. Dr John Macpherſon, late miniſter of Slate in Skie, let me acknowledge the aſſiſtance I receive from his ingenious eſſay on this very ſubject: for his labours greatly facilitate my attempt; not undertaken without conſulting the authors he refers to; and adding numbers of remarks overſeen by him, and giving a conſiderable continuation of the hiſtory. It would be an oſtentatious taſk to open a new quarry, when ſuch heaps of fine materials lie ready to my hand.

"All the accounts left us by the Greek and Roman writers are inveloped with obſcurity: at all times brief, even in their deſcriptions of places they had eaſieſt acceſs to, and might have deſcribed with the moſt ſatisfactory preciſion; but in remote places, their relations furniſh little more than hints, the food for conjecture to the viſionary antiquary.

"That Pytheas, a traveller mentioned by Strabo, had viſited Great Britain, I would wiſh to make only *apocryphal*. He aſſerts, that he viſited the remoter parts; and that he had alſo ſeen Thule, the land of romance amongſt the ancients: which all might pretend to have ſeen; but every voyager, to ſwell his fame, made the iſland he ſaw laſt, the Ultima Thule of his travels. If Pytheas had reached theſe parts, he might have obſerved, floating in the ſeas, multitudes of gelatinous animals, the *meduſæ* of Linnæus, and out of theſe have formed his fable: he made his Thule a *compoſition of neither earth, ſea, nor air; but like a compoſition of them all:* then, catching his ſimile from what floated before him, compares it to the *lungs* of the ſea, the Ariſtotelian idea of theſe bodies; and from him adopted by naturaliſts, ſucceſſors to that great philoſopher. Strabo very juſtly explodes theſe abſurd tales; yet allows him merit in deſcribing the climate of the places he had ſeen. As a farther proof of his having viſited the Hebrides, he mentions their unfriendly ſky, that prohibits the growth of the finer fruits; and that the natives are obliged to carry their corn under ſhelter, to beat the grain out, leſt it ſhould be ſpoiled by the defect of ſun and violence of the rains. This is the probable part of his narrative; but when the time that the great geographer wrote is conſidered, at a period that theſe iſlands had been neglected for a very long ſpace by the Romans, and when the difficulties of getting among a fierce and unfriendly nation muſt be almoſt inſuperable, doubts innumerable, reſpecting the veracity of this relater, muſt ariſe. All that can be admitted in favour of him is, That he was a great traveller: and that he might have either viſited Britain, from ſome of the nations commercing with our iſle; or received from them accounts, which he afterwards dreſſed out, mixed with the ornaments of fable. A traffic muſt have been carried on with the very northern inhabitants of our iſlands in the time of Pytheas; for one of the articles of commerce mentioned by Strabo, the ivory bits, were made either of the teeth of the walrus, or of a ſpecies of whale native of the northern ſeas.

“ The geographer Mela, who flouriſhed in the reign of Claudius, is the next who takes notice of our leſſer iſlands. He mentions the Orcades as conſiſting of 30; the Æmodæ of ſeven. The Romans had then made a conqueſt of the former, and might have ſeen the latter: but, from the words of the hiſtorian, it is probable that the Shetlands iſlands were thoſe intended; for he informs us, that the “ Æmodæ were carried out over againſt Germany:” the ſite of the Hebrides will not admit this deſcription, which agrees very well with the others; for the ancients extended their Germany, and its imaginary iſlands, to the extreme north.

“ Pliny the elder is the next that mentions theſe remote places. He lived later than the preceding writers, and of courſe his information is fuller: by means of intervening diſcoveries, he has added ten more to the number of the Orcades; is the firſt writer that mentions the Hœbudes, the iſlands in queſtion; and joins in the ſame line the Æmodæ, or, as it is in the beſt editions more properly written, the *Acmodæ*, or extreme point of the Roman expeditions to the north, as the Shetland iſles in the higheſt probability were. Pliny and Mela agree in the number of the Æmodæ, or Acmodæ: the former makes that of the Hœbudes 30; an account extremely near the truth, deducting the little iſles, or rather rocks, that ſurround moſt of the greater, and many of them ſo indiſtinct as ſcarcely to be remarked, except on an actual ſurvey.

“ Solinus ſucceeds Pliny. If he, as is ſuppoſed, was cotemporary with Agricola, he has made very ill uſe of the light he might have received from the expeditions of that great general: his officers might have furniſhed the hiſtorian with better materials than thoſe he has communicated. He has reduced the number of the Hœbudes to five. He tells us, that “ the inhabitants were unacquainted with corn: that they lived “ only on fiſh and milk: that they had one king, as “ the iſlands were only ſeparated from each other by “ narrow ſtraits: that their prince was bound by certain rules of government, to do juſtice; and was “ prevented by poverty from deviating from the true “ courſe, being ſupported by the public, and allowed “ nothing that he could call his own, not even a wife; “ but then he was allowed free choice, by turns one “ out of every diſtrict, of any female that caught his “ his affection; which deprived him of all ambition about a ſucceſſor.

“ By the number of theſe iſlands, and by the minute attention given by the hiſtorian to the circumſtance of their being ſeparated from each other by very narrow ſtraits, I ſhould imagine, that which is now called the *Long iſland*, and includes Lewis, North Uiſt, Benbecula, South Uiſt, and Barra, to have been the five Hœbudes of Solinus; for the other great iſlands, ſuch as Skie, &c. are too remote from each other to form the preceding very characteriſtic deſcription of that chain of iſlands. Theſe might naturally fall under the rule of our petty prince; almoſt the only probable part of Solinus's narrative.

“ After a long interval appears Ptolemy, the Egyptian geographer. He alſo enumerates five Ebudæ; and has given each a name: the weſtern, *Ebuda;* the eaſtern, *Ricina, Maleos, Epidium.* Cambden conjectures them to be the modern Skie, Lewis, Rathry or Racline, Mull, and Ilay: and I will not controvert his opinion.

“ The Roman hiſtorians give very little light into the geography of theſe parts. Tacitus, from whom moſt might have been expected, is quite ſilent about the names of places; notwithſtanding, he informs us, that a fleet by the command of Agricola performed the circumnavigation of Britain. All that he takes notice of is the diſcovery and the conqueſt of the Orkneys: it ſhould ſeem, that with the biographers of an ambitious nation, nothing ſeemed worthy of notice, but what they could dignify with the glory of victory.

“ It is very difficult to aſſign a reaſon for the change of name from *Ebudæ* to *Hebrides:* the laſt is modern; and ſeems, as the annotator on Dr Macpherſon ſuppoſes, to have ariſen from the error of a tranſcriber, who changed the *u* into *ri*.

“ From all that has been collected from the ancients, it appears, that they were acquainted with little more of the Hebrides than the bare names: it is probable, that the Romans, either from contempt of ſuch barren ſpots, from the dangers of ſeas, the violence of the tides, and horrors of the narrow ſounds, in the inexperienced ages of navigation, never attempted their conqueſt, or ſaw more of them than what they had in ſight during the few circumnavigations of Great Britain, which were expeditions more of oſtentation than of utility.

“ The inhabitants had probably for ſome ages their own governors; one little king to each iſland, or to each groupe as neceſſity required. It is reaſonable to ſuppoſe, that their government was as much divided as that of Great Britain, which, it is well known, was under the direction of numbers of petty princes before it was reduced under the power of the Romans.

“ No account is given in hiſtory of the time theſe iſlands were annexed to the government of Scotland. If we may credit our Saxon hiſtorians, they appear to have been early under the dominion of the Picts; for Bede and Adamnanus informs, that ſoon after the arrival of St Columba in their country, Brudeus, a Pictiſh monarch, made the ſaint a preſent of the celebrated iſland of Iona.

“ But neither the holy men of this iſland, nor the natives of the reſt of the Hebrides, enjoyed a permanent repoſe after this event.

“ The firſt invaſion of the Danes does not ſeem to be eaſily aſcertained. It appears that they ravaged Ireland, and the iſle of Rathry, as early as the year 735. In the following century, their expeditions became more frequent: Harold Harfager, or the *light-haired*, purſued, in 875, ſeveral petty princes, whom he had expelled out of Norway; who had taken refuge in the Hebrides, and moleſted his dominions by perpetual deſcents from thoſe iſlands. He ſeems to have made a rapid conqueſt: he gained as many victories as he fought battles; he put to death the chief of the pirates, and made an indiſcriminate ſlaughter of their followers. Soon after his return, the iſlanders repoſſeſſed their ancient ſeats: and, in order to repreſs their inſults, he ſent Ketil the *flat-noſed*, with a fleet and ſome forces for that purpoſe. He ſoon reduced them to terms, but made his victories ſubſervient to his own ambition: he made alliances with the reguli he had ſubdued; he formed intermarriages, and confirmed to them their old dominions. This effected, he ſent back the fleet to Harold; openly declared himſelf independent; made himſelf prince of the Hebrides; and cauſed them to acknowledge him as ſuch, by the payment of tribute and the badges of vaſſalage. Ketil remained, during life, maſter of the iſlands; and his ſubjects appear to have been a warlike ſet of freebooters, ready to join with any adventurers. Thus when Eric, ſon of Harold Harfager, after being driven out of his own country, made an invaſion of England, he put with his fleet into the Hebrides, received a large reinforcement of people fired with the hopes of prey, and then proceeded on his plan of rapine. After the death of Ketil, a kingdom was in after-times compoſed out of them, which, from the reſidence of the little monarch in the iſle of Man, was ſtyled that of *Man*. The iſlands became tributary to that of Norway for a conſiderable time, and princes were ſent from thence to govern; but at length they again ſhook off the yoke. Whether the little potentates ruled independent, or whether they put themſelves under the protection of the Scottiſh monarchs, does not clearly appear; but it is reaſonable to ſuppoſe the laſt, as Donald-bane is accuſed of making the Hebrides the price of the aſſiſtance given him by the Norwegians againſt his own ſubjects. Notwithſtanding they might occaſionally ſeek the protection of Scotland, yet they never were without princes of their own: policy alone directed them to the former. From the chronicles of the kings of Man we learn, that they had a ſucceſſion of princes.

“In 1089 is an evident proof of the independency of the iſlanders on Norway; for, on the death of Lagman, one of their monarchs, they ſent a deputation to O'Brian king of Ireland, to requeſt a regent of royal blood to govern them during the minority of their young prince. They probably might in turn compliment in ſome other reſpects their Scottiſh neighbours: the iſlanders muſt have given them ſome pretence to ſovereignty; for,

“In 1093, Donald-bane, king of Scotland, calls in the aſſiſtance of Magnus the Barefooted, king of Norway, and bribes him with the promiſe of all the iſlands. Magnus accepts the terms; but at the ſame time boaſts, that he does not come to invade the territories of others, but only to reſume the ancient rights of Norway. His conqueſts are rapid and complete; for, beſides the iſlands, by an ingenious fraud he adds Cantyre to his dominions.

“The Hebrides continued governed by a prince dependent on Norway, a ſpecies of viceroy appointed by that court; and who paid, on aſſuming the dignity, ten marks of gold, and never made any other pecuniary acknowledgment during life: but if another viceroy was appointed, the ſame ſum was exacted from him. Theſe viceroys were ſometimes Norwegians, ſometimes natives of the iſles. In 1097 we find, that Magnus deputes a nobleman of the name of Ingemund: in after-times we learn, that natives were appointed to that high office. Thus were the Hebrides governed, from the conqueſt by Magnus, till the year 1263, when Acho, or Haquin, king of Norway, by an unfortunate invaſion of Scotland, terminating in his defeat at Largs, ſo weakened the powers of his kingdom, that his ſucceſſor Magnus IV. was content to make a ceſſion of the iſlands to Alexander III.; but not without ſtipulating for the payment of a large ſum, and of a tribute of a hundred merks for ever, which bore the name of the *annual of Norway*. Ample proviſion was alſo made by Magnus in the ſame treaty, for the ſecurity of the rights and properties of his Norwegian ſubjects, who choſe to continue in the iſles; where many of their poſterity remain to this day.

“Notwithſtanding this revolution, Scotland ſeems to have received no real acquiſition of ſtrength. The iſlands ſtill remained governed by powerful chieftains, the deſcendents of Somerled, thane of Heregaidel, or Argyle, who, marrying the daughter of Olave, king of Man, left a divided dominion to his ſons Dugal and Reginald: from the firſt were deſcended the Macdougals of Lorn; from the laſt, the powerful clan of the Macdonalds. The lordſhip of Argyle, with Mull, and the iſlands north of it, fell to the ſhare of the firſt; Ilay, Cantyre, and the ſouthern iſles, were the portion of the laſt: a diviſion that formed the diſtinction of the Sudereys and Nordereys, [as farther noticed in the article Iona.]

“Theſe chieftains were the ſcourges of the kingdom: they are known in hiſtory but as the devaſtations of a tempeſt; for their paths were marked with the moſt barbarous deſolation. Encouraged by their diſtance from the ſeat of royalty, and the turbulence of the times, which gave their monarchs full employ, they exerciſed a regal power, and often aſſumed the title; but are more generally known in hiſtory by the ſtyle of the *lord of the iſles*, or the earls of Roſs; and ſometimes by that of the *Great Macdonald*.

“Hiſtorians are ſilent about their proceedings, from the retreat of the Danes, in 1263, till that of 1335, when John, lord of the iſles, withdrew his allegiance. In the beginning of the next century his ſucceſſors were ſo independant, that Henry IV. entered into a formal alliance with the brothers Donald and John. This encouraged them to commit freſh hoſtilities againſt their natural prince. Donald, under pretence of a claim to the earldom of Roſs, invaded and made a conqueſt of that county; but penetrating as far as the ſhire of Aberdeen, after a fierce but undeciſive battle with the royal party, thought proper to retire, and in a little time to ſwear allegiance to his monarch James I. But he was permitted to retain the county of Roſs, and aſſume the title of earl. His ſucceſſor, Alexander, at the head of 10,000 men, attacked and burnt Inverneſs; at length, terrified with the preparations made againſt him, he fell at the royal feet, and obtained pardon as to life, but was committed to ſtrict confinement.

“His kinſman and deputy, Donald Balloch, reſenting the impriſonment of his chieftain, excited another rebellion, and deſtroyed the country with fire and ſword: but on his flight was taken and put to death by an Iriſh chieftain, with whom he ſought protection.

“Theſe barbarous inroads were very frequent with a ſet of banditti, who had no other motive in war but the infamous inducement of plunder.

“In the reign of James II. in the year 1461, Donald, another petty tyrant, an earl of Roſs, and lord of the iſles, renewed the pretence of independency; fur-ſurpriſed the caſtle of Inverneſs; forced his way as far as Athol; and obliged the earl and counteſs, with the principal inhabitants, to ſeek refuge in the church of St Bridget, in hopes of finding ſecurity from his cruelty by the ſanctity of the place: but the barbarian and his followers ſet fire to the church, put the eccleſiaſtics to the ſword, and, with a great booty, carried the earl and counteſs priſoners to his caſtle of Claig, in the iſland of Ilay. In a ſecond expedition, immediately following the firſt, he ſuffered the penalty of his impiety: a tempeſt overtook him, and overwhelmed moſt of his aſſociates; and he, eſcaping to Inverneſs, periſhed by the hands of an Iriſh harper: his ſurviving followers returned to Ilay, conveyed the earl and counteſs of Athol to the ſanctuary they had violated, and expiated their crime by reſtoring the plunder, and making large donations to the ſhrine of the offended ſaint.

"John, ſucceſſor to the laſt earl of Roſs, entered into alliance with Edward IV. and ſent ambaſſadors to the court of England, where Edward empowered the biſhop of Durham and earl of Wincheſter to conclude a treaty with him, another Donald Balloch, and his ſon and heir John. They agreed to ſerve the king with all their power, and to become his ſubjects: the earl was to have a hundred marks ſterling for life in time of peace, and two hundred pounds in time of war; and theſe iſland allies, in caſe of the conqueſt of Scotland, were to have confirmed to them all the poſſeſſions benorth of the Scottiſh ſea; and in caſe of a truce with the Scottiſh monarch, they were to be included in it. But about the year 1476, Edward, from a change of politics, courted the alliance of James III. and dropt his new allies. James, determined to ſubdue this rebellious race, ſent againſt them a powerful army, under the earl of Athol; and took leave of him with this good wiſh, *Furth, Fortune, and fill the fetters;* as much as to ſay, "Go forth, be fortunate, and bring home many captives:" which the family of Athol have uſed ever ſince for its motto. Roſs was terrified into ſubmiſſion; obtained his pardon; but was deprived of his earldom, which by act of parliament was then declared unalienably annexed to the crown: at the ſame time the king reſtored to him Knapdale and Cantyre, which the earl had reſigned; and inveſted him anew with the lordſhip of the iſles, to hold them of the king by ſervice and relief.

"Thus the great power of the iſles was broken: yet for a conſiderable time after, the petty chieftains were continually breaking out into ſmall rebellions, or harraſſed each other in private wars; and tyranny ſeems but to have been multiplied. James V. found it neceſſary to make the voyage of the iſles in perſon, in 1536; ſeized and brought away with him ſeveral of the moſt conſiderable leaders; and obliged them to find ſecurity for their own good behaviour, and that of their vaſſals. The names of theſe chieftains were (according to Lindeſay), *Mydyart, Mac-connel, Mac-loyd* of the Lewis, *Mac-niel, Mac-lane, Mac-intoſh, John Mudyart, Mac-kay, Mac-kenzie,* and many others: but by the names of ſome of the above, there ſeem to have been continental as well as inſular malecontents. He examined the titles of their holdings; and finding ſeveral to have been uſurped, re-united their lands to the crown. In the ſame voyage he had the glory of cauſing a ſurvey to be taken of the coaſts of Scotland, and of the iſlands, by his pilot Alexander Lindeſay; which were publiſhed in 1583, at Paris, by Nicholas de Nicholay, geographer to the French monarch.

"The troubles that ſucceeded the death of James occaſioned a neglect of theſe inſulated parts of the Scottiſh dominions, and left them in a ſtate of anarchy. In 1614, the Mac-donalds made a formidable inſurrection, oppugning the royal grant of Cantyre to the earl of Argyle and his relations. The petty chieftains continued in a ſort of rebellion; and the ſword of the greater, as uſual in weak government, was employed againſt them: the encouragement and protection given by them to pirates, employed the power of the Campbells during the reign of James VI. and the beginning of that of Charles I. (A).

"But the turbulent ſpirit of the old times continued even to the preſent age. The heads of Clans were by the diviſions, and a falſe policy that predominated in Scotland during the reign of William III. flattered with an unreal importance: inſtead of being treated as bad ſubjects, they were courted as deſirable allies: inſtead of feeling the hand of power, money was allowed to bribe them into the loyalty of the times. They would have accepted the ſubſidies, notwithſtanding they deteſted the prince that offered them. They were taught to believe themſelves of ſuch conſequence, that in theſe days turned to their deſtruction. Two recent rebellions gave legiſlature a late experience of the folly of permitting the feudal ſyſtem to exiſt in any part of its dominions. The act of 1748, for aboliſhing heretable juriſdictions, at once deprived the chieſtains of all power of injuring the public by their commotions. Many of theſe *Reguli* ſecond this effort of legiſlature, and neglect no opportunity of rendering themſelves hateful to their unhappy vaſſals, the former inſtruments of their ambition."

Smollet's Mod. Hiſt. i. 430, &c.

"The ſituation of theſe iſlands in the great Atlantic ocean renders the air cold and moiſt in the greater part of them. In the moſt northerly iſles the ſun, at the ſummer ſolſtice, is not above an hour under the horizon at midnight, and not longer above it at midday in the depth of winter. The ſoil of the Hebrides varies alſo in different iſles, and in different parts of the ſame iſland: ſome are mountainous and barren, producing little elſe than heath, wild myrtle, fern, and a little graſs; while others, being cultivated and manured with ſea-weed, yield plentiful crops of oats and barley.

"Lead mines have been diſcovered in ſome of theſe iſlands, but not worked to much advantage; the people being unſkilful, and fuel extremely ſcarce: others have been found to contain quarries of marble, limeſtone, and free-ſtone; nor are they deſtitute of iron, talc, cryſtals, and many curious pebbles, ſome of which emulate the Braſilian topaz.

"With reſpect to vegetables, over and above the plentiful harveſts of corn that the natives earn from agri-

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(A) In the beginning of the laſt century the Iſlanders were continually harraſſing Ireland with their plundering invaſions, or landing there to ſupport rebellions: at length it was made treaſon to receive theſe Hebridian Redſhanks, as they were ſtyled.

agriculture, and the pot-herbs and roots that are planted in gardens for the ſuſtenance of the people, theſe iſlands produce ſpontaneouſly a variety of plants and ſimples, uſed by the iſlanders in the cure of their diſeaſes; but there is hardly a ſhrub or tree to be ſeen, except in a very few ſpots, where ſome gentlemen have endeavoured to rear them with much more trouble than ſucceſs.

“ The animals, both of the land and ſea, domeſtic and wild, quadrupeds, fowls, and fiſhes, found in and about theſe iſlands, are of the ſame ſpecies, ſize, and configuration, with thoſe of the ORKNEYS.

“ The people inhabiting theſe iſlands are of the ſame race with thoſe who live in the Highlands of Scotland; ſpeak the ſame language, wear the ſame habit, and obſerve the ſame cuſtoms. [See the article HIGHLANDS.]

“ The commodities which may be deemed the ſtaples of this country, are black cattle, ſheep, and fiſh, which they ſell to their fellow-ſubjects of Scotland. Part of the wool they work up into knit-ſtockings, coarſe cloth, and that variegated ſtuff called *tartan*. They likewiſe ſalt mutton in the hide, and export it in boats, or barklings, to different parts of the main land. Cod, ling, mackerel, whiting, haddock, and ſoles, are here caught in abundance, together with a ſmall red cod, remarkably voracious, of a very delicate flavour: there are likewiſe two kinds of white fiſh, which ſeem to be peculiar to this coaſt, known by the names of *lithe* and *cea*, eſteemed good eating: but the greateſt treaſure the ocean pours forth, is the prodigious quantity of herrings, which, at one ſeaſon of the year, ſwarm in all the creeks and bays along the weſtern ſhore of Scotland. Theſe are counted the largeſt, fatteſt, and fineſt herrings caught in any part of the northern ſeas. This fiſhery employs a great number of hands, and brings a conſiderable advantage to the kingdom. The fiſh are caught, cured, barrelled up, and exported: but whether from want of ſkill, or a proper ſalt for pickling, the Scotch-cured herrings of this coaſt, though ſuperior to all others in their natural ſtate, are counted inferior to thoſe which are dreſſed and pickled by the Dutch fiſhermen.

“ How mean and contracted ſoever the commerce and produce of theſe iſlands may be at preſent, they are, perhaps, more capable of improvement, in both articles, than any part of the Britiſh dominions in Europe. The inhabitants are ſo little ſkilled in huſbandry, that the ſoil, though generally good in the low grounds, yields nothing but ſcanty crops of oats and barley; and great tracts of land lie altogether uncultivated. If a very ſmall number of judicious farmers would ſettle in ſome of the moſt conſiderable iſlands, they would ſoon raiſe ſuch harveſts as would enrich themſelves; employ and maintain all the idle people, a great number of whom are obliged to repair to foreign countries for ſubſiſtence; afford ſufficient bread for the inhabitants, and even ſupply the barren parts of the oppoſite continent. The ſoil, in many places, would produce wheat, and in almoſt every where would give good paſturage, inſomuch that, with proper culture, the people might provide hay and fodder for their cattle, which, during the ſeverity of the winter, die in great numbers for want of proviſion. Improvements of this kind would be the more eaſily made, as the ſea-ſhore abounds with ſhells for lime, and ſea-weeds for manure; and the labourers would be eaſily ſubſiſted by the fiſh that ſwarm, not only in the ocean which ſurrounds theſe iſlands, but likewiſe in the numerous lakes and rivers of freſh water. Martin declares, that he knew 100 families in this country maintained by as many little farms, the rent of each not exceeding 5 s. one ſheep, and a few pecks of oats.

“ The commerce of theſe iſlands might be extended in ſuch a manner as to render them a ſtaple of trade, and an excellent nurſery for ſeamen. They are furniſhed with an infinite number of bays, creeks, and harbours, for the convenience of navigation: the inhabitants are numerous, ſtrong, active, and every way qualified for the life of a mariner. The ſea affords myriads of fiſh for exportation: the lands might afford plenty of paſturage for black cattle, horſes, and ſheep, as well as plenteous harveſts of corn, and other grain: woollen and linen manufactures might be proſecuted to great advantage, where labour is cheap and proviſions are reaſonable. The iſlands afford good ſtone and lime; and ſome parts of the oppoſite main land, timber for building: they have plenty of fuel, not only for the ordinary purpoſes of life, but alſo for ſalt-pans, which might be erected on different parts of the coaſt; and for burning ſea-ware for the uſe of a glaſs or ſoap manufacture. Finally, the ſituation of theſe iſlands is ſo commodious for trade, that the navigator is immediately in the open ſea, and almoſt in the neighbourhood of Denmark, Sweden, Hamburgh, Holland; nay, with a favourable wind, he can reach the coaſts of France and Spain in a week's ſailing; if he is bound for the Britiſh plantations, or indeed for any part of the known globe, he is at once diſencumbered of the land, and proſecutes his voyage thro' the open ſea without obſtruction or difficulty.”

New HEBRIDES, a cluſter of iſlands lying in the Great South Sea, or Pacific Ocean. The northen iſlands of this archipelago were firſt diſcovered by that great navigator Quiros in 1606, and, not without reaſon, conſidered as a part of the ſouthern continent, which at that time, and till very lately, was ſuppoſed to exiſt. They were next viſited by M. de Bougainville in 1768, who, beſides landing on the iſland of Lepers, did no more than diſcover that the land was not connected, but compoſed of iſlands, which he called the *Great Cyclades*. Captain Cook, beſides aſcertaining the extent and ſituation of theſe iſlands, added the knowledge of ſeveral in this group which were before unknown: he explored the whole cluſter; and thinking himſelf thereby entitled to affix to them a general appellation, he named them the *New Hebrides*. They are ſituated between latitudes of 14 deg. 25 min. and 20 deg. 4 min. ſouth; and between 166 deg. 41 min. and 170 deg. 21 min. eaſt longitude; and extend one hundred and twenty-five leagues in the direction of north-north-weſt, and ſouth-ſouth-eaſt. The moſt northern part of this archipelago was called by M. de Bougainville the *Peak of the Etoile*. The whole cluſter conſiſts of the following iſlands; ſome of which have received names from the different European navigators; others retain the names which they bear among the natives, viz. Tierra del Eſperitu Santo, Mallicollo, St Bartholomew, Iſle of Lepers, Aurora, Whitſuntide, Ambrym, Immer, Apee, Three Hills, Sandwich, Montagu, Hinchinbrook, Shepherd, Eorramanga, Irronan, Annatom, and Tanna.

HEBRON (anc. geog.), a very ancient city ſituated in the hilly country of the tribe of Judah to the ſouth. Its more ancient name was *Kiriath Arba*, or *Cariath Arba*. In antiquity this city vied with the moſt ancient cities of Egypt, being ſeven years priors to Zoan, tranſlated *Tanis* by the ſeventy. Joſephus makes it not only older than Tanis, but even than Memphis. It ſtood to the weſt of the lake Aſphaltites, and was for ſome time the royal reſidence of David. After the captivity, it fell into the hands of the Edomites, as did all the ſouth country of Judæa.

HECATE, in Pagan worſhip, a goddeſs called *Luna* in heaven, *Diana* on earth, and *Hecate* in the infernal regions. But others repreſent her as a diſtinct deity. She was the goddeſs of the infernal regions, and of inevitable fate. She preſided over ſtreets and highways, for which reaſon ſhe was called *Trivia*; and and the doors of houſes being under her protection, ſhe was called *Propylea*. She was alſo famous for her ſkill in poiſonous roots and herbs, inchantments, and magical arts, in the practice of which her name was conſtantly invoked.

HECATOMB, Hecatombe, in antiquity, a ſacrifice of 100 beaſts of the ſame kind, at 100 altars, and by 100 prieſts or ſacrificers.—The work is formed of the Greek εκατομβη which properly ſignifies a ſumptuous or magnificent ſacrifice.—Others derive it from the Greek εκατον, *eentum*, "a hundred, and ϐȣς, *bos*, "bullock," &c.; on which footing the hecatomb ſhould be a ſacrifice of 100 bullocks.—Others derive the word from εκατον, and ϖȣς, *pes*, "foot;" and on that principle hold, that the hecatomb might conſiſt of only 25 four-footed beaſts. They add, that it did not matter what kind of beaſts were choſe for victims, provided the quota of feet were but had.

Pythagoras is ſaid to have ſacrificed a hecatomb to the muſes, of 100 oxen, in joy and gratitude for his diſcovering the demonſtration of the 47th propoſition of the firſt book of Euclid, viz. that, in a rectangled triangle, the ſquare of the hypothenuſe is equal to the ſquares of the two other ſides.

For the origin of hecatombs: Strabo relates, that there were 100 cities in Laconia, and that each city uſed to ſacrifice a bullock every year for the common ſafety of the country; whence the inſtitution of the celebrated ſacrifice of 100 victims, called *hecatombs*. Others refer the origin of hecatombs to a plague, wherewith the 100 cities of Peloponneſus were afflicted; for the removal whereof, they jointly contributed to ſo ſplendid a ſacrifice.

Julius Capitolinus relates, that for a hecatomb they erected 100 altars of turf, and on theſe ſacrificed 100 ſheep, and 100 hogs. He adds, that when the emperors offered ſacrifices of this kind, they ſacrificed 100 lions, 100 eagles, and 100 other beaſts of the like kind.

HECATOMPOLIS, (anc. geog.), a ſurname of the iſland of Crete, from its 100 cities. The territory of Laconia alſo had anciently this name, for the ſame reaſon; and the cuſtom of theſe 100 cities was to ſacrifice a hecatomb annually.

HECATOMPYLOS, (anc. geog.) the metropolis of Parthia, and royal reſidence of Arſaces, ſituated at the ſprings of the Araxes. Thebes, in Egypt, had alſo the ſame name, from its 100 gates.

HECK, an engine to take fiſh. A ſalmon heck is a grate for catching that ſort of fiſh.

HECTIC fever. See (the *Index* ſubjoined to) Medicine.

HECTOR, the ſon of Priam and Hecuba, and the father of Aſtyanax, is celebrated for the valour with which he defended the city of Troy againſt the Greeks. He was killed by Achilles, who dragged his body, faſtened to his chariot, thrice round the walls of Troy, and afterwards reſtored it to Priam for a large ranſom. See Troy.

HEDERA, Ivy, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants.

Species. 1. The helix, or common ivy, grows naturally in many parts of Britain; and, where it meets with any ſupport, will riſe to a great height, ſending out roots on every ſide, which ſtrike into the joints of walls or the bark of trees. If there is no ſupport, they trail on the ground, and take root all their length, ſo that they cloſely cover the ſurface, and are difficult to eradicate. While theſe ſtalks are fixed to any ſupport, or trail upon the ground, they are ſlender and flexible; but when they have reached to the top of their ſupport, they ſhorten and become woody, forming themſelves into large buſhy heads, and their leaves are larger, more of an oval ſhape, and not divided into lobes like the lower leaves, ſo that it hath a quite different appearance. There are two varieties of this ſpecies, one with ſilver-ſtriped leaves, the other with yellowiſh leaves on the top of the branches; and theſe are ſometimes admitted into gardens. 2. The quinquefolia, or Virginia creeper, is a native of all the northern parts of America. It was firſt brought to Europe from Canada; and has been long cultivated in the Britiſh gardens, chiefly to plant againſt walls or buildings to cover them: which theſe plants will do in a ſhort time; for they will ſhoot almoſt 20 feet in one year, and will mount up to the top of the higheſt building: but as the leaves fall off in autumn, the plants make but an indifferent appearance in winter, and therefore are proper only for ſuch ſituations as will not admit of better plants; for this will thrive in the midſt of cities, and is not injured by ſmoke or the cloſeneſs of the air.

Culture. The firſt ſpecies is eaſily propagated by its trailing branches, and will thrive in almoſt any ſoil or ſituation. The ſecond may be propagated by cuttings; which if planted in autumn in a ſhady border will take root, and by the following autumn will be fit to plant in thoſe places where they are deſigned to remain.

Uſes. The roots of the ivy are uſed by leather-cutters to whet their knives upon. Apricots and peaches covered with ivy during the month of February, have been obſerved to bear fruit plentifully. The leaves have a nauſeous taſte; Haller ſays, they are given to children in Germany as a ſpecific for the atrophy. The common people of England apply them to iſſues; and an ointment made from them is in great eſteem among the Highlanders of Scotland as a ready cure for burns. The berries have a little acidity. When fully ripe, a doſe of them has been recommended in the plague. In warm climates, a reſinous juice exſudes from the ſtalks, which is ſaid to be a powerful reſolvent and diſcutient, and an excellent ingredient in plaſters and ointments adopted for thoſe purpoſes. Horſes and ſheep eat the plant; goats and cows refuſe it.—Caſpar Bauhine and Tournefort mention a ſort of ivy that grows in many of the iſlands of the Archipelago, to which they have given the name of the *poet's ivy*, becauſe the ancients are ſaid to have made crowns of this plant for adorning the brows of their poets. By others it is called *hedera dionyſias*, becauſe they made uſe of the ſame ſort of ivy in their public rejoicings and feaſts in honour of Bacchus. The berries are of a fine gold colour, whence this ſpecies has been termed by others *chryſocarpos*.

HEDERACEÆ, (from *hedera* "ivy.") The name of the 46th order in Linnæus's fragments of a natural method, conſiſting of ivy, and a few other genera which from their general habit and appearance ſeem nearly allied to it. See BOTANY, p. 1315.

HEDGES, in agriculture, are either planted to make fences round incloſures, or to divide the ſeveral parts of a garden. When they are deſigned as outward fences, they are planted either with hawthorn, crabs, or black-thorn; but thoſe hedges which are planted in gardens, either to ſurround wilderneſs-quarters, or to ſcreen the other parts of a garden from ſight, are planted according to the fancy of the owner; ſome preferring ever-greens, in which caſe the holly is beſt; next the yew, then the laurel, lauruſtinus, phillyrea, &c. Others prefer the beech, the hornbeam, and the elm.

Before planting, it is proper to conſider the nature of the land, and what ſort of plants will thrive beſt in it; and alſo, what is the ſoil from whence the plants are to be taken. As for the ſize, the ſets ought to be about the thickneſs of one's little finger, and cut within about four or five inches of the ground; they ought to be freſh taken up, ſtraight, ſmooth, and well rooted. Thoſe plants that are raiſed in the nurſery, are to be preferred.

In planting outſide hedges, the turf is to be laid, with the graſs-ſide downwards, on that ſide of the ditch the bank is deſigned to be made; and ſome of the beſt mould ſhould be laid upon it to bed the quick, which is to be ſet upon it a foot aſunder. When the firſt row of quick is ſet, it muſt be covered with mould; and when the bank is a foot high, you may lay another row of ſets againſt the ſpaces of the former, and cover them as you did the others: the bank is then to be topped with the bottom of the ditch, and a dry or dead-hedge laid, to ſhade and defend the underplantation. Stakes ſhould then be driven into the looſe earth, ſo low as to reach the firm ground: theſe are to be placed at about two feet and a half diſtance: and in order to render the hedge yet ſtronger, you may edder it, that is, bind the top of the ſtakes with ſmall long poles, and when the eddering is finiſhed, drive the ſtakes anew.

The quick muſt be kept conſtantly weeded, and ſecured from being cropped by cattle; and in February it will be proper to cut it within an inch of the ground, which will cauſe it ſtrike root afreſh, and help it much in the growth.

The crab is frequently planted for hedges; and if the plants are raiſed from the kernels of the ſmall wild crabs, they are much to be preferred to thoſe raiſed from the kernels of all ſorts of apples without diſtinction; becauſe the plants of the true ſmall crab never ſhoot ſo ſtrong as thoſe of the apples, and may therefore be better kept within the proper compaſs of an hedge.

The black-thorn, or ſloe, is frequently planted for hedges: and the beſt method of doing it, is to raiſe the plants from the ſtones of the fruit, which ſhould be ſown about the middle of January, if the weather will permit, in the place where the hedge is intended; but when they are kept longer out of the ground, it will be proper to mix them with ſand, and keep them in a cool place. The ſame fence will do for it when ſown, as when it is planted.

The holly is ſometimes planted for hedges; but where it is expoſed, there will be great difficulty in preventing its being deſtroyed: otherwiſe, it is by far the moſt beautiful plant; and, being an ever-green, will afford much better ſhelter for cattle in winter than any other ſort of hedge. The beſt method of raiſing theſe hedges, is to ſow the ſtones in the place where the hedge is intended; and, where this can be conveniently done, the plants will make a much better progreſs than thoſe that are tranſplanted: but theſe berries ſhould be buried in the ground ſeveral months before they are ſown. The way to do this, is to gather the berries about Chriſtmas, when they are uſually ripe, and put them into large flower-pots, mixing ſome ſand with them; then dig holes in the ground, into which the pots muſt be ſunk, covering them over with earth, about ten inches thick. In this place they muſt remain till the following October, when they ſhould be taken up, and ſown in the place where the hedge is intended to be made. The ground ſhould be well trenched, and cleared from the roots of all bad weeds, buſhes, trees, &c. Then two drills ſhould be made, at about a foot diſtance from each other, and about two inches deep, into which the ſeeds ſhould be ſcattered pretty cloſe, leſt ſome ſhould fail. When the plants grow up, they muſt be carefully weeded: and if they are deſigned to be kept very neat, they ſhould be cut twice a year, that is in May and in Auguſt; but if they are only deſigned for fences, they need only be ſheered in July. The fences for theſe hedges, while young, ſhould admit as much free air as poſſible: the beſt ſort are thoſe made with poſts and rails, or with ropes drawn through holes made in the poſts; and if the ropes are painted over with a compoſition of melted pitch, brown Spaniſh colour and oil, well mixed, they will laſt ſeveral years.

Hedges for ornament in gardens are ſometimes planted with ever-greens, in which caſe the holly is preferable to any other: next to this, moſt people prefer the yew; but the dead colour of its leaves renders thoſe hedges leſs agreeable. The laurel is one of the moſt beautiful ever-greens; but the ſhoots are ſo luxuriant that it is difficult to keep it in any tolerable ſhape; and as the leaves are large, to prevent the diſagreeable appearance given them by their being cut through with the ſheers, it will be the beſt way to prune them with a knife, cutting the ſhoots juſt down to a leaf. The lauruſtinus is a very fine plant for this purpoſe; but the ſame objection may be made to this as to the laurel: this, therefore, ought only to be pruned with a knife in April, when the flowers are going off; but the new ſhoots of the ſame ſpring muſt by no means be ſhortened. The ſmall-leaved and rough-leaved lauruſtinus are the beſt plants for this purpoſe. The true phillyrea is the next beſt plant for hedges, which may be led up to the height of 10 or 12 feet; and if they are kept narrow at the top, that there may be not too much width for the ſnow to lodge upon them, they will be cloſe and thick, and make a fine appearance. The ilex, or ever-green oak, is alſo planted for hedges, and is a fit plant for thoſe deſigned to grow very tall.—The deciduous plants uſually planted to form hedges in gardens are, The hornbeam, which may be kept neat with leſs trouble than moſt other plants. The beech, which has the ſame good qualities as the hornbeam; but the gradual falling of its leaves in winter cauſes a continual litter. The ſmall-leaved Engliſh elm is a proper tree for tall hedges, but theſe ſhould not be planted cloſer than eight or ten feet. The lime-tree has alſo been recommended for the ſame purpoſe; but after they have ſtood ſome years, they grow very thin at bottom, and their leaves frequently turn of a black diſagreeable colour.

Many of the flowering ſhrubs have alſo been planted in hedges, ſuch as roſes, honeyſuckles, ſweet-briar, &c. but theſe are difficult to train; and if they are cut to bring them within compaſs, their flowers, which are their greateſt beauty, will be entirely deſtroyed.

Mr Anderſon who hath treated the ſubject of hedging very particularly, is of opinion, that ſome other plants beſides thoſe abovementioned, might be uſefully employed in the conſtruction of hedges. Among theſe he reckons the common willow. This, he ſays, by no means requires the wetneſs of ſoil which is commonly ſuppoſed. "It is generally imagined, (ſays he,) that the willow can be made to thrive no where except in wet or boggy ground: but this is one of thoſe vulgar errors, founded upon inaccurate obſervation, too often to be met with in ſubjects relating to rural affairs; for, experience has ſufficiently convinced me, that this plant will not only grow, but thrive, in any rich well-cultivated ſoil, (unleſs in particular circumſtances that need not here be mentioned), even altho' it be of a very dry nature. It could not, however, in general, be made to thrive, if planted in the ſame manner as thorns; nor would it, in any reſpect, be proper to train it up for a fence in the ſame way as that plant. The willow, as a fence, could ſeldom be ſucceſsfully employed, but for dividing into ſeparate incloſures any extenſive field of rich ground: and, as it is always neceſſary to put the ſoil into as good order as poſſible before a hedge of this kind is planted in it, the eaſieſt method of putting it into the neceſſary high tilth, will be to mark off the boundaries of your ſeveral fields in the winter, or early in the ſpring, with a deſign to give a complete fallow to a narrow ridge, ſix or eight feet broad, in the middle of which the hedge is intended to be planted the enſuing winter. This ridge ought to be frequently ploughed during the ſummer-ſeaſon, and in autumn to be well manured with dung, or lime, or both, (for it cannot be made too rich) and be neatly formed into a ridge before winter.

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ulture,
, &c.

"Having prepared the ground in this manner, it will be in readineſs to receive the hedge, which ought to be planted as early in winter as can be got conveniently done; as the willow is much hurt by being planted late in the ſpring. But before you begin to make a fence of this kind, it will be neceſſary to provide a ſufficient number of plants: which will be beſt done by previouſly rearing them in a nurſery of your own, as near the field to be incloſed as you can conveniently have it; for, as they are very bulky, the carriage of them would be troubleſome if they were brought from any conſiderable diſtance. The beſt kinds of willow for this uſe, are ſuch as make the longeſt and ſtrongeſt ſhoots, and are not of a brittle nature. All the large kinds of hoop-willows may be employed for this uſe; but there is another kind with ſtronger and more taper ſhoots, covered with a dark green bark when young, which, upon the older ſhoots, becomes of an aſh-gray, of a firm texture, and a little rough to the touch. The leaves are not ſo long, and a great deal broader than thoſe of the common hoop-willow, pretty thick, and of a dark-green colour. What name this ſpecies is uſually known by, I cannot tell; but, as it becomes very quickly of a large ſize at the root, and is ſtrong and firm, it ought to be made choice of for this purpoſe in preference to all other kinds that I have ſeen. The ſhoots ought to be of two or three years growth before they can be properly uſed, and ſhould never be leſs than eight or nine feet in length. Theſe ought to be cut over cloſe by the ground immediately before planting, and carried to the field at their whole length. The planter having ſtretched a line along the middle of the ridge which was prepared for their reception, begins at one end thereof, thruſting a row of theſe plants firmly into the ground, cloſe by the ſide of the line, at the diſtance of 18 or 20 inches from one another; making them all ſlant a little to one ſide in a direction parallel to the line. This being finiſhed, let him begin at the oppoſite end of the line, and plant another row in the intervals between the plants of the former row; making theſe incline as much as the others, but in a direction exactly contrary; and then, plaiting theſe baſket-ways, work them into lozenges like a net, faſtening the tops by plaiting the ſmall twigs with one another, which with very little trouble may be made to bind together very firmly. The whole, when finiſhed, aſſumes a very beautiful net-like appearance, and is even at firſt a tolerable good defence: and, as theſe plants immediately take root and quickly increaſe in ſize, it becomes, after a few years, a very ſtrong fence which nothing can penetrate. This kind of hedge I myſelf have employed; and find that a man may plant and twiſt properly about a hundred yards in a day, if the plants be laid down to his hand: and, in a ſituation ſuch as I have deſcribed, I know no kind of fence which could be reared at ſuch a ſmall expence, ſo quickly become a defence, and continue ſo long in good order. But it will be greatly improved by putting a plant of eglantine between each two plants of willow, which will quickly climb up and be ſupported by them; and, by its numerous prickles would effectually preſerve the defenceleſs willow from being browſed upon by cattle.

"As it will be neceſſary to keep the narrow ridge, upon which the hedge is planted in culture for one year at leaſt, that the plants of eglantine may not be choked by weeds, and that the roots of the willow may be allowed to ſpread with the greater eaſe in the tender mold produced by this means, it will be proper to ſtir the earth once or twice by a gentle horſe-hoe in the beginning of ſummer; and, in the month of June, it may be ſowed with turnips, or planted with coleworts, which will abundantly repay the expence of the fallow.”

The ſame author alſo gives the following uſeful directions for planting hedges in ſituations very much expoſed to the weather, and recovering them when on the point of decaying. “Thoſe who live in an open uncultivated country, have many difficulties to encounter, which others who inhabit more warm and ſheltered regions never experience; and, among theſe difficulties, may be reckoned that of hardly getting hedges to grow with facility. For, where a young hedge is much expoſed to violent and continued guſts of wind, no art will ever make it riſe with ſo much freedom, or grow with ſuch luxuriance, as it would do in a more ſheltered ſituation and favourable expoſure.

Vol. II. p. 16, &c.

“But, although it is impoſſible to rear hedges, in this ſituation, to ſo much perfection as in the others, yet they may be reared even there, with a little attention and pains, ſo as to become very fine fences.

“It is adviſeable, in all caſes, to plant the hedges upon the face of a bank; but it becomes abſolutely neceſſary in ſuch an expoſed ſituation as that I have now deſcribed: for the bank, by breaking the force of the wind, ſcreens the young hedge from the violence of the blaſt, and allows it to advance, for ſome time at firſt, with much greater luxuriance than it otherwiſe could have done.

“But, as it may be expected ſoon to grow as high as the bank, it behoves the provident huſbandman to prepare for that event, and guard, with a wiſe forecaſt, againſt the inconvenience that may be expected to ariſe from that circumſtance.

“With this view, it will be proper for him, inſtead of making a ſingle ditch, and planting one hedge, to raiſe a pretty high bank, with a ditch on each ſide of it, and a hedge on each face of the bank; in which ſituation, the bank will equally ſhelter each of the two hedges, while they are lower than it; and, when they at length become as high as the bank, the one hedge will in a manner afford ſhelter to the other, ſo as to enable them to advance with much greater luxuriance than either of them would have done ſingly.

“To effectuate this ſtill more perfectly, let a row of ſervice-trees be planted along the top of the bank, at the diſtance of 18 inches from each other, with a plant of eglantine between each two ſervices. This plant will advance, in ſome degree, even in this expoſed ſituation; and, by its numerous ſhoots, covered with large leaves, will effectually ſcreen the hedge on each ſide of it, which, in its turn, will receive ſome ſupport and ſhelter from them, ſo that they will be enabled to advance all together, and form, in time, a cloſe, ſtrong, and beautiful fence.

“The *ſervice* is a tree but little known in Scotland; although it is one of thoſe that ought perhaps to be often cultivated there in preference to any other tree whatever, as it is more hardy, and, in an expoſed ſituation, affords more ſhelter to other plants than almoſt any other tree I know: for it ſends out a great many ſtrong branches from the under part of the ſtem, which, in time, aſſume an upright direction, and continue to advance with vigour, and carry many leaves to the very bottom, almoſt as long as the tree exiſts; ſo that, if it is not pruned, it riſes a large cloſe buſh, till it attains the height of a foreſt-tree.

“It is of the ſame genus with the rawn-tree—and has a great reſemblance to it both in flower and fruit; its branches are more waving and pliant—its leaves undivided, broad and round, ſomewhat reſembling the elm, but white and mealy on the under ſide. It deſerves to be better known than it is at preſent.

“But if, from the poorneſs of the ſoil in which your hedge is planted, or from any other cauſe, it ſhould ſo happen, that, after a few years, the hedge becomes ſickly, and the plants turn poor and ſtinted in appearance, the eaſieſt and only effectual remedy for that diſeaſe, is to cut the ſtems of the plants clean over, at the height of an inch or two above the ground; after which they will ſend forth much ſtronger ſhoots than they ever would have done without this operation. And, if the hedge be kept free of weeds, and trained afterwards in the manner above deſcribed, it will, in almoſt every caſe, be recovered, and rendered freſh and vigorous.

“This amputation ought to be performed in autumn, or the beginning of winter; and, in the ſpring, when the young buds begin to ſhow themſelves, the ſtumps ought to be examined with care, and all the buds be rubbed off, excepting one or two of the ſtrongeſt and beſt placed, which ſhould be left for a ſtem. For, if the numerous buds that ſpring forth round the ſtem are allowed to ſpring up undiſturbed, they will become in a few years as weak and ſtinted as before; and the hedge will never afterwards be able to attain any conſiderable height, ſtrength, or healthfulneſs.—I have ſeen many hedges, that have been repeatedly cut over, totally ruined by this circumſtance not having been attended to in proper time.

“If the ground for 16 or 20 feet on each ſide of the hedge be fallowed at the time that this operation is performed, and get a thorough dreſſing with rich manures, and be kept in high order for ſome years afterwards by good culture and meliorating crops, the hedge will proſper much better than if this had been omitted, eſpecially if it has been planted on the level ground, or on the bank of a ſhallow ditch.

“It ſometimes happens, that a hedge may have been long neglected, and be in general in a healthy ſtate, but full of gaps and openings, or ſo thin and ſtraggling, as to form but a very imperfect ſort of fence. On theſe occaſions, it is in vain to hope to fill up the gaps by planting young quicks; for theſe would always be outgrown, choaked, and ſtarved, by the old plants: nor could it be recovered by cutting clear over by the roots, as the gaps would ſtill continue where they formerly were. The only methods that I know of rendering this a fence are, either to mend up the gaps with dead wood, or to *plaſh* the hedge; which laſt operation is always the moſt eligible, where the gaps are not too large to admit of being cured by this means.

“The operation I here call *plaſhing*, may be defined,

fined, “a wattling made of living wood.” To form this, ſome ſtems are firſt ſelected, to be left as ſtakes at proper diſtances, the tops of which are all cut over at the height of four feet from the root. The ſtraggling ſide-branches of the other part of the hedge are alſo lopped away. Several of the remaining plants are then cut over, cloſe by the ground, at convenient diſtances; and the remaining plants are cut perhaps half through, ſo as to permit them to be bent to one ſide. They are then bent down almoſt to a horizontal poſition, and interwoven with the upright ſtakes, ſo as to retain them in that poſition. Care ought to be taken, that theſe be laid very low, at thoſe places where there were formerly gaps; which ought to be farther ſtrengthened by ſome dead ſtakes or truncheons of willows, which will frequently take root in this caſe, and continue to live. And ſometimes a plant of eglantine will be able to overcome the difficulties it there meets with, ſtrike root, and grow up ſo as to ſtrengthen the hedge in a moſt effectual manner.

“The operator begins at one end of the field, and proceeds regularly forward, bending all the ſtems in one direction, ſo that the points riſe above the roots of the others, till the whole wattling is completed to the ſame height as the uprights.

“An expert operator will perform this work with much greater expedition, than one who has not ſeen it done could eaſily imagine. And, as all the diagonal wattlings continue to live and ſend out ſhoots from many parts of their ſtems, and as the upright ſhoots that riſe from the ſtumps of thoſe plants that have been cut over quickly ruſh up through the whole hedge, theſe ſerve to unite the whole into one entire maſs, that forms a ſtrong, durable, and beautiful fence.

“This is the beſt method, of recovering an old neglected hedge, that hath as yet come to my knowledge.

“In ſome caſes it happens that the young ſhoots of a hedge are killed every winter; in which caſe it ſoon becomes dead and unſightly, and can never riſe to any conſiderable height. A remedy for this diſeaſe may therefore be wiſhed for.

“Young hedges are obſerved to be chiefly affected with this diſorder; and it is almoſt always occaſioned by an injudicious management of the hedge, by means of which it has been forced to ſend out too great a number of ſhoots in ſummer, that are thus rendered ſo ſmall and weakly as to be unable to reſiſt the ſevere weather in winter.

It often happens that the owner of a young hedge, with a view to render it very thick and cloſe, cuts it over with the ſhears a few inches above the ground the firſt winter after planting; in conſequence of which, many ſmall ſhoots ſpring out from each of the ſtems that has been cut over:—Each of which, being afterwards cut over in the ſame manner, ſends forth a ſtill greater number of ſhoots, which are ſmaller and ſmaller in proportion to their number.

“If the ſoil in which the hedge has been planted is poor, in conſequence of this management, the branches, after a few years, become ſo numerous, that the hedge is unable to ſend out any ſhoots at all, and the utmoſt exertion of the vegetative powers enables it only to put forth leaves. Theſe leaves are renewed in a ſickly ſtate for ſome years, and at laſt ceaſe to grow at all—the branches become covered with fog, and the hedge periſhes entirely.

“But if the ſoil be very rich, notwithſtanding this great multiplication of the ſtems, the roots will ſtill have ſufficient vigour to force out a great many ſmall ſhoots, which advance to a great length, but never attain a proportional thickneſs. And, as the vigour of the hedge makes them continue to vegetate very late in autumn, the froſts come on before the tops of theſe dangling ſhoots have attained any degree of woody firmneſs, ſo that they are killed almoſt entirely by it; the whole hedge becomes covered with theſe long dead ſhoots, which are always diſagreeable to look at, and uſually indicate the approaching end of the hedge.

“The cauſes of the diſorder being thus explained, it will readily occur, that the only radical cure is amputation; which, by giving an opportunity to begin with training the hedge anew, gives us alſo an opportunity of avoiding the errors that occaſioned it. In this caſe, care ought to be taken to cut the plants as cloſe to the ground as poſſible, as there the ſtems will be leſs numerous than at any greater height. And particular attention ought to be had to allow very few ſhoots to ariſe from the ſtems that have been cut over, and to guard carefully againſt ſhortening them.

“But as the roots, in the caſe here ſuppoſed, will be very ſtrong, the ſhoots that are allowed to ſpring from the ſtems will be very vigorous, and there will be ſome danger of their continuing to grow later in the ſeaſon than they ought in ſafety to do; in which caſe, ſome part of the top of the ſhoot may perhaps be killed the firſt winter, which ought if poſſible to be prevented. This can only be effectually done by giving a check to the vegetation in autumn, ſo as to allow the young ſhoots to harden in the points before the winter approaches. If any of the leaves or branches of a tree are cut away while it is in the ſtate of vegetation, the whole plant feels the loſs, and it ſuffers a temporary check in its growth in proportion to the loſs that it thus ſuſtains. To check, therefore, the vigorous vegetation at the end of autumn, it will be prudent to chooſe the beginning of September for the time of lopping off all the ſupernumerary branches from the young hedge, and for clipping off the ſide-branches that have ſprung out from it; which will, in general, be ſufficient to give it ſuch a check in its growth at that ſeaſon, as will prevent any of the ſhoots from advancing afterwards. If the hedge is extremely vigorous, a few buds may be allowed to grow upon the large ſtumps in the ſpring, with a view to be cut off at this ſeaſon, which will tend to ſtop the vegetation of the hedge ſtill more effectually.

“By this mode of management, the hedge may be preſerved entire through the firſt winter. And, as the ſhoots become leſs vigorous every ſucceſſive ſeaſon, there will be leſs difficulty in preſerving them at any future period. It will always be proper, however, to trim the ſides of a very vigorous hedge for ſome years while it is young, about the ſame ſeaſon of the year, which will tend powerfully to prevent this malady. But when the hedge has advanced to any conſiderable height, it will be equally proper to clip it during any of the winter-months, before Candlemas.”

Hedge-*Hog*. See Erinaceus.

HEDYSARUM, in botany, a genus of the decandria order, belonging to the diadelphia claſs of plants. There are 49 ſpecies of this plant, of which the moſt remarkable are, 1. The movens, or moving plant, a native of the Eaſt Indies, where it is called *burrum chundalli*. The ſeeds of it were ſent to Edinburgh by Mr Kerr, and the plant is now growing in the botanical garden there. It arrives at the height of four feet, and in autumn produces bunches of yellow flowers. The root is annual or biennial. It is a trifolious plant, and the lateral leaves are ſmaller than thoſe at the end, and all day long they are in conſtant motion without any external impulſe. They move up and down and circularly. This laſt motion is performed by the twiſting of the footſtalks; and while the one leaf is riſing, its aſſociate is generally deſcending. The motion downwards is quicker and more irregular than the motion upwards, which is ſteady and uniform. Theſe motions are obſervable for the ſpace of 24 hours in the leaves of a branch which is lopped off from the ſhrub if it is kept in water. If from any obſtacle the motion is retarded, upon the removal of that obſtacle it is reſumed with a greater degree of velocity. This ſpecies was unknown to Linnæus.—2. The coronarium, or common biennial French honeyſuckle, hath large deeply-ſtriking biennial roots; upright, hollow, ſmooth, very branchy ſtalks, three or four feet high, garniſhed with pinnated leaves; and from the places of the leaves proceed long ſpikes of beautiful red flowers, ſucceeded by jointed ſeed-pods.

Culture. The firſt ſpecies being a native of hot climates, requires the common culture of tender exotics; the ſecond is eaſily raiſed from ſeed in any of the common borders, and is very ornamental.

HEEL, in anatomy. See there, n° 65.

Heel *of a Horſe*, the lower hinder-part of the foot comprehended between the quarters and oppoſite to the toe. The heel of a horſe ſhould be high and large, and one ſide of it ſhould not riſe higher than the other upon the paſtern. To recover the heels of a horſe that is hoof-bound, you ſhould take out his ſole and keep his heels very wide, by which they will be reſtored in a month.

Heel *of a Horſeman*. This being the part that is armed with the ſpur, the word is uſed for the ſpur itſelf; as, "This horſe underſtands the heel well." To ride a horſe from one heel to another, is to make him go ſideways, ſometimes to one heel and ſometimes to another.

Heel, in the ſea-language. If a ſhip leans on one ſide, whether ſhe be a-ground or a-float, then it is ſaid ſhe heels a-ſtarboard, or a-port; or that ſhe heels offwards, or to the ſhore; that is, inclines more to one ſide than to another.

HEELER, or *Bloody*-Heel-*Cock*, a fighting cock, that ſtrikes or wounds much with his ſpurs.

The maſters know ſuch a cock, even while a chicken, by the ſtriking of his two heels together in his going.

HEEM, (John David,) an able painter, born at Utrecht in 1604. He excelled in painting flowers, fruit, vaſes, and inſtruments of muſic, which he performed in ſuch a perfect manner, that a perſon was apt to attempt taking them in his hand. His colouring is agreeable, and the inſects in his pictures appear alive. He died at Antwerp in 1674.

Cornelius de Heem, his ſon, was alſo a good painter, though inferior to his father.

HEEMSKIRK. See Hemskirk.

HEGIRA, in chronology, a celebrated epocha among the Mahometans.

The event which gave riſe to this epocha was the flight of Mahomet from Mecca, with his new proſelytes, to avoid the perſecution of the Coraiſchites; who, being then moſt powerful in the city, could not bear that Mahomet ſhould aboliſh idolatry, and eſtabliſh his new religion. This flight happened in the fourteenth year after Mahomet had commenced prophet: he retired to Medina, which he made the place of his reſidence. See Arabia, n° 44.

HEIDENHEIM, a town of Germany, in Swabia, and in the territory of Brentzhall, with a handſome palace or caſtle, belonging to the houſe of Wirtemberg. E. Long. 10. 19. N. Lat. 48. 37.

HEIDLEBERG, a conſiderable and populous town of Germany, capital of the Lower Palatinate, with a celebrated univerſity. It is noted for its great ton, which holds 800 hogſheads, generally kept full of good Rheniſh wine. It ſtands in a pleaſant rich country, and was a famous ſeat of learning: but it has undergone ſo many calamities, that it is nothing now to what it was formerly. It was firſt reduced to a heap of ruins in 1622, by the Spaniards; and the rich library was tranſported partly to Vienna, and partly to the Vatican at Rome. After this it enjoyed the benefits of peace, till the Proteſtant electoral houſe became extinct, and a bloody war enſued, in which not only the caſtle was ruined, but the tombs and bodies of the electors were ſhamefully violated and pillaged. This happened in 1693; and the people of the Palatinate were obliged to leave their dwellings, and to go for refuge into foreign countries. To add to theſe misfortunes, the elector reſided at Manheim, and carried moſt of the people of diſtinction along with him, ſo that it is uncertain whether Heidleberg will ever recover itſelf or not, though they have begun to rebuild ſome of the fortifications. The great ton was broke to pieces in 1693 by the French, and at great expence in 1729 was repaired. The town ſtands on the river Neckar, over which there is a handſome bridge. E. Long. 8. 48. N. Lat. 49. 25.

HEIGHT, in general, ſignifies the difference between the ground and the top of any object meaſured perpendicularly.

Methods of meaſuring Heights. See Geometry, Trigonometry, Barometer, Mountain, and (Barometer in the APPENDIX.)

HEILA, a town of Royal Pruſſia, in Caſſubia, ſeated at the mouth of the river Viſtula, on the Baltic Sea, and ſubject to Poland, 12 miles north of Dantzick. E. Long. 19. 25. N. Lat. 54. 53.

HEILEGEN-have, a ſea-port town of Germany, in Lower Saxony, and in Wageria, ſeated on the Baltic Sea, over-againſt the iſland of Termeren. E. Long. 11. 15. E. Lat. 57. 30.

HEINECCIUS (John Gotlieb), one of the greateſt civilians of the 18th century, was born at Eiſenberg, in the principality of Altenburg, in 1681. After having ſtudied at Goſlar and Leipſick, he was deſigned for the miniſtry, and began to preach; but diſliking that profeſſion, he laid it aſide, and applied himſelf entirely to the ſtudy of philoſophy and the civil law. In 1710, he became profeſſor of philoſophy at Hall; and in 1721, he was made profeſſor of civil law, with the title of *counſellor of the court*. His great reputation made the ſtates of Frieſland invite him to Franeker in 1724; but three years after, the king of Pruſſia prevailed on him to accept of a profeſſorſhip of law at Francfort on the Oder, where he diſtinguiſhed himſelf till the year 1733. Becoming again profeſſor at Hall, he remained there till his death, which happened in 1941, notwithſtanding his being invited to Marpurg, Denmark, and three academies in Holland. He wrote many works, all of them much eſteemed. The principal are, 1. *Antiquitatum Romanarum juriſprudentiam illuſtrantium ſyntagma*. It was this excellent abridgment that gave riſe to his reputation in foreign countries. 2. *Elementa juris civilis ſecundum ordinem inſtitutionum & pandectarum*. 3. *Fundamenti ſtyli cultioris*. There are few works ſo uſeful as this for forming a Latin ſtyle. 4. *Elementa philoſophiæ rationalis & moralis, quibus præmiſſa hiſtoria philoſophica*. 5. *Hiſtoria juris civilis Romani ac Germanici*. 6. *Elementa juris naturæ & gentium*, &c.

HEINETKEN (Chriſtian), an extraordinary child, the prodigy of the North, was born at Lubeck in 1721. He ſpoke his maternal tongue fluently at 10 months. At one year old, he knew the principal events of the pentateuch; in two months more, he was maſter of the entire hiſtory of the Old and New Teſtaments; at two years and an half, he anſwered the principal queſtions in geography and in ancient and modern hiſtory; and he ſpoke Latin and French with great facility before the commencement of his fourth year. His conſtitution was ſo delicate, that he was not weaned till a few months before his death. M. Martini of Lubec publiſhed a pamphlet in 1730, in which he endeavoured to give natural reaſons for the extraordinary capacity of this infant, who died in his fifth year.

HEINSIUS (Daniel), profeſſor of politics and hiſtory at Leyden, and librarian to the univerſity there, was born at Gand in Flanders in 1580. He became a ſcholar to Joſeph Scaliger at Leyden, and was indebted to the encouragement and care of that great man, for the perfection to which he attained in literature, and which at the beginning of his life there was little reaſon to hope from him. He diſtinguiſhed himſelf as a critic by his labours on many claſſical authors; and was highly honoured as well abroad as at home: Guſtavus Adolphus king of Sweden gave him a place among his counſellors of ſtate; the republic of Venice made him a knight of the order of St Mark; and pope Urban VIII. made him great offers, if he would come, as he expreſſed it, "to reſcue Rome from barbariſm." He died in 1666, leaving ſeveral works of his own, both in poetry and proſe.

Heinsius (Nicholas), the ſon of Daniel Heinſius, was born at Leyden; and became as great a Latin poet, and a greater critic than his father. His poems have been ſeveral times printed, but the beſt edition is that of Amſterdam in 1666. He gave editions of ſeveral of the claſſics, with notes; his Claudian is dedicated in a Latin poem to queen Chriſtina of Sweden, and his Ovid to Thuanus. At his death, which happened in 1681, he diſclaimed all his works, and expreſſed the utmoſt regret at having left behind him ſo many "monuments of his vanity," as he called them. He was as much diſtinguiſhed by his great employments in the ſtate, as by his talents, learning, and good qualities.

HEIR, in law, ſignifies the perſon who ſucceeds another by deſcent to lands, tenements, and hereditaments, being an eſtate of inheritance, or an eſtate in fee; becauſe nothing paſſes by right of inheritance but in fee. See the articles Consanguinity, Descent, Fee, Succession; and Law, N° lxxvi. & clxxx. *et ſeq.*

Heir *Apparent*, is a perſon ſo called in the lifetime of his anceſtor, at whoſe death he is heir at law.

HEIRESS, a female heir to one who has an eſtate in lands, &c. See Heir.

Stealing an Heiress. See Forcible *Marriage*.

HEIRSHIP moveables, in Scots law, the beſt of certain kinds of moveables, which the heir of line is intitled to take, beſides the heritable eſtate. See Law, N° clxxx. 7.

HELENA, or St Helena, an iſland in the Atlantic Ocean, belonging to the Engliſh Eaſt India company, and ſituated in W. Long. 6. 30. S. Lat. 16°. The greateſt length of the iſland is about eight miles, and its circumference about 20. It hath ſome high mountains, particularly one called *Diana's peak*, which is covered with woods to the very top. Other hills there are which bear evident marks of a volcanic origin; and ſome have huge rocks of lava, and a kind of half-vitrified flags. The country, according to Mr Forſter, has a fine appearance; the ſoil is in many places a rich mould, from ſix to ten inches deep, and a variety of plants thrive in it luxuriantly. He found many plants here which he had not obſerved in other parts of the world. Among theſe were ſome called by the natives *cabbage-trees*, *gum-trees*, and *red wood*. The former thrive in moiſt places; but the latter are always found on the ridges of hills where the ſoil is dry. The cabbage-tree has rather large leaves; but after many inquiries Mr Forſter could not find that it was uſed for any other purpoſe than that of fuel, and no reaſon could be aſſigned why it had obtained that name. It muſt not be confounded with the cabbage-tree of America, India, and the South Seas, which is a ſpecies of palm.

The iſland is laid out entirely in gardens and paſturage. Peaches are the only European fruits that thrive here. Cabbages and other greens which thrive extremely well are devoured by caterpillars; and every ſpecies of corn is deſtroyed by rats. All the paſtures were over-run with furze; which, though in our country a very uſeleſs and even pernicious plant, was of ſingular advantage to the inhabitants of St Helena. Before the introduction of that plant, the ground was parched by the intenſe heat, and all kinds of graſs and herbage were ſhrivelled up. But the furze-buſhes, which throve as it were in deſpite of the ſun, preſerved a degree of moiſture in the ground; by which means the graſs ſprung up vigorouſly, and the country became covered with a rich and beautiful ſod. The furze is now no longer wanted, and the people aſſiduouſly root it out for fuel. The number of people on St Helena does not exceed 2000 perſons, including 500 ſoldiers, and 600 ſlaves; and it is ſaid that the number of females born on the iſland conſiderably exceeds that of the males. By the arrival of the India ſhips which they ſupply with refreſhments, they are in return provided with all ſorts of manufactures and other neceſſaries; and the Company annually order one or two of their ſhips to touch there in their way to India, in order to ſend them a ſufficient quantity of European goods and proviſions. Many of their ſlaves are employed in catching fiſh, which are very plentiful; and, by the help of theſe, together with their poultry, cattle, roots, and ſalt proviſions, they ſubſiſt through the year. Their life (ſays Mr Forſter) ſeems to paſs along very happily; free from the multitude of cares which diſtreſs their countrymen in England, and bleſſed with quiet and content.

St Helena was firſt diſcovered by the Portugueſe in 1502, on St Helen's day; whence its name. They ſtocked it with different kinds of uſeful animals; but whether they ever ſettled a colony on it or not, is uncertain. The Portugueſe having either abandoned, or never taken poſſeſſion of it, the Dutch became its maſters; and kept poſſeſſion of it till the year 1600, when they were driven out by the Engliſh. In 1673, the Dutch took it by ſurpriſe; but a ſhort time after it was recovered by the brave captain Munden, who alſo took three Dutch Eaſt Indiamen then lying in the harbour. On this occaſion the Hollanders had fortified the landing-place, of which there is only one on the iſland; and erected batteries of great guns to prevent a deſcent: but the Engliſh having knowledge of a ſmall creek, where only two men abreaſt could creep up, climbed to the top of the rock in the night; and appearing the next morning behind the batteries, the Dutch were ſo terrified, that they threw down their arms, and ſurrendered at diſcretion. This creek has been ſince fortified, and a battery of large cannon placed at the entrance of it; ſo that now the iſland is rendered perfectly ſecure againſt all regular approaches or ſudden attacks.

HELEN, (in fab. hiſt.) the daughter of Tyndarus and Leda, was married to Menelaus king of Sparta, but was ſtolen from him by Theſeus, 1235 B. C. She was reſtored ſoon after; but carried off again by Paris, the Trojan prince; which occaſioned the famous Trojan war. See Troy.

HELENIUM, BASTARD SUN-FLOWER; a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants.

Species. 1. The autumnale, with ſpear-ſhaped narrow leaves. 2. The latifolium, with pointed, ſpear-ſhaped, ſawed leaves.—Both theſe are natives of North America, where they grow wild in great plenty. They riſe to the height of ſeven or eight feet in good ground. The roots, when large, ſend up a great number of ſtalks, which branch toward the top; the upper part of the ſtalk ſuſtains one yellow flower ſhaped like the ſun-flower, but much ſmaller, having long rays, which are jagged pretty deep into four or five ſegments.

Culture. Theſe plants may be propagated by ſeeds, or by parting their roots; the latter is generally practiſed in this country. The beſt ſeaſon to tranſplant and part the old roots is in October when their leaves are paſt, or in the beginning of March juſt before they begin to ſhoot. They delight in a ſoil rather moiſt than dry, provided it is not too ſtrong, or does not hold the wet in winter.

HELEPOLIS, in the ancient art of war, a machine for battering down the walls of a place beſieged, the invention of which is aſcribed to Demetrius Poliorcetes.—Diodorus Siculus ſays, that each ſide of the Helepolis was 405 cubits in breadth, and 90 in height; that it had nine ſtages, and was carried on four ſtrong ſolid wheels eight cubits in diameter; that it was armed with large battering rams, and had two roofs capable of ſupporting them; that in the lower ſtages there were different ſorts of engines for caſting ſtones; and in the middle they had large catapultas for diſcharging arrows, and ſmaller ones in thoſe above, with a number of expert men for working all theſe machines.

HELIÆA, in Grecian antiquity, was the greateſt and moſt frequented court in Athens for the trial of civil affairs. See Heliastæ.

HELIACAL, in aſtronomy, a term applied to the riſing and ſetting of the ſtars; or, more ſtrictly ſpeaking, to their emerſion out off, and immerſion into, the rays and ſuperior ſplendor of the ſun.—A ſtar is ſaid to riſe heliacally, when, after having been in conjunction with the ſun, and on that account inviſible, it comes to be at ſuch a diſtance from him, as to be ſeen in the morning before ſun-riſing; the ſun, by his apparent motion, receding from the ſtar towards the Eaſt. On the contrary, the heliacal ſetting is, when the ſun approaches ſo near a ſtar as to hide it with his beams, which prevent the fainter light of the ſtar from being perceived; ſo that the terms *apparition* and *occultation* would be more proper than *riſing* and *ſetting*.

HELIANTHUS, the GREAT SUNFLOWER; a genus of the polygamia fruſtanea order, belonging to the ſyngeneſia claſs of plants. There are 12 ſpecies, moſt of which are now very common in our gardens, tho' all of them are natives of America. They are all very hardy, and will proſper in almoſt any ſoil or ſituation. They may be propagated either by ſeeds, or by parting their roots.

HELIASTÆ, in antiquity, the judges of the court Heliæa. They were ſo called, according to ſome authors, from a Greek word which ſignifies *to aſſemble in a great number*; and, according to others, from another word which ſignifies *the ſun*, becauſe they held their aſſemblies in an open place. They compoſed not only the moſt numerous, but likewiſe the moſt important of the Athenian tribunals; for their province was either to explain the obſcure laws, or to give new vigour and authority to thoſe which had been violated. The Theſmothetæ convoked the aſſembly of the Heliaſtæ, which ſometimes amounted to 1000, ſometimes to 1500 judges. Mr Blanchard is of opinion, that, to make this number, the Theſmothetæ ſometimes ſummoned thoſe of each tribe who had laſt quitted the public offices which they had exerciſed in another court.

However that may be, it appears that the aſſemblies of the Heliaſtæ were not frequent, as they would have interrupted the juriſdiction of the ſtated tribunals, and the common courſe of affairs.

The Theſmothetæ paid to each member of this aſſembly, for his attendance, three oboli; which are equal to two Roman ſeſterces, or to half a drachma. Hence Ariſtophanes terms them *the brothers of the triobolus*.

Heliaſtæ.

triobolus. They were likewiſe condemned to pay a fine if they came too late; and if they did not preſent themſelves till after the orators had begun to ſpeak, they were not admitted. Their attendance was requited out of the public treaſury, and their pay was called *miſthos heliaſticus*.

The aſſembly met, at firſt, according to Ariſtophanes, at the riſing of the ſun. If the judges were obliged to meet under cover on account of froſt and ſnow, they had a fire; but there is not a paſſage in any ancient author which informs us of the place where theſe aſſemblies were held, either in the rigorous or in the mild ſeaſons. We only learn that there was a double incloſure around the aſſembly, that it might not be diſturbed. The firſt was a kind of arborwork, from ſpace to ſpace, ſeparated by doors, over which were painted in red the ten or twelve firſt letters of the Greek alphabet, which directed the entrance of the officers who compoſed the tribunal, each of them entering under the letter which diſtinguiſhed his tribe. The beadles of the court, to whom they ſhewed the wands which had been ſent them by the Theſmothetæ as a ſummons to meet, examined its mark, to ſee if it was authentic, and then introduced them. The ſecond incloſure, which was at the diſtance of 20 feet from the former, was a rope, or cord; that the people who ſtood round the firſt incloſure, and were deſirous to ſee what paſſed within the ſecond, might not be prevented from gratifying their curioſity at a proper diſtance. Thus the attention of the judges was not interrupted by the concourſe of the multitude, many of whom were heated by views of intereſt or of party.

To each of the members of the aſſembly were diſtributed two pieces of copper; one of which was perforated, not, certainly, that it might be diſtinguiſhed from the other by feeling; for theſe aſſemblies met at the riſing, and were diſſolved at the ſetting of the ſun. Thoſe pieces of copper had been ſubſtituted for little ſea-ſhells, which were at firſt in uſe. The king was preſent at the aſſembly, at whoſe command it had been ſummoned. The Theſmothetæ read the names of thoſe who were to compoſe it, and each man took his place as he was called. The Theſmothetæ were then ſent for, whoſe function it was to obſerve prodigies, and to ſuperintend the ſacrifices; and if they gave their ſanction, the deliberations were begun. It is well known, that the officers called *Exegetæ* were often corrupted by thoſe who were intereſted in the debates of the aſſembly; and that they excited ſuch tumults as were raiſed by the Roman tribunal in the popular aſſemblies convoked by the conſuls.

Of all the monuments which remain relating to the Heliaſtæ, the moſt curious is the oath which thoſe judges took before the Theſmothetæ: Demoſthenes hath preſerved it in his oration againſt Timocrates, who having been bribed by thoſe who had been intruſted with the effects taken on board a veſſel of Naucratis, and refuſed to give an account of them, got a law paſſed, by which an enlargement was granted to priſoners for public debts, on giving bail. Demoſthenes, in making his oration againſt that law, ordered the oath of the Heliaſtæ to be read aloud, as a perpetual auxiliary to his arguments, and happily calculated to intereſt the multitude and inflame their paſſions. This oath we ſhall quote, that our readers may know how reſpectable a tribunal that of the Heliaſtæ was, and the importance of their deciſions.

"I will judge according to the laws and decrees of the people of Athens, and of the ſenate of 500. I will never give my vote for the eſtabliſhment of a tyrant, nor of an oligarchy. Nor will I ever give my approbation to an opinion prejudicial to the liberty, or to the union, of the people of Athens. I will not ſecond thoſe perſons who may propoſe a reduction of private debts, or a diſtribution of the lands or houſes of the Athenians. I will not recall exiles, nor endeavour to procure a pardon for thoſe who ſhall be condemned to die. Nor will I force thoſe to retire whom the laws and the ſuffrages of the people ſhall permit to remain in their country. I will not give my vote to any candidate for a public function, who gives not an account of his conduct in the office which he has previouſly filled; nor will I preſume to ſolicit any truſt from the commonwealth, without ſubjecting myſelf to this condition, which I mean as obligatory to the nine archons, to the chief of religious matters, to thoſe who are balloted on the ſame day with the nine archons, to the herald, the ambaſſador, and the other officers of their court. I will not ſuffer the ſame man to hold the ſame office twice, or to hold two offices in the ſame year. I will not accept any preſent, either myſelf or by another, either directly or indirectly, as a member of the Heliaſtic aſſembly. I ſolemnly declare that I am 30 years old. I will be equally attentive and impartial to the accuſer and the accuſed; I will give my ſentence rigorouſly according to evidence. Thus I ſwear, by Jupiter, by Neptune, and by Ceres, to act. And if I violate any of my engagements, I imprecate, from theſe deities, ruin on myſelf and my family. And I requeſt them to grant me every kind of proſperity, if I am faithful to my oath."

The reader ſhould peruſe what follows this oath, to ſee with what eloquence Demoſthenes avails himſelf of it, and how he applies its principles to the cauſe which he defends.

Here we have one of the motives of the meeting of this aſſembly. Ariſtotle informs us of another; which was, by the public authority, deputed to them, to elect a magiſtrate in the room of one dead. It is ſurpriſing, that Pauſanias, who enters ſo often into details, gives us no particular account of this aſſembly. All that he ſays of it is, that the moſt numerous of the Athenian aſſemblies was called *Helicè*.

We are told by Diogenes Laertius, in his life of Solon, that it was before one of theſe Heliaſtic aſſemblies that Piſiſtratus preſented himſelf, covered with wounds and contuſions, (for thus he had treated himſelf and the mules which drew his car,) to excite the indignation of the people againſt his pretended enemies, who, jealous, as he alleged, of the popularity he had acquired by aſſerting the rights of his poorer fellow-citizens, in oppoſition to the men in power, had attacked him while he was hunting, and had wounded him in that barbarous manner. His deſign ſucceeded; a guard was appointed him, by the aſſiſtance of which he acquired the ſovereignty or tyranny of Athens, and kept it 33 years. The power of the aſſembly appeared remarkably on that occaſion; for Solon, who was preſent, oppoſed it with all his efforts, and did not ſucceed.

As to the manner in which the judges gave their ſuffrages, there was a ſort of veſſel, covered with an oſier mat, on which were placed two urns, the one of copper, the other of wood. In the lid of theſe urns there was an oblong hole, which was large at the top, and grew narrower downwards, as we ſee in ſome old boxes of our churches. The ſuffrages which condemned the accuſed perſon, were thrown into the wooden urn, which was termed *kyrios*. That of copper, named *akyros*, received thoſe which abſolved him.

Ariſtotle obſerves, that Solon, whoſe aim was to make his people happy, and who found an ariſtocracy eſtabliſhed by the election of the nine archons, (annual officers, whoſe power was almoſt abſolute,) tempered their ſovereignty, by inſtituting the privilege of appealing from *them* to the people, who were to be aſſembled by lot to give their ſuffrage; after having taken the oath of the Heliaſtæ, in a place near the Panathenæum; where Hiſſus had, in former days, calmed a ſedition of the people, and bound them to unanimity by an oath. It has likewiſe been remarked, that the god Apollo was not invoked in the oath of the Heliaſtæ, as in the oaths of the other judges. We have obſerved, that he who took the oath of the Heliaſtæ, engaged that he would not be corrupted by ſolicitation or money. Thoſe who violated this part of their oath, were condemned to pay a ſevere fine. The decemvirs at Rome made ſuch corruption a capital crime. But Aſconius remarks, that the puniſhment denounced againſt them was mitigated in later times; and that they were expelled the the ſenate, or baniſhed for a certain time, according to the degree of their guilt.

HELICON, (anc. geog.), a mountain on the borders of Bœotia and Phocis; of fertile ſoil, covered with woods, and very extenſive, its north ſide touching Phocis, and partly its weſt ſide, quite to Mychos, its utmoſt port-town. There alſo we have the river Helicon; which ſinking in the earth riſes again at ſome diſtance under a new name, *Baphyra*. This mountain is the poets' ſport and delight: *Heliconius* the epithet; *Heliconiades*, and *Heliconides*, the muſes.

HELICTERES, the SCREW-TREE; a genus of the decandria order, belonging to the gynandria claſs of plants. There are four ſpecies, all natives of warm climates. They are ſhrubby plants, riſing from five to fourteen feet in height, adorned with flowers of a yellow colour. They are propagated by ſeeds; but are tender, and in this country muſt be kept in a ſtove during the winter.

HELIOCENTRIC LATITUDE *of a Planet*, the inclination of a line drawn between the centre of the ſun, and the centre of a planet, to the plane of the ecliptic.

HELIOCENTRIC *Place of a Planet*, the place of the ecliptic wherein the planet would appear to a ſpectator placed at the centre of the ſun.

HELIOCOMETES, a phenomenon ſometimes obſerved about ſunſetting; being a large luminous tail or column of light proceeding from the body of the ſun, and dragging after it, not unlike the tail of a comet; whence the name.

HELIODORUS *of* PHOENICIA, biſhop of Trica in Theſſaly, better known by the romance he compoſed in his youth, entitled *Æthiopics*, and relating the amours of Theagenes and Chariclea. Some ſay he was depoſed by a ſynod, becauſe he would not conſent to the ſuppreſſing of that romance: the fable has a moral tendency, and particularly inculcates the virtue of chaſtity. As it was the firſt of this ſpecies of writing, he is ſtyled the *Father of Romances*. He was alſo a good Latin poet. He lived in the 4th century.

HELIOPOLIS, (anc. geog.), ſo called by Herodotus and Diodorus Siculus, by Moſes *On*, and in Jeremiah *Bethſemes*; a city of Egypt, to the ſouth-eaſt of the Delta, and eaſt of Memphis; of a very old ſtanding, its origin terminating in fable. Here ſtood the temple of the ſun, held in religious veneration. The city ſtood on an extraordinary mount, but in Strabo's time was deſolate. It gave name to the *Nomos Heliopolites*.—There was another *Heliopolis* in Cœloſyria, near the ſprings of the Orontes; ſo called from the worſhip of the ſun, which was in great vogue over all Syria.

HELIOSCOPE, in optics, a ſort of teleſcope, peculiarly fitted for viewing the ſun, without hurting the eyes. See TELESCOPE.

As the ſun may be viewed through coloured glaſſes, without hurt to the eyes, if the object and eye glaſſes of a teleſcope be made of coloured glaſs, as red or green, ſuch a teleſcope will become an helioſcope.

But Mr Huygens only uſed a plain glaſs, blacked at the flame of a candle on one ſide, and placed between the eye-glaſs and the eye; which anſwers the deſign of an helioſcope very well.

HELIOSTATA, in optics, an inſtrument invented by the late learned Dr 'S. Graveſande; who gave it this name from its fixing, as it were, the rays of the ſun in an horizontal direction acroſs the dark chamber all the while it is in uſe. See OPTICS.

HELIOTROPIUM, TURNSOLE; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are a number of ſpecies, all of them natives of warm countries. Only one, called the *tricoccum*, grows in Europe; and is a native of France, Spain, and Italy. It is only remarkable for the property of its berries, of which an account is given under COLOUR-*Making*, n° 35.

HELIX, in anatomy. See there, n° 405.

HELIX, the *Snail*, in zoology, a genus belonging to the order of vermes teſtacea. The ſhell conſiſts of one ſpiral, brittle, and almoſt diaphanous valve; and the aperture is narrow. There are 60 ſpecies, principally diſtinguiſhed by the figure of their ſhells. They are of various ſizes, from that of a ſmall apple to leſs than half a pea. Some of them live on land, frequenting woods and gardens, or inhabiting clefts of rocks and dry ſand-banks. Others of them are aquatic, inhabiting ponds, deep rivers, and the ocean. The principal ſpecies are,

1. The janthina, with a violet-coloured ſhell, is remarkable for the extreme thinneſs of its texture, which breaks with leaſt preſſure, and ſeems therefore entirely calculated to keep the open ſea, or at leaſt to ſhun rocky ſhores. It inhabits the ſeas of Europe, eſpecially the Mediterranean; thoſe of Aſia and Africa;

and alſo the ocean. The living animal, when touched, exſudes a juice, which ſtains the hands of a violet colour. Dr Hawkeſworth, in his account of Cooke's voyage, miſtakes this ſhell for that which yielded the *purpura* of the ancients. But whoever looks into Pliny, can never have the leaſt idea that the thin ſhell aforementioned could be the ſame with it. They had ſeveral ſhells which yielded the purple dye: but theſe were all rock-ſhells *, and very different, both in figure and hardneſs, from the little helix jacintha; which is not calculated for the neighbourhood of rocks, as already mentioned. Vid. *Plin.* lib. v. cap. 1. and lib. ix. cap. 60, 61. See alſo Don Ant. Ulloa's voyage to South America, book iv. ch. 8.

* See Buc-
m and
rex.

2. The pomatia, or exotic ſnail, with five ſpires, moſt remarkably ventricoſe, and faſciated with a lighter and a deeper brown, is a native of France, where it inhabits the woods; but has been naturalized in England, where it inhabits the woods of the ſouthern counties. It was introduced, as it is ſaid, by Sir Kenelm Digby; whether for medical purpoſes, or as food, is uncertain: tradition ſays, that to cure his beloved wife of a decay was the object.—They are quite confined to our ſouthern counties. An attempt was made to bring them into Northamptonſhire, but they would not live there.—Theſe are uſed as a food in ſeveral parts of Europe during lent; and are preſerved in an eſcargatoire, or a large place boarded in, with a floor covered half a foot deep with herbs, in which the ſnails neſtle and fatten *.—They were alſo a favourite diſh with the Romans, who had their *cochlearia*, a nurſery ſimilar to the above. Fulvius Hirpinus † was the firſt inventor of this luxury, a little before the civil wars between Cæſar and Pompey. The ſnails were fed with bran and ſodden wine. If we could credit Varro ‡, they grew ſo large, that the ſhells of ſome would hold ten quarts! People need not admire the temperance of the ſupper of the younger Pliny ‖, which conſiſted of only a lettuce a-piece, three *ſnails*, two eggs, a barley-cake, ſweet wine and ſnow,—in caſe his ſnails bore any proportion in ſize to thoſe of Hirpinus.—Its name is derived not from any thing relating to an orchard, but from πωμα, an *operculum*, it having a very ſtrong one. This ſeems to be the ſpecies deſcribed by Pliny, lib. viii. c. 39. which he ſays was ſcarce; that it covered itſelf with the opercle, and lodged under ground; and that they were at firſt found only about the maritime Alps, and more lately near Velitræ. [See Plate CLVIII. the figure half the natural ſize.]

* ddiſon's
v. 272.

† Pliny,
c. 56.

‡ iii.

‖ piſt. xv.

3. The hortenſis, or garden-ſnail, is in form like the laſt, but leſſer, and not umbilicated and clouded, or mottled with browns.—Theſe are often uſed with ſucceſs in conſumptive caſes.

HELL, the place of divine puniſhment after death. As all religions have ſuppoſed a future ſtate of exiſtence after this life, ſo all have their hell or place of torment in which the wicked are ſuppoſed to be puniſhed. The hell of the ancient heathens was divided into two manſions; the one called *Elyſium*, on the right hand, pleaſant and delightful, appointed for the ſouls of good men; the other called *Tartara*, on the left, a region of miſery and torment, appointed for the wicked. The latter only was hell, in the preſent reſtrained ſenſe of the word. See Elysium.

The philoſophers were of opinion, that the infernal regions were at an equal diſtance from all the parts of the earth; nevertheleſs it was the opinion of ſome, that there were certain paſſages which led thither, as the river Lethe near the Syrtes, and the Acheruſian cave in Epirus. At Hermione it was thought, that there was a very ſhort way to hell; for which reaſon the people of that country never put the fare into the mouths of the dead to pay their paſſage.

The Jews placed hell in the centre of the earth, and believed it to be ſituated under waters and mountains. According to them, there are three paſſages leading to it: the firſt is in the wilderneſs, and by that Korah, Dathan, and Abiram, deſcended into hell; the ſecond is in the ſea, becauſe Jonah, who was thrown into the ſea, cried to God out of the belly of hell; the third is in Jeruſalem, becauſe it is ſaid the fire of the Lord is in Zion, and his furnace is in Jeruſalem. They likewiſe acknowledged ſeven degrees of pain in hell, becauſe they find this place called by ſeven different names in ſcripture. Though they believed that infidels, and perſons eminently wicked, will continue for ever in hell; yet they maintained, that every Jew who is not infected with ſome hereſy, and has not acted contrary to the points mentioned by the rabbins, will not be puniſhed therein for any other crimes above a year at moſt.

The Mahometans believe the eternity of rewards and puniſhments in another life. In the Koran it is ſaid, that hell has ſeven gates, the firſt for the Muſſulmans, the ſecond for the Chriſtians, the third for the Jews, the fourth for the Sabians, the fifth for the Magians, the ſixth for the Pagans, and the ſeventh for the hypocrites of all religions.

Among Chriſtians, there are two controverted queſtions in regard to hell; the one concerns locality, the other the duration of its torments. The locality of hell, and the reality of its fire, began firſt to be controverted by Origen. That father, interpreting the ſcripture account metaphorically, makes hell to conſiſt, not in external puniſhments, but in a conſciouſneſs or ſenſe of guilt, and a remembrance of paſt pleaſures. Among the moderns, Mr Whiſton advanced a new hypotheſis. According to him, the comets are ſo many hells appointed in their orbits alternately to carry the damned into the confines of the ſun, there to be ſcorched by its violent heat, and then to return with them beyond the orb of Saturn, there to ſtarve them in theſe cold and diſmal regions. Another modern author, not ſatisfied with any hypotheſis hitherto advanced, aſſigns the ſun to be the local hell. As to the ſecond queſtion, viz. the duration of hell-torments, we have Origen again at the head of thoſe who deny that they are eternal; it being that father's opinion, that not only men, but devils, after a due courſe of puniſhment ſuitable to their reſpective crimes, ſhall be pardoned and reſtored to heaven. The chief principle upon which Origen buil[illegible]s opinion, was the nature of puniſhment, which [illegible]k to be emendatory, applied only as phyſic for the recovery of the patient's health. The chief objection to the eternity of hell-torments among modern writers, is the diſproportion between temporary crimes and eternal puniſhments. Thoſe who maintain the affirmative, ground their opinions on ſcripture-accounts, which repreſent the pains of hell under the figure of a worm which never dies, and a fire which is not quenched; as alſo upon the words, "Theſe ſhall go away into "everlaſting puniſhment, but the righteous into life "eternal."

HELLANICUS of Mitylene, a celebrated Greek hiſtorian, born before Herodotus, flouriſhed about 480 B. C. He wrote a hiſtory of the ancient kings and founders of cities, but which hath not come down to us.

HELLAS, (anc. geog.), an appellation compriſing, according to the more ancient Greeks and Romans, Achaia and Peloponneſus, but afterwards reſtrained to Achaia. It was bounded on the weſt by the river Achelous, on the north by mounts Othrys and Oeta, on the eaſt by the Egean ſea, and on the ſouth by the Saronic and Corinthian bays, and by the iſthmus which joins it to Peloponneſus. It was called *Hellas*, from *Hellen* the ſon of Deucalion; or from *Hellas*, a diſtrict of Theſſaly; whence *Hellenes*, the gentilitious name, denoting *Greeks*. Now called *Livadia*.

HELLEBORUS, HELLEBORE; a genus of the polygynia order, belonging to the polyandria claſs of plants.

Species. The moſt remarkable ſpecies of this plant is the niger, commonly called *Chriſtmas roſe*. It hath roots compoſed of many thick fleſhy ſpreading fibres, crowned by a large cluſter of lobbed leaves, conſiſting each of ſeven or eight obtuſe fleſhy lobes, united to one foot-ſtalk; and between the leaves ſeveral thick fleſhy flower-ſtalks three or four inches high, ſurmounted by large beautiful white flowers of five roundiſh petals, and numerous filaments, appearing in winter, about or ſoon after Chriſtmas.

Culture. This plant may be propagated either by ſeeds or parting the roots. It proſpers in the open borders, or may be planted in pots to move when in bloom in order to adorn any particular place; but it alway flowers faireſt and moſt abundantly in the front of a warm ſunny border. The plants may be removed, and the roots divided for propagation, in September, October, or November; but the ſooner in autumn it is done, the ſtronger will the plants flower at their proper ſeaſon.

Uſes. The root of this plant was anciently uſed as a cathartic. The taſte of it is acrid and bitter. Its acrimony, as Dr Grew obſerves, is firſt felt on the tip of the tongue, and then ſpreads itſelf immediately to the middle, without being much perceived in the intermediate part. On chewing the root for a few minutes, the tongue ſeems benumbed, and affected with a kind of paralytic ſtupor, as when burnt by eating any thing too hot. The fibres are more acrimonious than the head of the root from whence they iſſue. Black hellebore root, taken from 15 to 30 grains, proves a ſtrong cathartic; and, as ſuch, has been celebrated for the cure of maniacal and other diſorders proceeding from what the ancients called the *atrabilis*; in which caſes, medicines of this kind are doubtleſs occaſionally of uſe, though they are by no means poſſeſſed of any ſpecific power. It does not however appear, that our black hellebore acts with ſo much violence as that of the ancients; whence many have ſuppoſed it to be a different ſpecies of plant: and indeed the deſcriptions which the ancients have left us of their hellebore, do not agree with thoſe of any of the ſorts uſually taken notice of by modern botaniſts. Another ſpecies has been diſcovered in the Eaſtern countries, which Tournefort diſtinguiſhes by the name of *helleborus niger orientalis, ampliſſimo folio, caule præalto, flore purpuraſcente*, and ſuppoſes to be the true ancient hellebore, from its growing in plenty about mount Olympus, and in the iſland of Anticyra, celebrated of old for the production of this antimaniacal drug: he relates, that a ſcruple of this ſort, given for a doſe, occaſioned convulſions.—Our hellebore is at preſent looked upon principally as an alterative; and in this light is frequently employed, in ſmall doſes, for attenuating viſcid humours, promoting the uterine and urinary diſcharges, and opening inveterate obſtructions of the remoter glands. It often proves a powerful emmenagogue in plethoric habits, where ſteel is ineffectual or improper. In ſome parts of Germany, a ſpecies of black hellebore has been made uſe of, which frequently produced violent, and ſometimes deleterious, effects. It appears to be the fetid kind of Linnæus, called in Engliſh *ſettlewort*, *ſetterwort*, or *baſtard hellebore*. The roots of this may be diſtinguiſhed from thoſe of the true kind, by their being leſs black.

HELLEN, the ſon of Deucalion, is ſaid to have given the name of Helleniſts to the people before called *Greeks*, 1521 B. C. See GREECE.

HELLENISM, in matters of language, a phraſe in the idiom, genius, or conſtruction of the Greek tongue.

This word is only uſed when ſpeaking of the authors who, writing in a different language, expreſs themſelves in a phraſeology peculiar to the Greek.

HELLENISTIC LANGUAGE, that uſed by the Grecian Jews who lived in Egypt and other parts where the Greek tongue prevailed. In this language it is ſaid the Septuagint was written, and alſo the books of the New Teſtament; and that it was thus denominated to ſhew that it was Greek filled with Hebraiſms and Syriaciſms.

HELLESPONT, the entrance of the ſtreights which divides Aſia from Europe, and paſſes from the Archipelago to Conſtantinople. It is now called the *Dardanelles*, and is about two miles wide.

HELM, a long and flat piece of timber, or an aſſemblage of ſeveral pieces, ſuſpended along the hind-part of a ſhip's ſtern-poſt, where it turns upon hinges to the right or left, ſerving to direct the courſe of the veſſel, as the tail of a fiſh guides the body.

The helm is uſually compoſed of three parts, viz. the rudder, the tiller, and the wheel, except in ſmall veſſels, where the wheel is unneceſſary.

As to the form of the rudder, it becomes gradually broader in proportion to its diſtance from the top, or to its depth under the water. The *back*, or inner part of it, which joins to the ſtern-poſt, is diminiſhed into the form of a wedge throughout its whole length, ſo as that the rudder may be more eaſily turned from one ſide to the other, where it makes an obtuſe angle with the keel. It is ſupported upon hinges; of which thoſe that are bolted round the ſtern-poſt to the after-extremity of the ſhip, are called *googings*, and are furniſhed with a large hole on the after-part of the ſtern-poſt. The other parts of the hinges, which are bolted to the back of the rudder, are called *pintles*, being ſtrong cylindrical pins, which enter into the googings, and reſt upon them. The length and thickneſs of the rudder is nearly equal to that of the ſtern-poſt.

The rudder is turned upon its hinges by means of a long bar of timber, called the *tiller*, which is fixed horizontally in its upper end within the veſſel. The movements of the tiller to the right and left, accordingly, direct the efforts of the rudder to the government of the ſhip's courſe as ſhe advances; which, in the ſea language, is called *ſteering*. The operations of the tiller are guided and aſſiſted by a ſort of tackle, communicating with the ſhip's ſide, called the *tiller-rope*, which is uſually compoſed of untarred rope-yarns for the purpoſe of traverſing more readily through the blocks or pullies.

In order to facilitate the management of the helm, the tiller-rope, in all large veſſels, is wound about a wheel, which acts upon it with the powers of a crane or windlaſs. The rope employed in this ſervice being conveyed from the fore-end of the tiller *k*, to a ſingle block *i*, on each ſide of the ſhip†, is farther communicated to the wheel, by means of two blocks ſuſpended near the mizen-maſt, and two holes immediately above, leading up to the wheel, which is fixed upon an axis on the quarter-deck, almoſt perpendicularly over the fore-end of the tiller. Five turns of the tiller-rope are uſually wound about the barrel of the wheel; and, when the helm is amidſhip, the middle turn is nailed to the top of the barrel, with a mark by which the helmſman readily diſcovers the ſituation of the helm, as the wheel turns it from the ſtarboard to the larboard ſide. The ſpokes of the wheel generally reach about eight inches beyond the rim or circumference, ſerving as handles to the perſon who ſteers the veſſel. As the effect of a lever increaſes in proportion to the length of its arm, it is evident that the power of the helmſman to turn the wheel will be increaſed according to the length of the ſpokes beyond the circumference of the barrel.

When the helm, inſtead of lying in a right line with the keel, is turned to one ſide or the other, as in BD, fig. 1. it receives an immediate ſhock from the water, which glides along the ſhip's bottom in running *aſt* from A to B; and this fluid puſhes it towards the oppoſite ſide, whilſt it is retained in this poſition: ſo that the ſtern, to which the rudder is confined, receives the ſame impreſſion, and accordingly turns from B to *b* about ſome point *c*, whilſt the head of the ſhip paſſes from A to *a*. It muſt be obſerved, that the current of water falls upon the rudder obliquely, and only ſtrikes it with that part of its motion which acts according to the ſine of incidence, puſhing it in the direction NP, with a force which not only depends on the velocity of the ſhip's courſe, by which this current of water is produced, but alſo upon the extent of the ſine of incidence. This force is by conſequence compoſed of the ſquare of the velocity with which the ſhip advances, and the ſquare of the ſine of incidence, which will neceſſarily be greater or ſmaller according to circumſtances; ſo that if the veſſel runs three or four times more ſwiftly, the abſolute ſhock of the water upon the rudder will be nine or ſixteen times ſtronger under the ſame incidence: and, if the incidence is increaſed, it will yet be augmented in a greater proportion, becauſe the ſquare of the ſine of incidence is more enlarged. This impreſſion, or, what is the ſame thing, the power of the helm, is always very feeble, when compared with the weight of the veſſel; but as it operates with the force of a long lever, its efforts to turn the ſhip are extremely advantageous. For the helm being applied to a great diſtance from the centre of gravity G, or from the point about which the veſſel turns horizontally, if the direction PN of the impreſſion of the water upon the rudder be prolonged, it is evident that it will paſs perpendicularly to R, widely diſtant from the centre of gravity G: thus the abſolute effort of the water is very powerful. It is not therefore ſurpriſing, that this machine impreſſes the ſhip with a conſiderable circular movement, by puſhing the ſtern from B to *b*, and the head from A to *a*; and even much farther whilſt ſhe ſails with rapidity, becauſe the effect of the helm always keeps pace with the velocity with which the veſſel advances.

Amongſt the ſeveral angles that the rudder makes with the keel, there is always one poſition more favourable than any of the others, as it more readily produces the deſired effect of turning the ſhip, in order to change her courſe. To aſcertain this, it muſt be conſidered, that if the obliquity of the rudder with the keel is greater than the obtuſe angle ABD, ſo as to diminiſh that angle, the action of the water upon the rudder will increaſe, and at the ſame time oppoſe the courſe of the ſhip in a greater degree; becauſe the angle of incidence will be more open, ſo as to preſent a greater ſurface to the ſhock of the water, by oppoſing its paſſage more perpendicularly. But at that time the direction NP of the effort of the helm upon the ſhip will paſs, with a ſmaller diſtance from the centre of gravity G towards R, and leſs approach the perpendicular NL, according to which it is abſolutely neceſſary that the power applied ſhould act with a greater effect to turn the veſſel. Thus it is evident, that if the obtuſe angle ABD is too much incloſed, the greateſt impulſe of the water will not counterbalance the loſs ſuſtained by the diſtance of the direction NP from NL, or by the great obliquity which is given to the ſame direction NP of the abſolute effort of the helm with the keel AB. If, on the contrary, the angle ABD is too much opened, the direction NP of the force of the action of the helm will become more advantageous to turn the veſſel, becauſe it will approach nearer the perpendicular NL; ſo that the line prolonged from NP will increaſe the line GR, by removing R to a greater diſtance from the centre of gravity G: but then the helm will receive the impreſſion of the water too obliquely, for the angle of incidence will be more acute; ſo that it will only preſent a ſmall portion of its breadth to the ſhock of the water, and by conſequence will only receive a feeble effort. By this principle it is eaſy to conceive, that the greateſt diſtance GR from the centre of gravity G, is not ſufficient to repair the diminution of force occaſioned by the too great obliquity of the ſhock of the water. Hence we may conclude, that when the water either ſtrikes the helm too directly, or too obliquely, it loſes a great deal of the effect it ought to produce. Between the two extremes there is therefore a mean poſition, which is the moſt favourable to its operations.

The diagonal NP of the rectangle IL repreſents the abſolute direction of the effort of the water upon the helm. NI expreſſes the portion of this effort which is oppoſed to the ſhip's head-way, or which puſhes her aſtern, in a direction parallel to the keel. It is eaſily perceived, that this part NI of the whole power of the helm contributes but little to turn the veſſel; for, if IN is prolonged, it appears that its direction approaches to a very ſmall diſtance GV from the centre of gravity G; and that the arm of the lever BN=GV, to which the force is applied, is not in the whole more than equal to half the breadth of the rudder: but the relative force NL, which acts perpendicular to the keel, is extremely different. If the firſt NI is almoſt uſeleſs, and even pernicious, by retarding the velocity; the ſecond NL is capable of a very great effect, becauſe it operates at a conſiderable diſtance from the centre of gravity G of the ſhip, and acts upon the arm of a lever GE, which is very long. Thus it appears, that between the effects NL and NI, which reſult from the abſolute effort NP, there is one which always oppoſes the ſhip's courſe, and contributes little to her motion of turning; whilſt the other produces only this movement of rotation, without operating to retard her velocity.

Geometricians have determined the moſt advantageous angle made by the helm with the line prolonged from the keel, and fixed it at 54° 44′, preſuming that the ſhip is as narrow at her floating-line, or at the line deſcribed by the ſurface of the water round her bottom, as at the keel. But as this ſuppoſition is abſolutely falſe, inaſmuch as all veſſels augment their breadth from the keel upward to the extreme breadth, where the floating-line or the higheſt water-line is terminated; it follows, that this angle is too large by a certain number of degrees. For the rudder is impreſſed by the water, at the height of the floating-line, more directly than at the keel, becauſe the fluid exactly follows the horizontal outlines of the bottom; ſo that a particular poſition of the helm might be ſuppoſed neceſſary for each different incidence which it encounters from the keel upwards. But as a middle poſition may be taken between all theſe points, it will be ſufficient to conſider the angle formed by the ſides of the ſhip, and her *axis*, or the middle-line of her length, at the ſurface of the water, in order to determine afterwards the mean point, and the mean angle of incidence.

It is evident that the angle 54° 44′ is too open, and very unfavourable to the ſhip's head-way, becauſe the water acts upon the rudder there with too great a ſine of incidence, as being equal to that of the angle which it makes with the line prolonged from the keel below: but above, the ſhock of the water is almoſt perpendicular to the rudder, becauſe of the breadth of the bottom, as we have already remarked. If then the rudder is only oppoſed to the fluid, by making an angle of 45° with the line prolonged from the keel, the impreſſion, by becoming weaker, will be leſs oppoſed to the ſhip's head-way, and the direction NP of the abſolute effort of the water upon the helm drawing nearer to the lateral perpendicular, will be placed more advantageouſly, for the reaſons above-mentioned. On the other hand, experience daily teſtifies, that a ſhip ſteers well when the rudder makes the angle DBE equal to 35° only.

It has been already remarked, that the effect of moving the wheel to govern the helm increaſes in proportion to the length of the ſpokes; and ſo great is the power of the wheel, that if the helmſman employs a force upon its ſpokes equivalent to 30 pounds, it will produce an effect of 90 or 120 pounds upon the tiller. On the contrary, the action of the water is collected into the middle of the breadth of the rudder, which is very narrow in compariſon with the length of the tiller; ſo the effort of the water is very little removed from the fulcrum B upon which it turns; whereas the tiller forms the arm of a lever 10 or 15 times longer, which alſo increaſes the power of the helmſman in the ſame proportion that the tiller bears to the lever upon which the impulſe of the water is directed. This force then is by conſequence 10 or 15 times ſtronger; and the effort of 30 pounds, which at firſt gave the helmſman a power equal to 90 or 120 pounds, becomes accumulated to one of 900 or 1800 pounds upon the rudder. This advantage then ariſes from the ſhortneſs of the lever upon which the action of the water is impreſſed, and the great comparative length of the tiller, or lever, by which the rudder is governed; together with the additional power of the wheel that directs the movements of the tiller, and ſtill farther accumulates the power of the helmſman over it. Such a demonſtration ought to remove the ſurpriſe with which the prodigious effect of the helm is ſometimes conſidered, from an inattention to its mechaniſm: for we need only to obſerve the preſſure of the water, which acts at a great diſtance from the centre of gravity G, about which the ſhip is ſuppoſed to turn, and we ſhall eaſily perceive the difference there is between the effort of the water againſt the helmſman, and the effect of the ſame impulſe againſt the veſſel. With regard to the perſon who ſteers, the water acts only with the arm of a very ſhort lever NB, of which B is the fulcrum: on the contrary, with regard to the ſhip, the force of the water is impreſſed in the direction NP, which paſſes to a great diſtance from G, and acts upon a very long lever EG, which renders the action of the rudder extremely powerful in turning the veſſel; ſo that, in a large ſhip, the rudder receives a ſhock from the water of 2700 or 2800 pounds, which is frequently the caſe when ſhe ſails at the rate of three or four leagues by the hour; and this force being applied in E, perhaps 100 or 110 feet diſtant from the centre of gravity G, will operate upon the ſhip, to turn her about, with 270,000 or 308,000 pounds; whilſt, in the latter caſe, the helmſman acts with an effort which exceeds not 30 pounds upon the ſpokes of the wheel.

After what has been ſaid of the helm, it is eaſy to judge, that the more a ſhip increaſes her velocity with regard to the ſea, the more powerful will be the effect of the rudder; becauſe it acts againſt the water with a force, which increaſes as the ſquare of the ſwiftneſs of the fluid, whether the ſhip advances or retreats; or, in other words, whether ſhe has head-way or ſtern-way; with this diſtinction, that in theſe two circumſtances the effects will be contrary. For if the veſſel retreats, or moves aſtern, the helm will be impreſſed from I to N; and inſtead of being puſhed, according to NP, it will receive the effort of the water from N towards R; ſo that the ſtern will be tranſported to the ſame movement, and the head turned in a contrary direction.

When the helm operates by itſelf, the centre of rotation of the ſhip, and her movement, are determined by eſtimating the force of this machine; that is to ſay, by multiplying the ſurface of the rudder by the ſquare of the ſhip's velocity.

There are ſeveral terms in the ſea-language relating to the helm; as, *Bear up the helm;* that is, Let the ſhip go more large before the wind. *Helm a mid ſhip,* or *right the helm:* that is, Keep it even with the middle of the ſhip. *Port the helm,* Put it over the left ſide of the ſhip. *Starboard the helm,* Put it on the right ſide of the ſhip.

HELMET, an ancient defenſive armour worn by horſemen both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front ſecured by bars, which was called the *viſor.*

In atchievements, it is placed above the eſcutcheon for the principal ornament, and is the true mark of chivalry and nobility. Helmets vary according to the different degrees of thoſe who bear them. They are alſo uſed as a bearing in coats of arms. See HERALDRY.

HELMINTHOLITHUS, in natural hiſtory, a name given by Linnæus to petrified bodies reſembling worms.

Of theſe he reckons four genera. 1. Petrified lithophyta, found in the mountains of Sweden. 2. Petrified ſhells. 3. Petrified zoophytes. 4. Petrified reptiles.

HELMONT (John Baptiſt Van), a celebrated Flemiſh gentleman, was born at Bruſſels in 1577. He acquired ſuch ſkill in natural philoſophy, phyſic, and chemiſtry, that he was accounted a magician, and thrown into the inquiſition: but having with difficulty juſtified himſelf, as ſoon as he was releaſed he retired to Holland; where he died in 1644. He publiſhed, 1. *De magnetica corporum curatione.* 2. *Febrium doctrina inaudita.* 3. *Ortus medicinæ.* 4. *Paradoxa de aquis ſpadanis;* and other works, printed together in one volume folio.

HELMONT, a ſmall town in the Netherlands, in Dutch Brabant, and capital of the diſtrict of Peeland, with a good caſtle. It is ſeated on the river Aa, in E. Long. 5. 37. N. Lat. 51. 31.

HELMSTADT, a town of Germany, in the duchy of Brunſwick, built by Charlemagne, in E. Long. 11. 10. N. Lat. 52. 20.

HELMSTADT, a ſtrong maritime town of Sweden, and capital of the province of Holland, ſeated near the Baltic ſea; in E. Long. 21. 5. N. Lat. 56. 44.

HELOISE, famous for her unfortunate affection for her tutor Abelard, and for her Latin letters to him after they had retired from the world. She died abbeſs of Paraclet in 1163. See ABELARD.

HELOS, (anc. geog.), a maritime town of Laconia, ſituated between Trinaſus and Acriæ, in Pauſanias's time in ruins. The diſtrict was called *Helotea,* and the people *Helotes, Helotæ, Helei,* and *Heleatæ,* by Stephanus; and *Ilotæ,* by Livy. Being ſubdued by the Lacedæmonians, they were all reduced to a ſtate of public ſlavery, or made the ſlaves of the public, on theſe conditions, viz. that they could neither recover their liberty nor be ſold out of the territory of Sparta. Hence the term ἐιλωτευειν, in Harpocration, for being in a ſtate of ſlavery; and hence alſo the Lacedæmonians called the ſlaves of all nations whatever *helotes. Heloticus* is the epithet.

HELOTS, in Grecian antiquity, the ſlaves of the Spartans. See HELOS.—The freemen of Sparta were forbidden the exerciſe of any mean or mechanical employment, and thereſore the whole care of ſupplying the city with neceſſaries devolved upon the Helots.

HELSINBURG. See ELSIMBURG.

HELSINGIA, a province of Sweden, bounded on the north by Jempterland and Medelpadia; on the eaſt by the Bothnic gulf, and on the ſouth and weſt by Dalecarlia and Geſtricia. It is full of mountains and foreſts, and the inhabitants are almoſt conſtantly employed in hunting and fiſhing. It has no cities: the principal towns are Hudwickvald, Alta, and Dilſbo.

HELSINGIC CHARACTER, a peculiar kind of character found inſcribed on ſtones in the province of Helſingia. The Runic and Helſingic characters may be eaſily transformed into each other.

HELSTON, a town of Cornwall in England, ſeat on the river Lowed, in W. Long. 5. 45. N. Lat. 50. 8. It contains about 400 houſes, is well inhabited, and ſends two members to parliament. The ſteeple with its ſpire, which is about 90 feet high, is a notable ſea-mark. A little below the town is a harbour where ſeveral tin-ſhips take in their lading, and here is the largeſt market-houſe in the county. The inhabitants neither pay to the church nor poor, theſe being ſupported by the revenues of the town.

HELVETIUS (Adrian), an eminent phyſician, born in Holland. After having ſtudied phyſic at Leyden, he went to Paris, where he acquired great reputation in his profeſſion. He introduced in France the uſe of ipecacuanha in the cure of dyſenteries, a remedy which he at firſt kept ſecret; but was ordered to make it public, and on that account received a gratification from the king of 1000 louis d'ors. He was made inſpector-general of the hoſpitals in Flanders, phyſician to the duke of Orleans, regent of France, &c.; and died at Paris, in 1727, aged 65. He wrote a treatiſe on the moſt common diſeaſes, and the remedies proper for their cure, (the beſt edition of which is that of 1724, in two volumes octavo); and other works.

HELVETIUS (John), ſon of the former, was born in 1685. He was bred to phyſic; in which line he became eminent both as a practitioner and a writer, but is beſt known by his famous philoſophical work entitled *L'Eſprit.* He died in 1755.

HELVICUS (Chriſtopher), profeſſor of divinity, Greek, and the Oriental tongues, in the univerſity of Giſſen, died in the flower of his age in 1617; after having publiſhed ſeveral books, and projected more. The Hebrew language was ſo familiar to him, that he ſpoke it as fluently as his mother tongue. He was not only a good grammarian, but alſo an able chronologer. His chronological tables have been greatly eſteemed, though they are not free from errors.

HELVOET-SLUYS, a ſea-port town of the United Netherlands, ſeated on the iſland of Voorn, in the province of Holland, and where the Engliſh packet-boat always goes. It is but a ſmall place, conſiſting only of a handſome quay, and two or three little ſtreets. But it is very well fortified, and eſteemed the ſafeſt harbour in the country. The largeſt men of war may come up to the middle of the town; and yet it has but very little trade, becauſe the merchants chooſe to live higher up the country. E. Long. 4. 0. N. Lat. 51. 44.

HEMELAR (John), an eminent antiquary, and canon of Antwerp, in the 17th century, was born at the Hague; and wrote a work, entitled, *Expoſitio Numiſmatum imperatorum Romanorum à Julio Cæſare ad Heraclium;* which is very ſcarce, though it has had ſeveral editions.

HEMATH, or Hamath, (anc. geog.), the name of a city (whoſe king was David's friend, 2 Sam. ix.) to the ſouth of Lebanon; from which a territory was called *Nemath*, on the north of Canaan and ſouth of Syria, as appears by the ſpies, Numb. xiii. 1 Kings viii. Ezek. xlvii. Whether one or more cities and diſtricts of this name lay in this tract, neither interpreters nor geographers are agreed. The eaſtern part was called *Hemath-zoba*, 2 Chron. viii. unleſs we ſuppoſe that there was a city in *Zoba* of this name fortified by Solomon. In defining the boundary of Paleſtine, it is often ſaid, *from the entering of Hamath;* as a province to be entered into through a ſtrait or defile. And if there was ſuch, the next queſtion is, From what metropolis it was called *Hemath*. Antioch, capital of Syria, is ſuppoſed to be called *Hemath* or *Amatha*, (Jonathan, Targum, &c.); and again, *Epiphania*, (Joſephus.) Both were to the north of Lebanon; conſequently not the *Hemath* of Scripture, the immediate boundary of Paleſtine to the north, and lying to the ſouth of Lebanon.

HEMATITES. See Hæmatites.

HEMEROBIUS, in zoology, a genus of inſects of the neuroptera order, the characters of which are theſe. The mouth is furniſhed with two teeth; the palpi are four; the wings are deflected, but not plaited; and the antennæ are briſtly, and longer than the breaſt. There are 15 ſpecies, principally diſtinguiſhed by their colours.

HEMEROCALLIS, day-lily, or *lily-aſphodel;* a genus of the monogynia order, belonging to the hexandria claſs of plants.

Species. 1. The flava, or yellow day-lily, hath ſtrong fibrous roots, ſending up large hollow keel-ſhaped leaves, two feet long, upright, leafleſs, firm ſtalks, two feet high; dividing at top into ſeveral foot-ſtalks, each terminated by one large lilaceous yellow flower of an agreeable odour. Of this there is a variety called the *hemerocallis minor*, or ſmall yellow day-lily. 2. The fulva, reddiſh, or copper-coloured day-lily, hath roots compoſed of ſtrong fleſhy fibres and large oblong tubes; radical, keel-ſhaped, hollow, pointed leaves, a yard long, reflexed at top; with leafleſs ſtalks three or four feet high, and large copper-coloured liliaceous flowers. Theſe have large ſtamina, charged with a kind of brown-coloured farina; which, on being touched or ſmelled to, is diſcharged in great plenty all over the hands or face.

Culture. Both theſe ſpecies are hardy, and will thrive any where. They may be eaſily propagated by parting their roots in autumn, or almoſt any time after flowering or before they begin to flower.

HEMI, a word uſed in the compoſition of divers terms, ſignifying the ſame with *ſemi*, or *demi*, viz. "one half."

HEMINA, in Roman antiquity, a liquid meaſure, which, according to Arbuthnot, was equal to half a wine-pint Engliſh meaſure; its contents being 2.818 ſolid inches.

HEMIPLEGIA, or Hemiplexia, among phyſicians, a palſy of one half of the body. See (the *Index* ſubjoined to) Medicine.

HEMISPHERE, in geometry, the half of a globe or ſphere, when it is ſuppoſed to be cut thro' its centre in the plane of one of its great circles.

Hemisphere, is alſo uſed to denote a projection of half the terreſtrial globe, or half the celeſtial ſphere, on a plane, and frequently called *planiſphere*.

HEMISTICH, in poetry, denotes half a verſe, or a verſe not completed.

Of this there are frequent examples in Virgil's Æneid; but whether they were left unfiniſhed by deſign or not, is diſputed among the learned: ſuch are, *Ferro accincta vocat*, Æn. II. v. 614. And, *Italiam non ſponte ſequor*, Æn. IV. v. 361.

In reading common Engliſh verſes, a ſhort pauſe is required at the end of each hemiſtich or half-verſe.

HEMITRITÆUS, in medicine, a kind of fever, denoting the ſame as ſemi-tertian, returning twice every day. The word is Greek, and compounded of ημισυς, "half," and τριταιος, "third, or tertian."

HEMLOCK, in botany. See Cicuta and Conium.

HEMOIPTOTON. See Oratory, n° 77.

HEMP, in botany. See Cannabis.

The raiſing and dreſſing of hemp ſcarcely differs from the raiſing and dreſſing of flax, but in the following particulars.

Hemp requires a light, free, duſty, and even a ſandy warm ſoil; which if not naturally rich, muſt be made ſo by manure. New broke-up ground does not anſwer for hemp, producing it thin and poor upon the ſtalk. Hemp does well to follow beans. The ground ſhould be ploughed and harrowed three or four times, a fortnight or three weeks intervening between each time. In ſome parts of Lincoln and Holland, the ſoil is naturally ſo free and rich, that it will produce hemp conſtantly year after year without manure. The leaves which fall off the ſtalk help to manure the ground. It is frequently ſown with a view to clear the ground of weeds; which it does moſt effectually, growing faſt, and ſoon checking every weed but mugwort, which is picked out with a fork.

It is ſown about the firſt of May; ſo thin, that about four pecks are ſufficient for an Engliſh acre; and the ground muſt then be covered as much as poſſible to preſerve the ſeed from the birds, who are very fond of it.

The *taper-topped* ſtalk which does not bear the pods, is called the *female;* though in fact it is the *male*, ſcattering from its bloom a ſmall duſt, which impregnates the pods of the *buſhy-topped;* which laſt is commonly, tho' improperly, called the *male* or *carle hemp*.

When hemp is the object of the farmer more than a crop of ſeed, the whole ſhould be pulled when the ſtalk begins to grow yellow, and the earth remaining about the roots ſhould be beat off to prevent more growth: but if the ſeed is wanted in its greateſt perfection, the ſtalks bearing the pods muſt be pulled before the uppermoſt pod begins to open; the earth ſhould not be beat off from the roots; it ſhould be ſtooked in ſheaves upon the field, to dry and win as corn; and the top of theſe ſtooks ſhould be covered with undergrowth or the like, to preſerve the ſeed from the birds.

Hemp is ſooner watered than flax, and the canals muſt be deeper.

In keeping the ſeed, care muſt be taken to preſerve it from rats, mice, and ſuch like vermin, who are all fond of it.

It is dreſſed as coarſe flax, but is ſooner dreſſed; and its greater length requires more care, and renders it more troubleſome in the handling, eſpecially in the ſkutching of it by the water lint-mills with horizontal ſkutchers, when it muſt be folded double. What is too coarſe and ſtrong in the ſtalk for the hand or foot machines, may be broke and peeled by the hand. See FLAX.

HEMP-*Agrimony*, a ſpecies of EUPATORIUM.—It has a very bitter taſte. A decoction of the roots operates as a violent emetic and cathartic, and is ſometimes taken by the lower claſs of people to cure the jaundice, dropſy, and cachexy; but is a rough medicine, and ought to be uſed with caution. Boerhaave made uſe of an infuſion of this plant to foment ulcers and putrid ſores. Tournefort informs us, that the Turks cure the ſcurvy with it. An ounce of the juice, or a dram of the extract, is a doſe.

HEMPSTEAD, a town of Hartfordſhire in England, ſeated among the hills on a branch of the river Coln. W. Long. 0. 40. N. Lat. 51. 44.

HEN, in ornithology. See PHASIANUS.

Guinea-HEN. See NUMIDA.

HEN-*Bane*. See HYOSCIAMUS.

HENDECAGON, in geometry, a figure that hath 11 ſides and as many angles.

HENLEY, a town of Oxfordſhire in England, ſeated on the river Thames, over which there is a handſome bridge. It ſends malt, corn, and other things, to London in barges. W. Long. 0. 40. N. Lat. 51. 34.

HENLEY, a town of Warwickſhire in England, ſeated on the river Alne, in W. Long. 1. 45. N. Lat. 52. 18.

HENNA, or ALHENNA. See LAWSONIA.

HENNEBERG, a county of Germany, in the circle of Franconia. It is bounded on the north by Thuringia, on the weſt by Heſſe, on the ſouth by the biſhopric of Wertzburg, and on the eaſt by that of Bamberg. It abounds in mountains and woods; and it is populous, and pretty fertile. Mainingen is the capital town.

HENNEBERG, a town of Germany, in the circle of Franconia, which gives title to a county of the ſame name, with a caſtle. E. Long. 9. 17. N. Lat. 50. 40.

HENNEBON, a town of France in Bretagne, in the dioceſe of Vannes. It is inhabited by rich merchants, and is ſeated on the river Blavet, in W. Long. 2. 13. N. Lat. 47. 48.

HENOTICON, in church-hiſtory, a decree or edict of the emperor Zeno, made at Conſtantinople in the year 482, by which he pretended to reconcile all parties under one faith. It is generally agreed, that Peter, patriarch of Alexandria, and Acacius, patriarch of Conſtantinople, were the authors of this decree; and that their deſign was to compliment the emperor with a right of preſcribing regulations in matters of faith. The emperor, by this decree, arrogated to himſelf the right of being head of the church. Pope Simplicius, however, in the year 483, condemned the henoticon, and cited Acacius to appear before him at Rome; but it was not entirely ſuppreſſed till the year 518.

HENRY, or CAPE-HENRY, the ſouth cape of Virginia, at the entrance of Cheſapeak-bay. W. Long. 74. 50. N. Lat. 37. 0.

HENRY, the name of ſeveral emperors of Germany, and kings of England and France. See ENGLAND, FRANCE, and GERMANY.

HENRY IV. emperor of Germany in 1056, ſtyled *the Great*, was memorable for his quarrels with pope Gregory II. whom at one time he depoſed, for having preſumed to judge his ſovereign; but at another, dreading the effects of the papal anathemas, he had the weakneſs to ſubmit to the moſt humiliating perſonal ſolicitations and penances to obtain abſolution, which impolitic meaſure increaſed the power of the Pope, and alienated the affections of his ſubjects: thus circumſtanced, he reaſſumed the hero, but too late; marched with an army to Rome, expelled Gregory, depoſed him, and ſet up another Pope. Gregory died ſoon after: but Urban II. and Paſcal II. ſucceſſively, excited his ambitious ſons, Conrad and Henry, to rebel againſt him, and the latter was crowned emperor by the title of Henry V. in 1106; and he had the inhumanity to arreſt his father, and to deprive him, not only of all his dignities, but even of the neceſſaries of life. The unfortunate Henry IV. was reduced to ſuch extremities, (after having fought 62 battles in defence of the German empire), that he ſolicited the biſhop of Spire to grant him an under-chaunter's place in his cathedral, but was refuſed. He died the ſame year, at Liege, aged 55, a martyr to the ignorance and ſuperſtition of the age, and to his own blind confidence in favourites and miſtreſſes.

HENRY IV. king of France (in 1589) and Navarre, juſtly ſtyled *the Great*, was the ſon of Anthony de Bourbon, chief of the branch of Bourbon, (ſo called from a fief of that name which fell to them by marriage with the heireſs of the eſtate). His mother was the daughter of Henry de Albert, king of Navarre; a woman of a maſculine genius; intrepid, ſimple and ruſtic in her manners, but deeply verſed in politics, and a zealous proteſtant. Foreſeeing that her party would want ſuch a protector (for her huſband was a weak indolent prince), ſhe undertook the care of the education of the young hero: his diet was coarſe; his clothes neat, but plain; he always went bare-headed; ſhe ſent him to ſchool with the other children of the ſame age, and accuſtomed him to climb the rocks and neighbouring mountains, according to the cuſtom of the country. He was born in 1553; and in 1569, the 16th year of his age, he was declared the Defender and Chief of the Proteſtants at Rochelle. The peace of St Germain, concluded in 1570, recalled the lords in the Proteſtant intereſt to court; and in 1572 Henry was married to Margaret de Valois, ſiſter to Charles IX. king of France. It was in the midſt of the rejoicings for theſe nuptials, that the horrid maſſacre of Paris took place. Henry was reduced, by this infernal ſtroke of falſe policy, to the alternative of changing his religion or being put to death: he choſe the former, and was detained priſoner of ſtate three years. In 1587, he made his eſcape; put himſelf at the head of the Huguenot party, expoſing himſelf to all the riſks and fatigues of a religious war, often in want of the neceſſaries of life, and induring all the hardſhips of the common ſoldier: but he gained a victory this year at Courtras, which eſtabliſhed his reputation in arms, and endeared him to the Proteſtants. On the death of Henry III. religion was urged as a pretext for one half of the officers of the French army to reject him, and for the leaguers not to acknowledge him. A phantom, the cardinal de Bourbon, was ſet up againſt him; but his moſt formidable rival was the duke de Mayenne: however, Henry, with few friends, fewer important places, no money, and a very ſmall army, ſupplied every want by his activity and valour. He gained ſeveral victories over the duke; particularly that of Ivri in 1590, memorable for his heroic admonition to his ſoldiers: "If you love your enſigns, rally by my white plume, you will always find it in the road to honour and glory." Paris held out againſt him, notwithſtanding his ſucceſſes: he took all the ſuburbs in one day; and might have reduced the city by famine, if he had not humanely ſuffered his own army to relieve the beſieged; yet the bigotted friars and prieſts in Paris all turned ſoldiers, except four of the Mendicant order; and made daily military reviews and proceſſions, the ſword in one band and the crucifix in the other, on which they made the citizens ſwear rather to die with famine than to admit Henry. The ſcarcity of proviſions in Paris at laſt degenerated to an univerſal famine; bread had been ſold, whilſt any remained, for a crown the pound, and at laſt it was made from the bones of the charnel-houſe of St Innocents; human fleſh became the food of the obſtinate Pariſians, and mothers eat the dead bodies of their children. In fine, the duke of Mayenne, ſeeing that neither Spain nor the league would ever grant him the crown, determined to aſſiſt in giving it to the lawful heir. He engaged the ſtates to hold a conference with the chiefs of both parties; which ended in Henry's abjuration of the Proteſtant religion at St Dennis, and his conſecration at Chartres in 1593. The following year Paris opened its gates to him; in 1596, the duke of Mayenne was pardoned; and in 1598, peace was concluded with Spain. Henry now ſhewed himſelf doubly worthy of the throne, by his encouragement of commerce, the fine arts, and manufactures, and by his patronage of men of ingenuity and ſound learning of every country: but though the fermentations of Romiſh bigotry were calmed, the leaven was not deſtroyed; ſcarce a year paſſed without ſome attempt being made on this real father of his people; and at laſt the monſter Ravaillac ſtabbed him to the heart in his coach, in the ſtreets of Paris, on the 14th of May 1610, in the 57th year of his age and 22d of his reign.

HENRY VIII. king of England, was the ſecond ſon of Henry VII. by Elizabeth the eldeſt daughter of Edward IV. He was born at Greenwich, on the 28th of June 1491. On the death of his brother Arthur, in 1502, he was created prince of Wales; and the following year betrothed to Catharine of Arragon, prince Arthur's widow, the Pope having granted a diſpenſation for that purpoſe. Henry VIII. acceded to the throne, on the death of his father, the 22d of April 1509, and his marriage with Catharine was ſolemnized about two months after. In the beginning of his reign he left the government of his kingdom entirely to his miniſters; and ſpent his time chiefly in tournaments, balls, concerts, and other expenſive amuſements. We are told that he was ſo extravagant in his pleaſures, that, in a very ſhort time, he entirely diſſipated 1,800,000 l. which his father had hoarded. This will ſeem leſs wonderful, when the reader is informed, that gaming was one of his favourite diverſions. Nevertheleſs he was not ſo totally abſorbed in pleaſure, but he found leiſure to ſacrifice, to the reſentment of the people, two of his father's miniſters, Empſon and Dudley. A houſe in London, which had belonged to the former of theſe, was in 1510 given to Thomas Wolſey, who was now the king's almoner, and who from this period began to inſinuate himſelf into Henry's favour. In 1513, he became prime miniſter, and from that moment governed the king and kingdom with abſolute power. In this year Henry declared war againſt France, gained the battle of Spurs, and took the towns of Terouenne and Tournay; but before he embarked his troops, he beheaded the earl of Suffolk, who had been long confined in the tower. In 1521, he ſacrificed the duke of Buckingham to the reſentment of his prime miniſter Wolſey, and the ſame year obtained from the Pope the title of *Defender of the Faith*.

Henry, having been 18 years married, grew tired of his wife, and in the year 1527 reſolved to obtain a divorce; but after many fruitleſs ſolicitations, finding it impoſſible to perſuade the Pope to annul his marriage with Catharine, he eſpouſed Ann Bullen in the year 1531. During this interval his favourite Wolſey was diſgraced, and died; Henry threw off the Papal yoke, and burnt three Proteſtants for hereſy. In 1535, he put to death Sir Thomas More, Fiſher, and others, for denying his ſupremacy, and ſuppreſſed all the leſſer monaſteries.

His moſt ſacred majeſty, having now poſſeſſed his ſecond queen about five years, fell violently in love with lady Jane Seymour. Ann Bullen was accuſed of adultery with her own brother, and with three other perſons: ſhe was beheaded the 19th of May, 1536. He married Jane Seymour the day following. In 1537, he put to death five of the noble family of Kildare, as a terror to the Iriſh, of whoſe diſloyalty he had ſome apprehenſions; and in the year following he executed the marquis of Exeter, with four other perſons of diſtinction, for the ſole crime of correſponding with cardinal Pole. In 1538 and 1539, he ſuppreſſed all the monaſteries in England, and ſeized their revenues for his own uſe. The queen having died in childbed, he this year married the princeſs Ann of Cleves: but diſliking her perſon, immediately determined to be divorced; and his obſequious parliament and convocation unanimouſly pronounced the marriage void, for reaſons too ridiculous to be recited: but this was not all; Henry was ſo incenſed with his miniſter and quondam favourite, Cromwell, for negociating this match, that he revenged himſelf by the hand of the executioner. Yet this was not the only public murder of the year 1540. A few days after Cromwell's death, ſeveral perſons were burnt for denying the king's ſupremacy, and other articles of hereſy.

His majeſty being once more at liberty to indulge himſelf with another wife, fixed upon Catharine Howard, niece to the duke of Norfolk. She was declared queen in Auguſt 1540; but they had been privately married ſome time before. Henry, it ſeems, was ſo entirely ſatisfied with this lady, that he daily bleſſed God for his preſent felicity; but that felicity was of ſhort duration: he had not been married above a year, before the queen was accuſed of frequent proſtitution, both before and ſince her marriage: ſhe confeſſed her guilt, and was beheaded in February 1542. In July 1543, he married his ſixth wife, the Lady Catharine Parr, the widow of John Nevil lord Latimer, and lived to the year 1547, without committing any more flagrant enormities: but finding himſelf now approach towards diſſolution, he made his will; and, that the laſt ſcene of his life might reſemble the reſt, he determined to end the tragedy with the murder of two of his beſt friends and moſt faithful ſubjects, the duke of Norfolk, and his ſon the earl of Surrey. The earl was beheaded on the 19th of January; and the duke was ordered for execution on the 29th, but fortunately eſcaped by the king's death on the 28th. They were condemned without the ſhadow of a crime; but Henry's political reaſon for putting them to death, was his apprehenſion, that, if they were ſuffered to ſurvive him, they would counteract ſome of his regulations in religion, and might be troubleſome to his ſon. Henry died on the 28th of January 1547, in the 56th year of his age, and was buried at Windſor.

As to his character, it is pretty obvious from the facts above related. Lord Herbert palliates his crimes, and exaggerates what he calls his *virtues*. Biſhop Burnet ſays, "he was rather to be reckoned among the *great* than the *good* princes." He afterwards acknowledges, that "he is to be numbered among the ill princes;" but adds, "I cannot rank him with the worſt." Sir Walter Raleigh, with infinitely more juſtice, ſays, "If all the pictures and patterns of a merciless prince were loſt to the world, they might again be painted to the life out of the hiſtory of this king." He was indeed a mercileſs tyrant, a ſcurvy politician, a fooliſh bigot, a horrible aſſaſſin. See **England**, n° 212—230.

Henry *of Huntingdon*, an Engliſh hiſtorian, of the 12th century, was canon of Lincoln, and afterwards archdeacon of Huntingdon. He wrote, 1. A hiſtory of England, which ends with the year 1154. 2. A continuation of that of Bede. 3. Chronological tables of the kings of England. 4. A ſmall treatiſe on the contempt of the world. 5. Several books of epigrams and love-verſes. 6. A poem on herbs; all which are written in Latin.——His invocation of Apollo and the goddeſſes of Tempe, in the exordium of his poem on herbs, may not be unacceptable as a ſpecimen of his poetry.

> Vatum magne parens, herbarum Phœbe repertor.
> Voſque, quibus reſonant Tempe jocoſa Deæ!
> Si mihi ſerta prius hedera florente paraſtis,
> Ecce meos flores, ſerta parate fero.

Henry *of Suſa*, in Latin, *de Seguſio*, a famous civilian and canoniſt of the 13th century, acquired ſuch reputation by his learning, that he was called *the ſource and ſplendor of the law*. He was archbiſhop of Embrun about the year 1258, and cardinal biſhop of Oſtia in 1262. He wrote *A ſummary of the canon and civil law*; and *A commentary on the book of the decretals*, compoſed by order of Alexander IV.

Henry (Philip), a pious and learned nonconformiſt miniſter, was the ſon of Mr John Henry, page of the back-ſtairs to James duke of York, and was born at Whitehall in 1631. He was admitted into Weſtminſter ſchool at about 12 years of age; became the favourite of Dr Buſby, and was employed by him, with ſome others, in collecting materials for the Greek grammar he afterwards publiſhed. From thence he removed to Chriſt-church, Oxford; where, having obtained the degree of maſter of arts, he was taken into the family of judge Puleſton, at Emeral in Flintſhire, as tutor to his ſons, and to preach at Worthenbury. He ſoon after married the only daughter and heireſs of Mr Daniel Matthews of Broad-oak near Whitchurch, by whom he became poſſeſſed of a competent eſtate. When the king and epiſcopacy were reſtored, he refuſed to conform, was ejected, and retired with his family to Broad-oak; here, and in the neighbourhood, he ſpent the remainder of his life, about 28 years, relieving the poor, employing the induſtrious, inſtructing the ignorant, and exerciſing every opportunity of doing good. His moderation in his nonconformity was eminent and exemplary; and upon all occaſions he bore teſtimony againſt uncharitable and ſchiſmatical ſeparation. In church-government he wiſhed for archbiſhop Uſher's reduction of epiſcopacy. He thought it lawful to join in the common-prayer in public aſſemblies; which, during the time of his ſilence and reſtraint, he commonly attended with his family, with reverence and devotion.

Henry (Matthew), an eminent diſſenting miniſter and author, was the ſon of the former, and was born in the year 1662. He continued under his father's care till he was 18 years of age; in which time he became well ſkilled in the learned languages, eſpecially in the Hebrew, which his father had rendered familiar to him from his childhood; and from firſt to laſt the ſtudy of the ſcriptures was his moſt delightful employment. He completed his education in an academy kept at Iſlington by Mr Doolittle, and was afterwards entered in Gray's-Inn for the ſtudy of the law; where he became well acquainted with the civil and municipal law of his own country, and from his application and great abilities it was thought he would have become very eminent in that profeſſion. But at length, reſolving to devote his life to the ſtudy of divinity, in 1686 he retired into the country, and was choſen paſtor of a congregation at Cheſter, where he lived about 25 years, greatly eſteemed and beloved by his people. He had ſeveral calls from London, which he conſtantly declined; but was at laſt prevailed upon to accept an unanimous invitation from a congregation at Hackney. He wrote, 1. Expoſitions of the Bible, in 5 vols. folio. 2. The life of Mr Philip Henry. 3. Directions for daily communion with God. 4. A method for prayer. 5. Four diſcourſes againſt vice and immorality. 6. The communicant's companion. 7. Family hymns. 8. A ſcriptural catechiſm; and, 9. A diſcourſe concerning the nature of ſchiſm. He died of an apoplexy at Nantwich, when upon a journey, in 1714; and was interred at Trinity-church, in Cheſter.

HEPAR sulphuris, or Liver *of* Sulphur, a combination of alkaline ſalt and ſulphur. See Chemistry, nº 321—325.

By means of the fume ariſing on the decompoſition of *hepar ſulphuris* by an acid, Mr Bergman hath found a method of imitating the hot or ſulphureous mineral waters, to as great perfection as the cold ones are now imitated by fixed air. The proceſs conſiſts ſimply in adding the vitriolic acid to *hepar ſulphuris*, and impregnating water with the peculiar ſpecies of *air* that ariſes from this mixture; in the ſame manner as when water is impregnated with the fixed air ariſing from the mixture of that or any other acid with chalk. This *hepatic air*, as the author calls it, is very readily abſorbed by water; to which it gives the ſmell, taſte, and all the other ſenſible qualities of the ſulphureous waters. A Swediſh *cantharus* of diſtilled water, containing 12½ Swediſh cubic inches, will abſorb about 60 cubic inches of this hepatic air; and on dropping into it the *nitrous acid*, it will appear, that a real ſulphur is contained, in a ſtate of perfect ſolution, in this water, to the quantity of eight grains. It does not appear that any other acid, except what the author calls the *dephlogiſticated marine acid*, will produce this effect.—When any particular ſulphureous water is to be imitated, we ſcarce need to obſerve, that the ſaline, or other contents peculiar to it, are to be added to the artificial *hepatic water*. Inſtead of the liver of ſulphur, the operator may uſe a mixture of three-parts of filings of iron and two-parts of ſulphur melted together.

It may, perhaps, be thought, that water thus prepared, does not differ from that in which a portion of the *hepar ſulphuris* has been diſſolved: but it appears evidently to differ from it in this material circumſtance;—that in the ſolution of *hepar ſulphuris*, the ſulphur is held in ſolution by the water, through the means of the *alkali* combined with it: whereas, in M. Bergman's proceſs, it does not appear probable that the *hepar ſulphuris* riſes ſubſtantially in the form of air; for, in that caſe, its preſence in the hepatic water might be detected by means of the weakeſt of the acids (even the mephitic), which would precipitate the ſulphur from it. Nor can it be ſuppoſed that any portion or conſtituent part of the *alkali* itſelf (except a part of its remaining fixed air) can come over. The water, therefore, muſt owe its impregnation to the ſulphur, raiſed, in ſome peculiar manner, into the ſtate of an elaſtic vapour; permanent, when the experiment is made in quickſilver; but condenſible in water, and rendered ſoluble in that fluid through the means of ſome unknown principle combined with it, and which the author ſuppoſes to be the matter of heat, combined with it through the medium of *phlogiſton*.

HEPATIC, in medicine and anatomy, any thing belonging to the liver.

Hepatic *Air*. See Hepar *Sulphuris*.

Hepatic *Aloes*, the inſpiſſated juice of a ſpecies of Aloes.

Hepatic *Water*. See Hepar *Sulphuris*.

HEPATICA, in botany, a ſpecies of Anemone.

HEPATITIS, in medicine, an inflammation of the liver. See (the *Index* ſubjoined to) Medicine.

HEPHÆSTIA, in Grecian antiquity, an Athenian feſtival in honour of Vulcan, the chief ceremony of which was a race with torches. It was performed in this manner: The antagoniſts were three young men, one of whom, by lot, took a lighted torch in his hand, and began his courſe; if the torch was extinguiſhed before he finiſhed the race, he delivered it to the ſecond; and he in like manner to the third: the victory was his who firſt carried the torch lighted to the end of the race; and to this ſucceſſive delivering of the torch, we find many alluſions in ancient writers.

HEPTACHORD, in the ancient poetry, ſignified verſes that were ſung or played on ſeven chords, that is, on ſeven different notes. In this ſenſe it was applied to the lyre when it had but ſeven ſtrings. One of the intervals is alſo called an *heptachord*, as containing the ſame number of degrees between the extremes.

HEPTAGON, in geometry, a figure conſiſting of ſeven ſides, and as many angles. In fortification, a place is termed an *heptagon*, that has ſeven baſtions for its defence.

HEPTAGONAL numbers, in arithmetic, a ſort of polygonal numbers, wherein the difference of the terms of the correſponding arithmetical progreſſion is 5. One of the properties of theſe numbers is, that if they be multiplied by 40, and 9 be added to the product, the ſum will be a ſquare number.

HEPTANDRIA, in botany, (from ἑπτα, *ſeptem*, and ανηρ, *a man;)* the ſeventh claſs in Linnæus's ſexual method, conſiſting of plants with hermaphrodite flowers, which have ſeven ſtamina, or male-organs. The orders are four, derived from the number of ſtyles or female-organs.

HEPTANGULAR, in geometry, an appellation given to figures which have ſeven angles.

HEPTARCHY, a government of ſeven perſons; alſo a ſtate or country divided into ſeven kingdoms, and governed by ſeven independent princes; in which ſenſe it is particularly applied to the government of South-Britain, when divided among the Saxons. See England, nº 43.

HERACLEA, an ancient city of Turky in Europe, and in Romania, with the ſee of an archbiſhop of the Grecian church, and a ſea-port. It was a very famous place in former times, and there are ſtill ſome remains of its ancient ſplendor. Theodore Laſcaris took it from David Comnenus, emperor of Trebiſond; when it fell into the hands of the Genoeſe, but Mahomet II. took it from them; ſince which time it has been in the poſſeſſion of the Turks. It is near the ſea. E. Lon. 27. 48. N. Lat. 40. 27.

HERACLEONITES, a ſect of Chriſtians, the followers of Heracleon, who refined upon the Gnoſtic divinity, and maintained that the world was not the immediate production of the Son of God, but that he was only the occaſional cauſe of its being created by the demiurgus. The Heracleonites denied the authority of the prophecies of the Old Teſtament, maintaining that they were mere random ſounds in the air; and that St John the Baptiſt was the only true voice that directed to the Meſſiah.

HERACLEUM, madness; a genus of the digynia order, belonging to the pentandria claſs of plants.—There are five ſpecies, of which the moſt remarkable is the ſpondylium, or cow-parſnip. This is common in many parts of Britain, and other northern parts of Europe and Aſia.—Gmelin, in his *Flora Siberica*, p. 214, tells us, that the inhabitants of Kamtſchatka, about the beginning of July, collect the foot-ſtalks of the radical leaves of this plant, and, after peeling off the rhind, dry them ſeparately in the ſun, and then, tying them in bundles, dry them carefully in the ſhade: in a ſhort time afterwards, theſe dried ſtalks are covered over with a yellow ſaccharine effloreſcence, taſting like liquorice; and in this ſtate they are eaten as a great delicacy.—The Ruſſians not only eat the ſtalks thus prepared, but procure from them a very intoxicating ſpirit. They firſt ferment them in water with the greater bilberries, (*vaccinium uliginoſum*), and then diſtil the liquor to what degree of ſtrength they pleaſe; which Gmelin ſays is more agreeable to the taſte than ſpirits made from corn. This may therefore prove good ſuccedaneum for whiſky; and prevent the conſumption of much barley, which ought to be applied to better purpoſes.—Swine and rabbits are very fond of this plant. In the county of Norfolk it is called *hog-weed*.

HERACLIDÆ, in antiquity, the deſcendants of Hercules. The Heraclidæ were expelled from Peloponneſus, by Euriſtheus king of Mycenæ, after the death of Hercules.

Return of the HERACLIDÆ into Peloponneſus, is a celebrated epocha in the ancient chronology.—The time of this return is differently aſſigned; by reaſon authors miſtake the divers attempts they made to return, for the return itſelf. The firſt attempt was 20 years before the taking of Troy: the ſecond was 100 years later, or 80 years after the taking of Troy. This laſt is ſuppoſed to have ſucceeded; at leaſt, according to Petavius, who mentions only theſe two. Scaliger diſtinguiſhes three attempts; and fixes the firſt 50 years later than Petavius, viz. 30 years after the taking of Troy. He ſays nothing of the ſecond, which was unfortunate like the firſt; but places the third in the ſame year with Petavius. As it occaſioned a world of changes and revolutions in the affairs of Greece, inſomuch that ſcarce a ſtate or people but were turned upſide down thereby, the return of the Heraclidæ is the epocha of the beginning of profane hiſtory: all the time that preceded it is reputed fabulous. Accordingly, Ephorus, Cumanus, Calliſthenes, and Theopompus, only begin their hiſtories from hence.

HERACLIDES *of* PONTUS, a Greek philoſopher, the diſciple of Speuſippus, and afterwards of Ariſtotle, flouriſhed about 336 B. C. His vanity prompted him to deſire one of his friends to put a ſerpent into his bed juſt as he was dead, in order to raiſe a belief that he was aſcended to the heavens among the gods; but the cheat was diſcovered. All his works are loſt.

HERACLITUS, a famous Epheſian philoſopher, who flouriſhed about the 69th Olympiad, in the time of Darius Hyſtaſpes. He is ſaid to have continually bewailed the wicked lives of men, and, as often as he came among them, to have fallen a-weeping; contrary to Democritus, who made the follies of mankind a ſubject of laughter. He retired to the temple of Diana, and played at dice with the boys there; ſaying to the Epheſians who gathered round him, "Worſt "of men, what do ye wonder at? Is it not better to "do thus than to govern you?" Darius wrote to this philoſopher to come and live with him; but he refuſed the offer: at laſt, out of hatred to mankind, he retired to the mountains, where he contracted a dropſy by living on herbs, which deſtroyed him at 60 years of age. His writings gained him ſo great reputation, that his followers were called *Heraclitians*. Laertius ſpeaks of a treatiſe upon nature, divided into three books, one concerning the univerſe, the ſecond political, the third theological, which he depoſited in the temple of Diana.

HERACLIUS, emperor of the eaſt, a renowned warrior, died A. D. 641. He carried on long and bloody wars with the Saracens, by whom he was almoſt always defeated. See ARABIA, n° 67—93.

HERALD, ſays Verſtegan, is derived from the Saxon word *Herehault*, and, by abbreviation, *Heralt*, which in that language ſignifies the champion of an army; and, growing to be a name of office, it was given to him who, in the army, had the ſpecial charge to denounce war, to challenge to battle and combat, to proclaim peace, and to execute martial meſſages. But the buſineſs of heralds with us is as follows, viz. To marſhal, order, and conduct all royal calvacades, ceremonies at coronations, royal marriages, inſtallations, creations of dukes, marquiſes, earls, viſcounts, barons, baronets, and dubbing of knights; embaſſies, funeral proceſſions, declarations of war, proclamations of peace, &c.: To record and blazon the arms of the nobility and gentry; and to regulate any abuſes therein thro' the Engliſh dominions, under the authority of the Earl-Marſhal, to whom they are ſubſervient. The office of Windſor, Cheſter, Richmond, Somerſet, York, and Lancaſter heralds, is to be aſſiſtants to the kings at arms, in the different branches of their office; and they are ſuperior to each other, according to creation, in the above order.

Heralds were formerly held in much greater eſteem than they are at preſent; and were created and chriſtened by the king, who, pouring a cold-cup of wine on their head, gave them the herald-name: but this is now done by the earl-marſhal. They could not arrive at the dignity of herald without having been ſeven years purſuivant; nor could they quit the office of herald, but to be made king at arms.

The office and dignity of a herald was firſt inſtituted by Ancus Martius, fourth king of the Romans, as Livy declares; but ſome writers aſcribe its origin to Numa Pompilius, and that he ordained a college of heralds. Richard III. was the firſt who formed them, in this kingdom, into a college; and afterwards great privileges were granted them by Edward VI. and Philip and Mary.

HERALDRY,

Definition origin, &c. of Heraldry.

A SCIENCE which teaches how to blazon, or explain in proper terms, all that belongs to coats-of-arms; and how to marſhal, or diſpoſe regularly, divers arms on a field. It alſo teaches whatever relates to the marſhalling of ſolemn calvacades, proceſſions, and other public ceremonies at coronations, inſtallations, creations of peers, nuptials, chriſtening of princes, funerals, &c.

Arms, or coats-of-arms, are hereditary marks of honour, made up of fixed and determined colours and figures, granted by ſovereign princes, as a reward for military valour, a ſhining virtue, or a ſignal public ſervice; and which ſerve to denote the deſcent and alliance of the bearer, or to diſtinguiſh ſtates, cities, ſocieties, &c. civil, eccleſiaſtical, and military.

Thus heraldry is the ſcience, of which *arms* are the proper object; but yet they differ much both in their origin and antiquity. Heraldry, according to Sir George Mackenzie, "as digeſted into an art, and ſubjected to rules, muſt be aſcribed to Charlemaign and Frederick Barbaroſſa, for it did begin and grow with the feudal law." Sir John Ferne is of opinion, that we did borrow *arms* from the Egyptians; meaning, from their hieroglyphicks. Sir William Dugdale mentions, that arms, as marks of honour, were firſt uſed by great commanders in war, neceſſity requiring that their perſons ſhould be notified to their friends and followers. The learned Alexander Niſbet, in his excellent ſyſtem of heraldry, ſays, that arms owe their riſe and beginning to the light of nature; and that ſigns and marks of honour were made uſe of in the firſt ages of the world, and by all nations, however ſimple and illiterate, to diſtinguiſh the noble from the ignoble. We find in Homer, Virgil, and Ovid, that their heroes had divers figures on their ſhields, whereby their perſons were diſtinctly known. Alexander the Great, deſirous to honour thoſe of his captains and ſoldiers who had done any glorious action, and alſo to excite an emulation among the reſt, did grant them certain badges to be borne on their armour, pennons, and banners; ordering, at the ſame time, that no perſon or potentate, through his empire, ſhould attempt or preſume to give or tolerate the bearing of thoſe ſigns upon the armour of any man, but it ſhould be a power reſerved to himſelf; which prerogative has been claimed ever ſince by all other kings and ſovereign princes within their dominions.

After theſe and many other different opinions, all that can be ſaid with any certainty is, that, in all ages, men have made uſe of figures of living creatures, or ſymbolical ſigns, to denote the bravery and courage either of their chief or nation, to render themſelves the more terrible to their enemies, and even to diſtinguiſh themſelves or families, as names do individuals. The famous C. Agrippa, in his treatiſe of the vanity of ſciences, cap. 81. has collected many inſtances of theſe marks of diſtinction, anciently borne by kingdoms and ſtates that were any way civilized, viz.

The Egyptians	bore	an Ox,
The Athenians		an Owl,
The Goths		a Bear,
The Romans		an Eagle,
The Franks		a Lion,
The Saxons		a Horſe.

Hereditary arms, &c.

The laſt is ſtill borne in the arms of his preſent Britannic Majeſty. As to hereditary arms of families, William Cambden, Sir Henry Spelman, and other judicious heralds, agree, that they began no ſooner than towards the latter end of the 11th century. According to Father Meneſtrier's opinion, a French writer whoſe authority is of great weight in this matter, Henry l'Oiſeleur (the Falconer) who was raiſed to the imperial throne of the Weſt in 920, by regulating tournaments in Germany gave occaſion to the eſtabliſhment of family-arms, or hereditary marks of honour, which undeniably are more ancient and better obſerved among the Germans than in any other nation. Moreover, this laſt author aſſerts, that with tournaments firſt came up coats-of-arms; which were a ſort of livery, made up of ſeveral liſts, fillets, or narrow pieces of ſtuff of divers colours, from whence came the feſs, the bend, the pale, &c. which were the original charges of family-arms; for they who never had been at tournaments, had not ſuch marks of diſtinction. They who inliſted themſelves in the Croiſades, took up alſo ſeveral new figures hitherto unknown in armorial enſigns; ſuch as alerions, bezants, eſcalop-ſhells, martlets, &c. but more particularly croſſes, of different colours for diſtinction's ſake. From this it may be concluded, that heraldry, like moſt human inventions, was inſenſibly introduced and eſtabliſhed; and that, after having been rude and unſettled for many ages, it was at laſt methodiſed, perfected, and fixed, by the Croiſades and tournaments.

Theſe marks of honour are called *arms*, from their being principally and firſt worn by military men at war and tournaments, who had them engraved, emboſſed, or depicted on ſhields, targets, banners, or other martial inſtruments. They are alſo called *coats-of-arms*, from the cuſtom of the ancients embroidering them on the coats they wore over their arms, as heralds do to this day.

Arms are diſtinguiſhed by different names, to denote the cauſes of their bearing; ſuch as,

ARMS

Of Dominion,	Of Patronage,
Of Pretenſion,	Of Family,
Of Conceſſion,	Of Alliance,
Of Community,	Of Succeſſion.

Arms of *dominion* or ſovereignty are thoſe which emperors, kings, and ſovereign ſtates, do conſtantly bear; being, as it were, annexed to the territories, kingdoms, and provinces, they poſſeſs. Thus the three lions are the arms of England, the fleurs-de-lis thoſe of France, &c.

Arms of *pretenſion* are thoſe of ſuch kingdoms, pro-

Different ſorts of Arms.

provinces, or territories, to which a prince or lord has ſome claim, and which he adds to his own, although the ſaid kingdoms or territories be poſſeſſed by a foreign prince or other lord. Thus the kings of England have quartered the arms of France with their own, ever ſince Edward III. laid claim to the kingdom of France, which happened in the year 1330, on account of his being ſon to Iſabella, ſiſter to Charles the Handſome, who died without iſſue.

Arms of *conceſſion* or augmentation of honour, are either entire arms, or elſe one or more figures, given by princes as a reward for ſome extraordinary ſervice. We read in hiſtory, that Robert Bruce, king of Scotland, allowed the earl of Wintoun's anceſtor to bear, in his coat-armour, a crown ſupported by a ſword, to ſhew that he, and the clan Seaton, of which he was the head, ſupported his tottering crown. The late Queen Anne granted to Sir Cloudeſly Shovel, rear-admiral of Great Britain, a cheveron between two fleurs-de-lis in chief, and a creſcent in baſe, to denote three great victories he had gained; two over the French, and one over the Turks.

Arms of *community*, are thoſe of biſhoprics, cities, univerſities, academies, ſocieties, companies, and other bodies corporate.

Arms of *patronage*, are ſuch as governors of provinces, lords of manors, patrons of benefices, &c. add to their family-arms, as a token of their ſuperiority, rights, and juriſdiction. Theſe arms have introduced into heraldry, caſtles, gates, wheels, ploughs, rakes, harrows, &c.

Arms of *family*, or *paternal-arms*, are thoſe that belong to one particular family, that diſtinguiſh it from others, and which no perſon is ſuffered to aſſume without committing a crime, which ſovereigns have a right to reſtrain and puniſh.

Arms of *alliance*, are thoſe which families, or private perſons, take up and join to their own, to denote the alliances they have contracted by marriage. This ſort of arms is either impaled, or borne in an *eſcutcheon of pretence*, by thoſe who have married heireſſes.

Arms of *ſucceſſion*, are ſuch as are taken up by them who inherit certain eſtates, manors, &c. either by will, entail, or donation, and which they either impale or quarter with their own arms; which multiplies the titles of ſome families out of neceſſity, and not through oſtentation, as many imagine.

Theſe are the eight claſſes under which the divers ſorts of arms are generally ranged; but there is a ſort which blazoners call *aſſumptive arms*, being ſuch as are taken up by the caprice or fancy of upſtarts, though of ever ſo mean extraction, who, being advanced to a degree of fortune, aſſume them without a legal title. This, indeed, is a great abuſe of heraldry; and common only in Britain, for on the continent no ſuch practice takes place.

We now proceed to conſider the eſſential and integral parts of arms, which are theſe:

The Escutcheon, The Charges,
The Tinctures, The Ornaments.

CHAP. I.

Of the Shield *or* Escutcheon.

Of the Shield, &c.

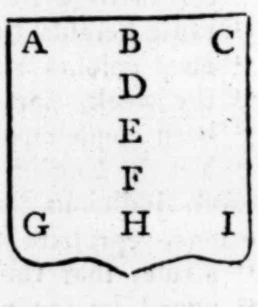
The *Shield*, or *Eſcutcheon*, is the field or ground whereon are repreſented the figures that make up a coat of arms: for theſe marks of diſtinction were put on bucklers or ſhields, before they were placed on banners, ſtandards, flags, and coat-armour; and wherever they may be fixed, they are ſtill on a plane or ſuperficies, whoſe form reſembles a ſhield.

Shields, in heraldry called *eſcutcheons*, or *ſcutcheons*, from the Latin word *ſcutum*, have been, and ſtill are, of different forms, according to different times and nations. Amongſt ancient ſhields, ſome were almoſt like a horſe-ſhoe, ſuch as is repreſented by n° 1. in the figure of Eſcutcheons; others triangular, ſomewhat rounded at the bottom, as n° 2. The people who inhabited Meſopotamia, now called *Diarbeck*, made uſe of this ſort of ſhield, which, it is thought, they had of the Trojans. Sometimes the ſhield was heptagonal, that is, had ſeven ſides, as n° 3.—The firſt of this ſhape is ſaid to have been uſed by the famous triumvir M. Antony. That of knights-banneret was ſquare, like a banner, as n° 4. As to modern eſcutcheons, thoſe of the Italians, particularly of eccleſiaſtics, are generally oval, as n° 5. The Engliſh, French, Germans, and other nations, have their eſcutcheons formed different ways, according to the carver's or painter's fancy; ſee the various examples contained from n° 6—16 of the figure. But the eſcutcheon of maids, widows, and of ſuch as are born ladies, and are married to private gentlemen, is in the form of a lozenge. See n° 17—20. Sir George Mackenzie mentions one Muriel, counteſs of Strathern, who carried her arms in a lozenge, anno 1284, which ſhews how long we have been verſant in heraldry.

Plate CXLIV.

Armoriſts diſtinguiſh ſeveral parts or points in eſcutcheons, in order to determine exactly the poſition of the bearings they are charged with; they are here denoted by the firſt nine letters of the alphabet, ranged in the following manner:

A—— *the dexter chief.*
B—— *the* preciſe *middle chief.*
C—— *the ſiniſter chief.*
D—— *the honour point.*
E—— *the feſs point.*
F—— *the nombril point.*
G—— *the dexter baſe.*
H—— *the* preciſe *middle baſe.*
I—— *the ſiniſter baſe.*



The knowledge of theſe points is of great importance, and ought to be well obſerved, for they are frequently occupied with ſeveral things of different kinds. It is neceſſary to obſerve, that the dexter-ſide of the eſcutcheon is oppoſite to the left hand, and the ſiniſter ſide to the right hand of the perſon that looks on it.

CHAP. II.

Of Tinctures, Furs, Lines, *and* Differences.

Sect. I. *Of Tinctures.*

By *tinctures* is meant that variable hue of arms which is common both to ſhields and their bearings. According to the French heralds, there are but ſeven tinctures in armory; of which two are metals, the other five are colours.

The Metals are,
Gold, } termed { *Or.*
Silver, } { *Argent.*

The Tinctures.

The Colours are

Blue,	termed	*Azure.*
Red,		*Gules.*
Green,		*Vert.*
Purple,		*Purpure.*
Black,		*Sable.*

When natural bodies, ſuch as animals, plants, celeſtial bodies, &c. are introduced into coats of arms, they frequently retain their natural colours, which is expreſſed in this ſcience by the word *proper*.

Beſides the five colours abovementioned, the Engliſh writers on heraldry admit two others, viz.

Orange,	termed	*Tenny.*
Blood-colour,		*Sanguine.*

But theſe two are rarely to be found in Britiſh bearings.

Theſe tinctures are repreſented in engravings and drawings (the invention of the ingenious Silveſter Petra Sancta, an Italian author of the laſt century), by dots and lines, as in fig. ii. n° 1—9.

Plate CXLIV.

Or is expreſſed by dots.

Argent needs no mark, and is therefore plain.

Azure, by horizontal lines.

Gules, by perpendicular lines.

Vert, by diagonal lines from the dexter chief to the ſiniſter-baſe points.

Purpure, by diagonal lines from the ſiniſter-chief to the dexter-baſe points.

Sable, by perpendicular and horizontal lines croſſing each other.

Tenny, by diagonal lines from the ſiniſter-chief to the dexter-baſe points, traverſed by horizontal lines.

Sanguine, by lines croſſing each other diagonally from dexter to ſiniſter, and from ſiniſter to dexter.

Sir George M'Kenzie obſerves, that “ ſome fantaſtic heralds have blazoned not only by the ordinary colours and metals, but by flowers, days of “ the week, parts of a man's body, &c. and have “ been condemned for it by the heralds of all nations. “ Yet the Engliſh have ſo far owned this fancy,” (the moſt judicious of them, as Mr Cartwright and others, reprobate it as abſurd,) “ that they give it for “ a rule, that the coats of ſovereigns ſhould be blazoned by the planets, thoſe of noblemen by precious ſtones; and have ſuited them in the manner “ here ſet down:

“ Or	Topaz	Sol
“ Argent	Pearl	Luna
“ Sable	Diamond	Saturn
“ Gules	Ruby	Mars
“ Azure	Sapphire	Jupiter
“ Vert	Emerald	Venus
“ Purpure	Amethyſt	Mercury
“ Tenny	Jacinth	Dragon's-head
“ Sanguine	Sardonix	Dragon's-tail.

“ But I crave leave to ſay, that theſe are but mere “ fancies, and are likewiſe unfit for the art, for theſe “ reaſons: 1ſt, The French (from whom the Engliſh “ derive their heraldry, not only in principles, but in “ words of the French language,) do not only not “ uſe theſe different ways of blazoning, but treat “ them *en ridicule*. 2dly, The Italian, Spaniſh, and “ Latin heralds uſe no ſuch different forms, but blazon “ by the ordinary metals and colours. 3dly, Art “ ſhould imitate nature; and as it would be an unnatural thing in common diſcourſe not to call red “ *red*, becauſe a prince wears it, ſo it is unnatural to “ uſe theſe terms in heraldry, and it may fall out to “ be very ridiculous in ſome arms; for inſtance, if “ a prince had for his arms an *aſs couchant* under his “ burden *gules*, how ridiculous would it be to ſay he “ had an *aſs couchant Mars?*——A hundred other “ examples might be given; but it is enough to ſay, “ that this is to confound colours with charges, and “ the things that are borne with colours. 4thly, It “ makes the art unpleaſant, and deters gentlemen “ from ſtudying it, and ſtrangers from underſtanding “ what our heraldry is; nor could the arms of our “ princes and nobility be tranſlated in this diſguiſe “ into Latin or any other language. But that which “ convinces moſt that this is an error is, becauſe it “ makes that great rule unneceſſary, whereby colour “ cannot be put upon colour, nor metal upon metal; “ but this cannot hold but where metals and colours “ are expreſſed.”

The Furs.

The Engliſh heralds give different names to the roundlet (n° 10), according to its colour. Thus, if it is

Or,	it is called a	*Bezant.*
Argent,		*Plate.*
Azure,		*Hurt.*
Gules,		*Torteau.*
Vert,		*Pomey.*
Purpure,		*Golpe.*
Sable,		*Pellet.*
Tenny,		*Orange.*
Sanguine,		*Guze.*

The French, and all other nations, do not admit ſuch a multiplicity of names to this figure; but call them *Bezants*, after an ancient coin ſtruck at Conſtantinople, once *Byzantium*, if they are Or and Torteaux; if of any other tincture, expreſſing the ſame.

SECT. II. *Of Furs.*

FURS repreſent the hairy ſkin of certain beaſts, prepared for the doublings or linings of robes and garments of ſtate: and as ſhields were anciently covered with furred ſkins, they are therefore uſed in heraldry not only for the linings of the mantles, and other ornaments of the ſhields, but alſo in the coats of arms themſelves.

There are three different kinds in general uſe, viz.

Plate CXLIV.

1. *Ermine*; which is a field argent, powdered with black ſpots, their tails terminating in three hairs. (Fig. ii. n° 11.)

2. *Counter-ermine*, where the field is ſable, and the powdering white. (n° 12.)

3. *Vair* (n° 15.), which is expreſſed by blue and white ſkins, cut into the forms of little bells, ranged in rows oppoſite to each other, the baſe of the white ones being always next to that of the blue ones. Vair is uſually of ſix rows; if there be more or fewer, the number ought to be expreſſed; and if the colours are different from thoſe abovementioned, they muſt likewiſe be expreſſed.

The Engliſh multiply the furs, as well as the names of the tinctures, though no other nation has adopted ſuch varieties. Thus they give us,

1. *White*, which is the natural colour of the ermine;

but it is uſed on no other occaſion but in the deſcriptions of mantles.

2. *Ermines*, which is the ſame with contra-ermine.

3. *Erminois*; the field is Or, the powdering Sable, (nº 13.). For the uſe of this fur Guillim cites Bara, p. 14. but no ſuch fur is to be found in Bara.

4. *Pean*; the field is Sable, the powdering Or, (nº 14.) The French uſe no ſuch term; but they call all furs or doublings *des pannes*, or *pennes*, which term has poſſibly given riſe to this miſtake, and many others, in thoſe who do not underſtand the French language.

5. *Erminites*; the ſame as Ermine, with the addition of a red hair on each ſide of the black. Sir Geo. Mackenzie calls theſe diſtinctions "but fancies, for "*Erminites* ſignifies properly *little Ermines*."

6. *Counter-vair*; when the bells of the ſame tincture are placed baſe againſt baſe, and point againſt point, (nº 16.).

7. *Potent-counter-potent*, anciently called *Vairy-cuppy*, as when the field is filled with crutches or potents counter-placed, (nº 17.).

It may not be improper to obſerve, that the uſe of the tinctures took its riſe from the ſeveral colours uſed by warriors whilſt they were in the army, which S. de Petra Sancta proves by many citations. And becauſe it was the cuſtom to embroider gold and ſilver on ſilk, or ſilk on cloth of gold and ſilver, the heralds did therefore appoint, that in imitation of the clothes ſo embroidered, colour ſhould never be uſed upon colour, nor metal upon metal.

Sect. III. *Of the Lines uſed in the Parting of Fields.*

Escutcheons are either of one tincture, or more than one: thoſe that are of one only, that is, when ſome metal, colour, or fur, is ſpread all over the ſurface or field, ſuch a tincture is ſaid to be predominant. But in ſuch as have on them more than one, as moſt have, the field is divided by lines, which, according to their divers forms, receive various names.

Lines may be either ſtraight or crooked. Straight lines are carried evenly through the eſcutcheon; and are of four different kinds, viz. a perpendicular line, |; a horizontal, —; a diagonal dexter, ╲; a diagonal ſiniſter, /.

Crooked lines are thoſe which are carried unevenly through the eſcutcheon with riſing and falling. French armoriſts reckon 11 different ſorts of them; Guillim admits of ſeven only; but there are 14 diſtinct kinds, the figures and names of which are as in fig. i. (A), nº 1—14. viz.

1. The engrailed. 2. The invected. 3. The wavy. 4. The embattled, or crenelle. 5. The nebule. 6. The raguly. 7. The indented. 8. The dancette. 9. The dove-tail. 10. The grafted. 11. The embattled a-ronde. 12. The battled embattled. 13. The patee or dove-tail. 14. Champaine.

The principal reaſon why lines are thus uſed in heraldry, is to difference bearings which would be otherwiſe the ſame; for an eſcutcheon charged with a chief engrailed, differs from one charged with a chief wavy, as much as if the one bore a croſs and the other a ſaltier.

As the forementioned lines ſerve to divide the field, it muſt be obſerved, that if the diviſion conſiſts of two equal parts made by the perpendicular-line, it is called *parted per pale*; by the horizontal-line, *parted per feſs*; by the diagonal-dexter, *parted per bend*; by the diagonal-ſiniſter, *parted per bend-ſiniſter*; examples of which will be given in the ſequel of this treatiſe.

If a field is divided into four equal parts by any of theſe lines, it is ſaid to be *quartered*, which may be done two ways, viz.

Quartered or parted *per croſs*; which is made by a perpendicular and horizontal line, which, croſſing each other at the centre of the field, divide it into four equal parts called *quarters*. See Plate CXLIV. under fig. i. (A).

Quartered or parted *per ſaltier*; which is made by two diagonal lines, dexter and ſiniſter, that croſs one another in the centre of the field, and likewiſe divide it into four equal parts. *Ibid.*

The eſcutcheon is ſometimes divided into a greater number of parts, in order to place in it the arms of the ſeveral families to which one is allied; and in this caſe it is called a *genealogical atchievement*. Theſe diviſions may conſiſt of 6, 8, 12, and 16, quarters, [as under fig i. (A.)] and even ſometimes of 20, 32, 64, and upwards; there being examples of ſuch diviſions frequently exhibited at pompous funerals. An extraordinary inſtance of this kind was lately exhibited at the pompous funeral of the late worthy viſcounteſs Townſhend, whoſe corps was brought from Dublin caſtle in Ireland, to Rainham-hall in Norfolk, one of the principal tenants on horſeback carrying before the hearſe a genealogical banner, containing the quarterings of his lordſhip's and her ladyſhip's family, to the amount of upwards of 160 coats. Sir George Booth, the preſent rector of the valuable living of Aſhton under Line, bears ſix diſtinct coats-of-arms in his ſhield, viz. thoſe for Booth, Barton, Venables, Mountfort, Aſhton, Egerton; and has beſides a right to 37 other coats: but Sir William Dugdale very juſtly objects to ſo many arms being cluſtered together in one ſhield or banner, on account of the difficulty of diſcerning and knowing aſunder one coat-of-arms from another.

Sect. IV. *Of the Differences of Coats-of-Arms.*

Armorists have invented divers differences, or characteriſtical marks, whereby bearers of the ſame coat-of-arms are diſtinguiſhed each from others, and their nearneſs to the principal bearer demonſtrated. According to J. Guillim, theſe differences are to be conſidered either as ancient or modern.

Art. I. Of Ancient Differences.

Those he calls *ancient differences* conſiſt in *bordures* (A); which is a bearing that goes all round, and parallel to the boundary of the eſcutcheon, in form of a hem, and always contains a fifth part of the field in breadth. Bordures were uſed in ancient times for the diſtinguiſhing not only of one nation or tribe from another, but alſo to note a diverſity between particular perſons deſcended of one family and from the ſame parents.

(A) Bordures are ſtill introduced into Engliſh coats-of-arms, but for particular reaſons, which heralds can beſt explain. They are by the French frequently taken for a principal figure, and numbered among the reſt of the ordinaries.

parents. This diſtinction, however, was not expreſsly ſignified by unvariable marks; nor were bordures always appropriated to denote the different degrees of conſanguinity: for, as Sir Henry Spelman obſerves in his *Aſpilogia*, p. 140, ancient heralds, being fond of perſpicuous differences, often inverted the paternal tincture, or ſometimes inſerted another charge in the eſcutcheon, ſuch as bends, croſlets, cantons, or the like; which irregularity has, I ſuppoſe, induced modern armoriſts to invent and make uſe of others."

There are bordures of different forms and tinctures, as in the examples, fig. iii.

Plate CXLV.

N° 1. is "Sable, a Bordure Argent;" borne by the right hon. Sackville Tufton, Earl of Thanet.—When a bordure is plain, you are not to mention it, as it is always underſtood ſo in heraldry, though it be not expreſſed; but if it has any other form, you are to ſignify it.

2. "Gules, a Bordure engrailed Argent;" borne by the right hon. Charles Gray, lord Gray.—This is called *engrailed*, from the French word *engrêlé*, which ſignifies a thing the hail has fallen upon and broken off the edges, leaving it with little ſemicircles ſtruck out of it.

3. "Gules, a Bordure engrailed Or;" borne by the right hon. George Talbot, earl of Shrewſbury.—You muſt obſerve, that, in a bordure or ordinary formed of theſe lines, the points are repreſented on all ſides towards the field, and the ſemicircles turned towards the bordure or ordinary.

4. "Argent, a Bordure invected Azure."—This is quite contrary to the laſt; for, as the other turns its points from the bordure into the field, ſo contrarywiſe this does, by the inverſion of the points from the field into the bordure. Such a charge, or any other formed of theſe lines, is ſeldom to be met with in Engliſh coats-of-arms.

5. "Gules, a Bordure indented Argent."—The word *indented* requires very little explanation, the ſignification being obvious to all perſons, from its figure, which is compoſed of tracts reſembling teeth, called in Latin *dentes*.

6. "Azure, a Bordure Ermine."

7. "Vert, a Bordure Vair."

8. "Ermine, a Bordure company, or gobony, Or and Sable."—This is ſo termed from its being compoſed of ſmall and equal pieces. J. Guillim calls this bordure *gobonated*, which implies the ſame meaning; but the word being obſolete, is not uſed by modern heralds.

9. "Quarterly, Azure and Gules, a Bordure company Argent and Azure;" borne by his grace Henry Somerſet, duke of Beaufort, &c.

10. "Azure, a Bordure counter-company Argent and Gules."—Obſerve, that the counter-company does always conſiſt of two tracts, and no more.

11. "Or, a Bordure checky Argent and Sable."—This has a great reſemblance with the laſt bordure, having only one tract more; therefore you muſt take care, before you blazon, to number them, or elſe you may eaſily err in taking the one for the other.

12. "Gules, a Bordure Argent charged with eight Trefoils ſlipped proper, that is, Vert."—All nations uſe few terms in blazoning bordures; but Engliſh armoriſts, in order, poſſibly, to raiſe the dignity of this ſcience, have perplexed it, and rendered it unintelligible to all foreigners, by introducing into it ſeveral myſtical names, among which may be reckoned the following ones, viz. They call a bordure, if charged with eight plants, fruits, flowers, or leaves, *verdoy* of ſuch vegetables; or *enaluron* of ſuch birds, *enurny* of beaſts, *perflew* of furs, and *entoyre* of inanimate things of what kind ſoever.

13. "Gules on a Bordure Azure, eight Stars Or."

14. "Argent, a Bordure company of the laſt and Gules, the firſt charged with Roſes of the ſecond, barbed and ſeeded proper."—This bordure is borne by his grace Charles Lennox, duke of Richmond, &c.

15. "Ermine, within a Bordure engrailed Gules;" the coat-of-arms of the right hon. Henry-Benedict Barnewall, viſcount Kingſland, &c. of Ireland.—This ancient and noble family is of French extraction, and allied to the dukes of Little-Bretagne, where the name continues ſtill in great repute.

16. "Argent, a Bordure Sable charged with eight Beſants;" borne by the right hon. ——— Cole, lord Ranelagh, of Ireland.

17. "Party per pale Argent and Gules, a Bordure charged with eight Eſcalops counterchanged;" the coat-of-arms of the right hon. William Maule, earl of Panmure, &c. of Ireland. This very ancient family is originally French, and derives its ſurname from the town and lordſhip of Maule in Normandy, where the ſame arms are ſtill to be ſeen in the pariſh-church.

18. "Azure, a Bordure quarterly, the firſt and fourth Ermine, the ſecond and third counter-company Argent and Azure."

19. "Purpure, a Bordure company Or and Gules, each of the laſt charged with a Beſant."

20. "Quarterly Or and Gules, within a Bordure Vert, charged with eight Eſcalops Or."

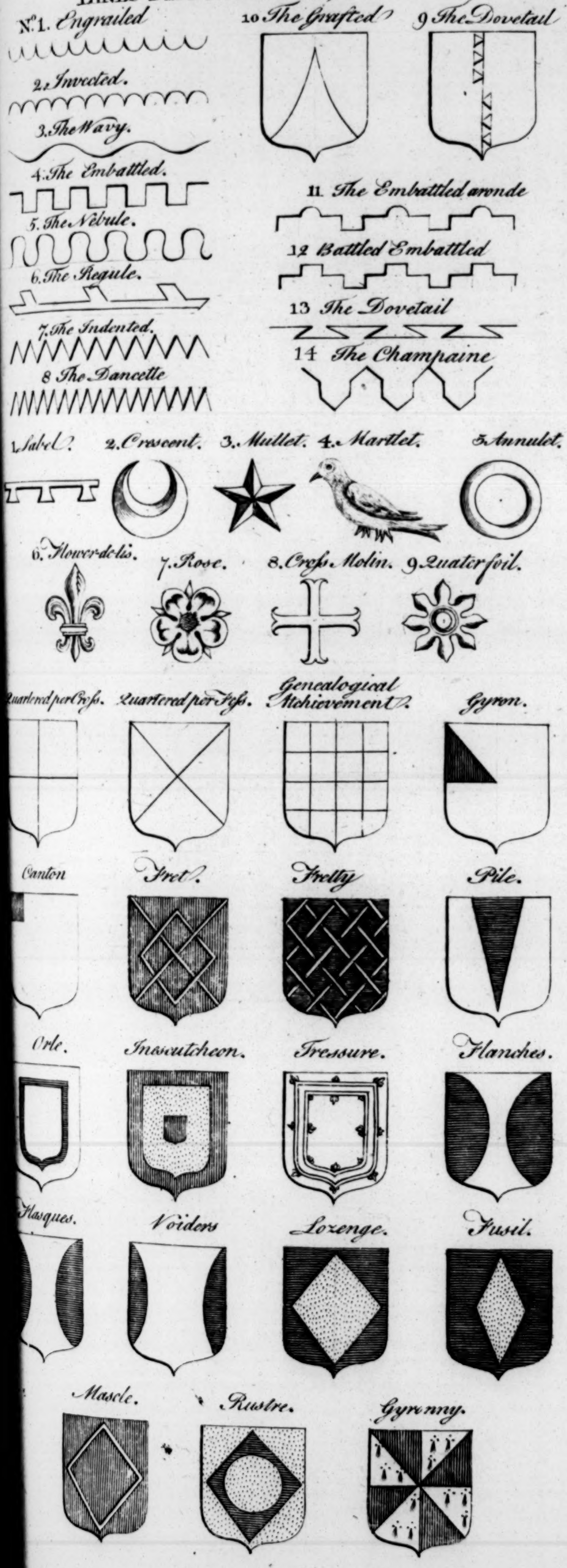
We ſhall conclude this head with obſerving, that a bordure is never of metal upon metal, and ſeldom of colour upon colour, but rather of the tincture which the principal bearing or charge is of. Thus Sir —— Dalziel of Glenae, whoſe predeceſſor was a younger brother of the noble family of Carnwath, has, within a Bordure Argent, the paternal coat of the ancient name of Dalziel, viz. "Sable, a hanged man with his arms extended, Argent;" formerly they carried him hanging on a gallows. This bearing, though ſo very ſingular for a coat-of-arms, was given as a reward to one of the anceſtors of the late Robert Dalziel, earl of Carnwath, to perpetuate the memory of a brave and hazardous exploit performed in taking down from a gallows the body of a favourite and near relation of king Kenneth II. hung up by the Picts, which ſtory is thus related by Alexander Niſbet: "The king being exceedingly grieved that the body of his minion and kinſman ſhould be ſo diſgracefully treated, he proffered a great reward to any of his ſubjects who would adventure to reſcue his corpſe from the diſgrace his cruel enemies had unjuſtly put upon it: but when none would undertake this hazardous enterpriſe, at laſt a valorous gentleman came and ſaid to the king, *Dalzeil*, which ſignifies, "I dare;" and he did actually perform that noble exploit to the king's ſatisfaction and his own immortal honour, and in memory of it got the aforeſaid remarkable bearing; and afterwards his poſterity took the word *Dalziel* for their ſurname, and the

HERALDRY.

Plate CXLIV.

Fig. 1. (A).

LINES DIFFERENCES, &c.



N.º 1. Engrailed
2. Invected.
3. The Wavy.
4. The Embattled.
5. The Nebule.
6. The Regule.
7. The Indented.
8 The Dancette
10 The Grafted
9 The Dovetail
11. The Embattled aronde
12 Battled Embattled
13 The Dovetail
14 The Champaine
1. Label.
2. Crescent.
3. Mullet.
4. Martlet.
5. Annulet.
6. Flower de lis.
7. Rose.
8. Cross Molin.
9. Quaterfoil.
Quartered per Cross.
Quartered per Fess.
Genealogical Atchievement
Gyron.
Canton
Fret.
Fretty
Pile.
Orle.
Inescutcheon.
Tressure.
Flanches.
Flasques.
Voiders
Lozenge.
Fusil.
Mascle.
Rustre.
Gyronny.

Fig. 1. (B)

ESCUTCHEONS.

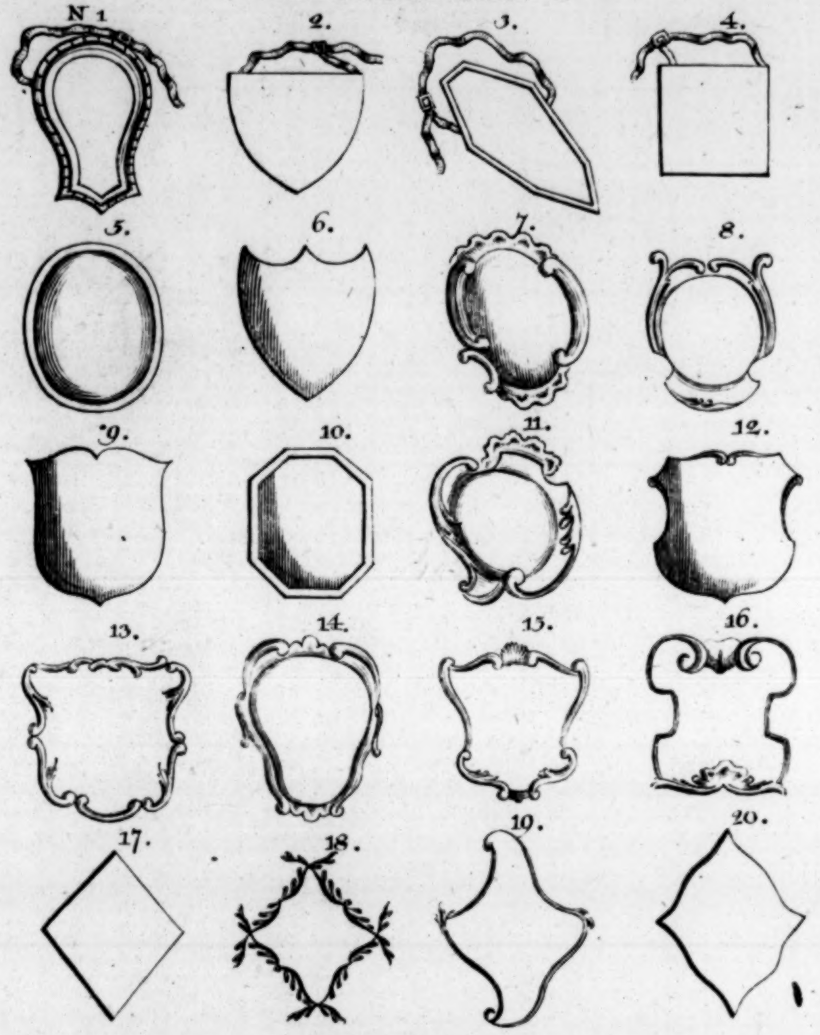


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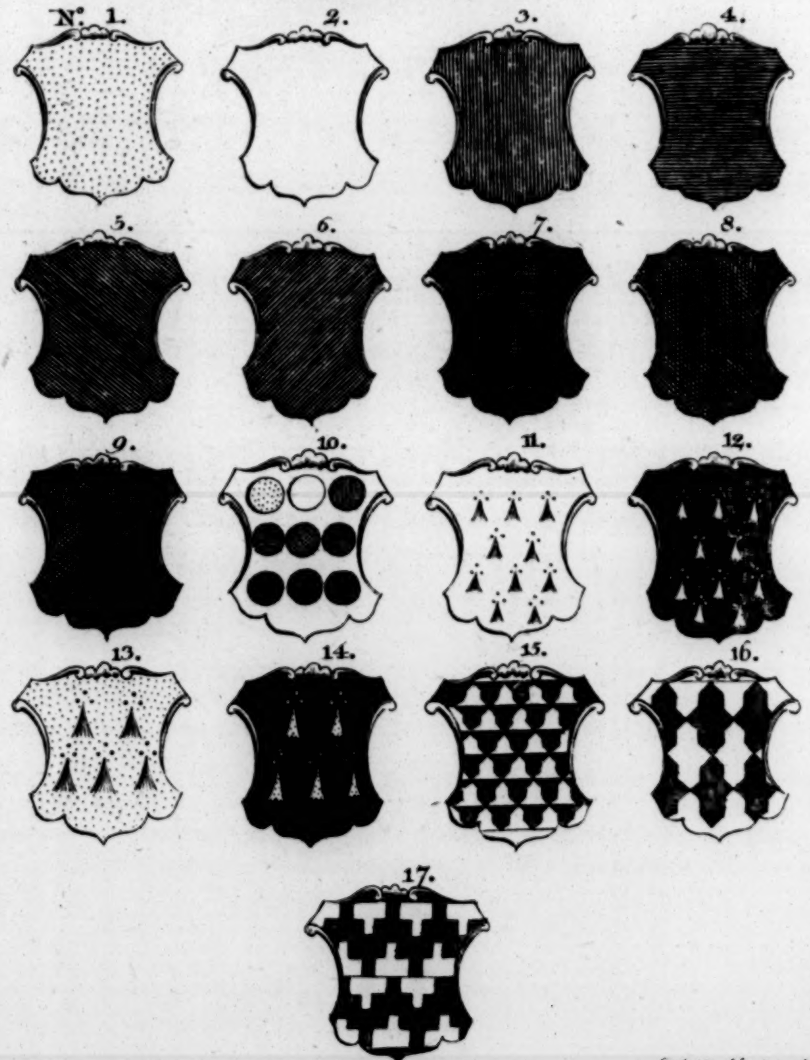
Fig. 2.

TINCTURES.



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A. Bell Sculp.

3 MA 53

Modern Differences.

the interpretation of it, *I dare*, continues even to this day to be the motto of that noble family." We can have no better proof of the truth of this tradition than this, that the heads of this ancient family have, for many ages, carefully retained this bearing without any alteration or addition.

Art. 2. Of Modern Differences.

The modern differences, which the Engliſh have adopted, not only for the diſtinguiſhing of ſons iſſued out of one family, but alſo to denote the difference and ſubordinate degrees in each houſe from the original anceſtors, are nine, viz.

ate XLIV. der fig. i.

For the heir or firſt ſon, the Label. 2d ſon, the Creſcent. 3d ſon, the Mullet. 4th ſon, the Martlet. 5th ſon, the Annulet. 6th ſon, the Flower-de-luce. 7th ſon, the Roſe. 8th ſon, the Croſs-moline. 9th ſon, the Double Quater-foil.

By theſe differences, the ſix ſons of Thomas Beauchamp, the 15th earl of Warwick, who died in the 34th year of king Edward III. are diſtinguiſhed in an old window of the church of St Mary at Warwick; ſo that although they are called *modern differences*, their uſage with the Engliſh is ancient.

It muſt be obſerved, that, of all the forementioned marks of diſtinction, none but the label is affixed on the coats-of-arms belonging to any of the royal family; which the introducers of this peculiarity have, however, thought proper to difference by additional pendants and diſtinct charges on them.

e LV.

As to the diſtinction to be made in the arms of the offspring belonging to each of the above-mentioned brothers, it is expreſſed by figures on the top and margin of the table contained in fig. iv. For inſtance, The heir or firſt ſon of the ſecond houſe, beareth a creſcent charged with a label during his father's life only. The ſecond ſon of the ſecond houſe, a creſcent charged with another creſcent. The third ſon of the ſecond houſe, a creſcent charged with a mullet. The fourth ſon of the ſecond houſe, a creſcent charged with a martlet. The fifth ſon of the ſecond houſe, a creſcent charged with an annulet. The ſixth ſon of the ſecond houſe, a creſcent charged with a flower-de-luce; and ſo on of the other ſons, taking care to have them of a different tincture.

In what part of the eſcutcheon theſe differences ſhould be borne is not certain; for Guillim, Morgan, and others, give us many different examples of their poſition. The honour-point would be the propereſt place, if the arms would admit of it; but that is not always the caſe, as that part may be charged with ſome figure in the paternal coat, which cannot with propriety receive the difference. There are inſtances where theſe are borne as perfect coats of arms, as the examples ſubjoined to the Table of Houſes ſufficiently ſhew, which are to be blazoned thus:

The firſt is "Azure, a Label argent."—When ſuch a label is borne as a difference, the pendants, according to G. Leigh, ſignify that he is but the third perſon; the dexter pendant referring to his father, the ſiniſter to his mother, and the middle one to himſelf.

The ſecond is "Argent, a Label of five points Azure;" borne by the name of Hentington. If a label has more or leſs than three pendants or points, they are to be expreſſed as in the foregoing example.

Modern Differences.

The third is "Azure, a Creſcent argent," borne by the name of Lucy.—The reaſon G. Leigh aſſigns for the ſecond ſon's having a creſcent for a difference, is to ſhow that he ſhould increaſe the family by adding to it riches and reputation.

The fourth is "Argent, a Mullet Sable, on a Chief Azure, a Fleur-de-lis Or;" borne by the name of Rogers, in Glouceſterſhire.—A mullet or ſpur was appointed for the third ſon's difference, as the laſt-mentioned author ſays, to ſhew that he ſhould follow chivalry.

The fifth is "Azure, a Fleur-de-lis Argent;" borne by the Right hon. Henry Digby, baron Digby of Geaſhil, in King's county, Ireland.

Theſe few examples, among many more that might be given, demonſtrate the impropriety of adopting theſe *modern differences*, as they are called, for marks of cadency to diſtinguiſh the different branches of a family: for it is impoſſible to diſtinguiſh the uncle or grand-uncle, from the nephew or grand-nephew, if each of them are ſecond, third, or fourth ſons; and in the courſe of ſucceſſion theſe differences would multiply to ſuch a number, that it would be impoſſible to delineate them diſtinctly in moſt caſes. But as they are given by moſt of the Engliſh writers on heraldry, though no foreign nation uſes them, it was thought proper to inſert them here.

Siſters, except of the blood-royal, have no other mark of difference in their coats-of-arms, but the form of the eſcutcheon, (as obſerved before); therefore they are permitted to bear the arms of their father, even as the eldeſt ſon does after his father's deceaſe. The reaſon of which is by Guillim ſaid to be, that when they are married, they loſe their ſurname, and receive that of their huſbands.

Next to theſe diminutions G. Leigh, J. Guillim, and after them Dr Harris in his *Lexicon Technicum*, ſet forth at large divers figures, which they pretend were formerly added to the coats of ſuch as were to be puniſhed and branded for cowardice, fornication, ſlander, adultery, treaſon, or murder, for which they give them the name of *abatements of honour*; but as they produce but one inſtance of ſuch whimſical bearings, we have not inſerted them here. Beſides, arms, being marks of honour, they cannot admit of any note of infamy; nor would anybody now-a-days bear them, if they were ſo branded. It is true, a man may be degraded for divers crimes, particularly high treaſon; but in ſuch caſes the eſcutcheon is reverſed, trod upon, and torn in pieces, to denote a total extinction and ſuppreſſion of the honour and dignity of the perſon to whom it belonged.

CHAP. III.

Of the Charges.

Armorists call a charge whatſoever is contained in the field, whether it occupy the whole, or only a part thereof. All charges are diſtinguiſhed by the names of *honourable ordinaries*, *ſub-ordinaries*, and *common charges*.

Honourable ordinaries, the principal charges in heraldry, are made of lines only, which, according to their diſpoſition and form, receive different names.

Sub-ordinaries are ancient heraldric figures frequently uſed in coats-of-arms, and which are diſtinguiſhed by terms appropriated to each of them.

Common charges are compoſed of natural, artificial, and even chimerical things, ſuch as planets, creatures, vegetables, inſtruments, &c.

Sect. I. *Of Honourable Ordinaries.*

The moſt judicious armoriſts admit only of nine honourable ordinaries, viz.

The Chief
The Pale
The Bend
The Bend ſiniſter
The Feſs
The Bar
The Cheveron
The Croſs
and
The Saltier.

Of theſe, but ſix have diminutives, which are called as follows: That of the chief is a *fillet:* The pale has a *pallet* and *endorſe;* the bend, a *bendlet, coſt,* and *ribband:* The bend-ſiniſter has the *ſcarpe* and *bâton;* the bar, the *cloſet* and *barulet;* the cheveron a *chevronel* and *couple-cloſe*. All which ſhall be treated of in order.

Art. I. Of the Chief.

The chief is an ordinary determined by an horizontal line, which, if it is of any other form but ſtraight, muſt be expreſſed. It is placed in the upper part of the eſcutcheon, and containeth in depth the third part of the field. Its diminutive is a fillet, the content of which is not to exceed one fourth of the chief, and ſtandeth in the loweſt part thereof. This ordinary is ſubject to be charged with variety of figures; and may be indented, wavy, nebule, &c. as in the examples, fig. v. Plate CXLV.

N° 1. is "Or, a Chief indented Azure;" borne by the right hon. Edmund Butler, viſcount Mountgarret, &c. of the kingdom of Ireland. This great and illuſtrious family of the Butlers, ſo renowned for the many valiant and loyal perſons it has produced, is deſcended from the ancient counts of Brion in Normandy; but ſince king Henry II. conferred the office of chief butler of Ireland upon one of the family, he and his ſucceſſors have aſſumed the name of *Butler*.

2. "Azure a Chief engrailed Or."

3. "Argent, a Chief invected Vert."

4. "Vert, a Chief undy Or."

5. "Azure, a Chief nebule Argent."

6. "Or, a Chief checky Azure and Argent."

7. "Ermine, a Chief quarterly Or and Gules;" borne by the name of Peckham.

8. "Argent, a Chief Sable, in the lower part thereof a Fillet of the Field."

9. "Azure, fretty Argent, a Chief Or;" borne by the right hon. Hayes St Leger, viſcount Doneraile, &c. of the county of Cork in Ireland. This ancient and noble family is of French extraction; and is deſcended from Sir Robert Sent Legére, knight, who, in 1066, accompanied William duke of Normandy in his expedition into England; and the family have a tradition, that he, with his own hand, ſupported the ſaid duke when he quitted the ſhip to land in Suſſex.

10. "Argent, on a Chief engrailed Azure, a Tortoiſe paſſant Or;" borne by the name of *Bidgood.*

11. "Argent, on a Chief Gules, two Spur revels Or;" borne by the right hon. John St John, lord St John of Bletſhoe, &c. Of this ancient family, which derive their ſurname from a place called *St John* in Normandy, was John de St John, Eſq. who having a principal employment in the army of the Norman duke, attended him in his expedition into England.

12. "Argent, on a Chief Vert, two Spears Heads erect of the Field, the points imbrued Gules;" borne by the Right Hon. George Brodrick, Viſcount Middleton, &c. of the kingdom of Ireland. This family is lineally deſcended from George de Brodrick, who came into England in the reign of William II.

13. "Or, on a Chief Sable, three Eſcalops of the field," for the name of *Graham;* and borne quartered in the arms of his Grace William Graham, duke, marquis, and earl of Montroſe, *&c.* with Argent three Roſes Gules. According to the Scots writers, this great and noble family is deſcended from the renowned Greme or Grame, who, in the year 404, was general of king Fergus II.'s, army, and, in 420, forced his way through the wall built by the Romans between the rivers Forth and Clyde to keep out the Scots from moleſting them in their poſſeſſions, and the ſaid breach has ever ſince been called *Grame's dike.*

14. "Argent, on a Chief indented Gules, three Croſſes pattee of the Field;" borne by the right hon. John Perceval, earl of Egmont, *&c.* This very ancient and noble family is ſuppoſed, from circumſtances little ſhort of poſitive proof, to have ſprung from a younger branch of the ſovereign dukes of Bretagne in France, of the ſame name. They were tranſplanted into Normandy before the conqueſt, poſſeſſed of great eſtates and power, and inveſted with the office of chief butler. Upon the Norman invaſion, two of this family came over into England with the Conqueror, from one of which the deſcent of the preſent earl of Egmont is deduced by the cleareſt and moſt indiſputable proofs of hiſtorians and records.

15. "Azure, on a Chief indented Or, three Spurrevels Gules;" borne by the right hon. Charles Moore, earl of Drogheda, *&c.* of the kingdom of Ireland. This noble family, which is of French extraction, came into England ſoon after the conqueſt, and made their firſt reſidence in the manor of Moore-court, in the county of Kent.

16. "Ermine, on a Chief indented Azure, three ducal coronets Or;" borne by the name of *Lytton.*

17. "Azure, on a Chief Or, three Martlets Gules," for the name of *Wray;* and borne by Sir Cecil Wray, Bart. of Lincolnſhire.

18. "Ermine, on a Chief Gules; five Lozenges of the firſt;" borne by the name of *Dixin.*

19. "Argent, fretty Gules, on a Chief of the ſecond, three Leopard's Faces Or;" borne by the right hon. Henry Liddel, lord Ravenſworth. This noble lord is deſcended from the ancient lords of Liddlecaſtle, in the county of Durham, where they have been proprietors of great-coal-mines time out of mind.

20. "Ermine, a Chief party per pale Azure and Or; on the dexter the Sun in its ſplendor, on the ſiniſter a Croſs pattee Gules." The arms of the biſhopric of Raphoe, in the kingdom of Ireland.

Fig. 3.

BORDURES.

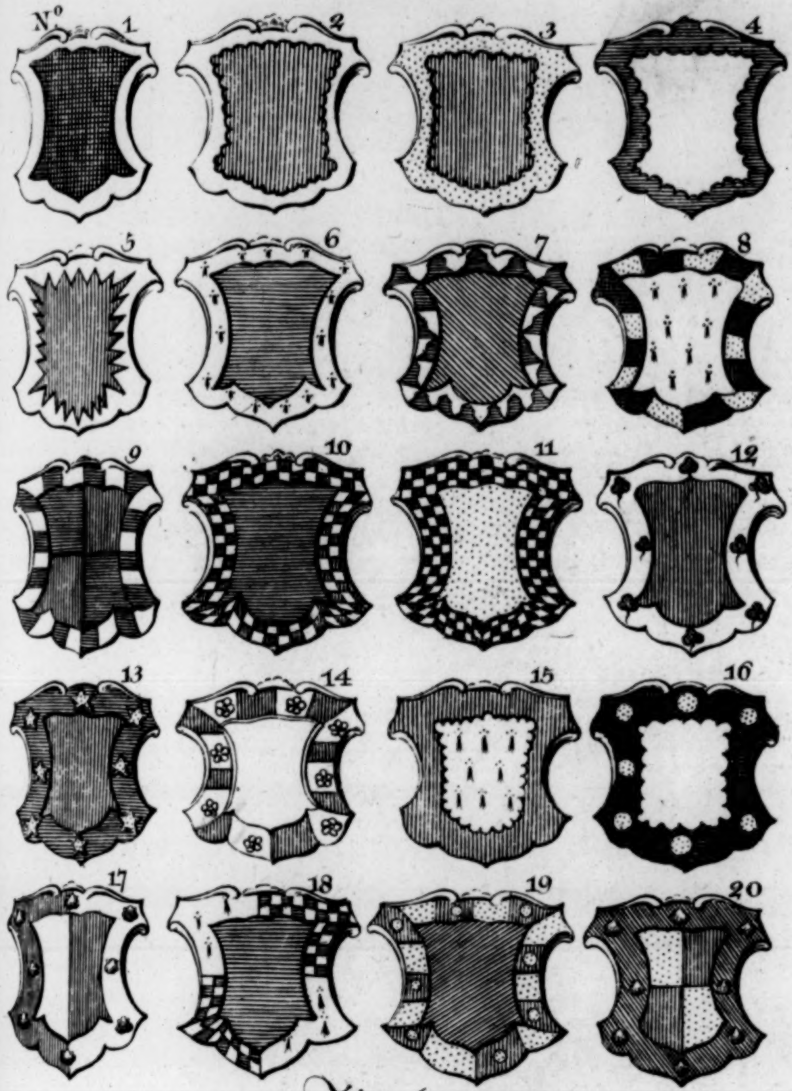
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Fig. 5.

CHIEFS &c.

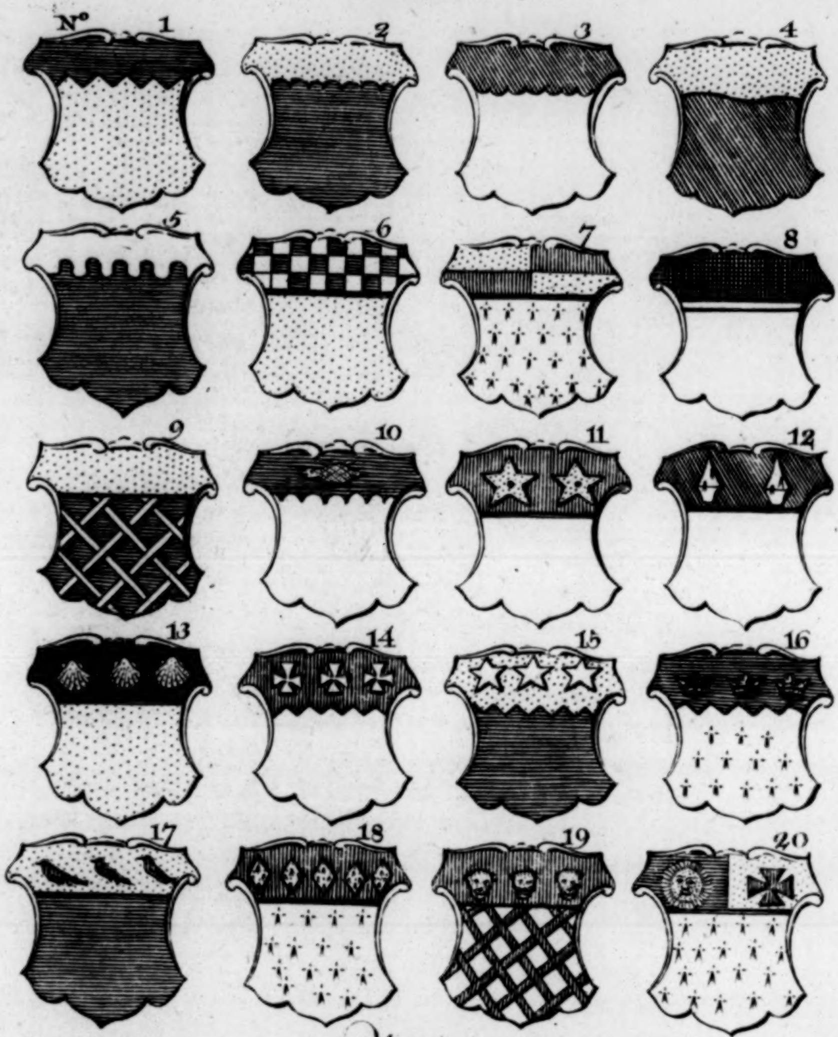
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Fig. 4.

TABLE of HOUSES.

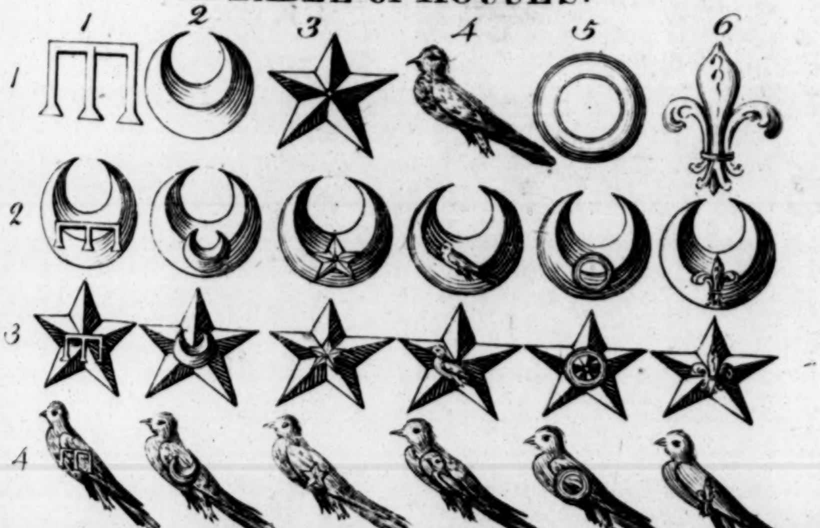
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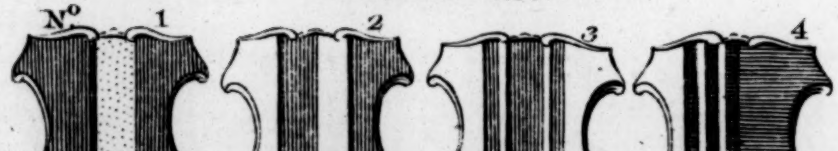
Fig. 6.

PALES &c.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A. Bell Sculpt.

3 MA 53

Art. II. Of the Pale.

The Pale is an ordinary, conſiſting of two perpendicular lines drawn from the top to the baſe of the Eſcutcheon, and contains the third middle part of the field. Its diminutives are, The pallet, which is the half of the pale; and the endorſe, which is the fourth part of a pale. This ordinary and the pallet may receive any charge, but the endorſe ſhould not be charged. The endorſe, beſides, is never uſed, according to J. Leigh, but to accompany the pale in pairs, as cotices do the bend; but Sir John Ferne is of a different opinion.

Plate CXLV. ig. vi.

Ex. 1. "Gules, a Pale Or;" by the name of *Grandmain*.

2. "Party per Pale Argent and Gules, a Pale counterchanged."

3. "Argent, a Pale between two Endorſes Gules."

4. "Party per Pale, *1ſt*, Paly of ſix Argent and Sable, *2d*, Azure;" borne by the name of *Trenchard*.

5. "Paly of ſix Or and Azure."

6. "Argent, three Pallets undy Sable;" by the name of *Downes*.

7. "Party per Pale, Argent and Gules;" borne by the right hon. John Waldegrave, earl Waldegrave, &c. This noble earl is deſcended from John de Waldegrave, who was ſheriff of London in the year 1205, in the ſeventh year of king John.

8. "Party per Pale indented, Or and Gules;" borne by the right hon. Thomas Bermingham, baron of Athenry, in the kingdom of Ireland. Of this ancient and noble family, which are of Engliſh extraction, and took their name from the town of Bermingham in the county of Warwick, was William de Bermingham, who was poſſeſſed of the town of that name in the reign of Henry II. which continued in that family till the reign of Henry VIII.

9. "Quarterly per Pale dove-tail, Gules and Or;" borne by the right hon. Thomas Bromley, lord Montfort, &c. This noble lord is maternally deſcended from Sir Walter Bromleghe, of Bromleghe, in the county of Stafford, who flouriſhed in the reign of king John. Sir Thomas Bromley, another of his lordſhip's anceſtors, was conſtituted lord high chancellor of England, 21 Elizabeth; in which poſt he died, 29 Elizabeth.

10. "Argent, a Pale flory counterflory Sable."

11. "Argent, a Pale lozengy Sable;" borne by the name of *Savage*.

12. "Argent, a Pale indented Vert;" borne by the name of Dixon.

13. "Argent, on a Pale engrailed Sable, three Creſcents Or;" borne by the name of *Aſhley*.

14. "Ermine, on a Pale engrailed azure, three Lion's Heads couped Or;" borne by the name of *Avery*.

15. "Vert, on a Pale radiant Or, a Lion rampant Sable;" borne by the right hon. James O'Hara, lord Tyrawley, &c. in the kingdom of Ireland. This noble lord is deſcended from Mileſius king of Spain, by his eldeſt ſon Hiberius, who, with his brother Heremon, eſtabliſhed a colony in Ireland. Sir Charles O'Hara, father to the preſent lord, was created baron of Tyrawley by queen Anne, Jan. 10. 1706, being at that time a lieutenant-general, and colonel of the royal regiment of fuſileers: and the next year was made general in Spain, where this ſon, lord James, was wounded at the battle of Almanza.

16. "Azure, a Pallet Argent."

17. "Vert, an Endorſe Or."

18. "Argent, on two Pallets Sable, ſix Croſscroſlets fitchy Or;" borne by the name of *Betunes*, of the county of Salop.

19. "Argent, two Endorſes Gules, in Chief three Mullets Sable;" borne by the name of *Vautort*.

20. "Azure, on a Pale walled with three pieces on each ſide Or, an Endorſe Sable;" borne by the name of *Sublet de Noyers*, a family of diſtinction in France.

Art. III. Of the Bend and Bend-sinister.

The Bend is an ordinary formed by two diagonal lines, drawn from the dexter-chief to the ſiniſter-baſe; and contains the fifth part of the field in breadth, if uncharged; but if charged, then the third. Its diminutives are, The bendlet, which is the half of a bend; the coſt or cotice, when two of them accompany a bend, which is the fourth part of a bend; and the riband, the moiety of a coſt, or the eighth part of the field.

There is alſo the bend-ſiniſter, which is of the ſame breadth as the bend, but drawn the contrary way: this is ſubdivided into a ſcarpe, which is the half of the bend, and into a bâton, which is the fourth part of the bend, but does not extend itſelf to the extremities of the field, there being part of it ſeen at both ends. See the examples, fig. vii.

Plate CXLVI.

Ex. 1. "Argent, a Bend wavy Sable;" borne by the right hon. John Wallop, earl of Portſmouth, &c. This noble earl is deſcended from the Wallops of Hampſhire, a Saxon family, who were poſſeſſed of lands to a conſiderable value in the county at the time of the conqueſt.

2. "Checky Or, and Azure, a Bend Ermine;" borne by the right hon. John Ward, viſcount Dudley and Ward, &c. The anceſtors of this noble lord were anciently of the county of Norfolk, of which was Simon Ward, who had large poſſeſſions in the reign of Edward I. and was in France and Scotland in the reigns of king Edward II. and III.

3. "Azure, a Bend engrailed Argent, between two Cotices Or;" borne by the right hon. Matthew Forteſcue, lord Forteſcue, as alſo by the right hon. Hugh Forteſcue-Aland, baron Forteſcue, in the kingdom of Ireland, this laſt nobleman bearing a creſcent in his arms for difference. The family of Forteſcue is deſcended from Sir Richard le Forte, a perſon of extraordinary ſtrength and courage, who accompanied William duke of Normandy in his invaſion of England; and bearing a ſtrong ſhield before the duke, at the battle of Haſtings, had three horſes killed under him, and from that ſignal event the name and motto of the family were aſſumed; for the Latin word *ſcutum*, or the old French word *eſcue* (a *ſhield*) being added to *forte* (*ſtrong*), compoſe their name; and the motto is, *Forte ſcutum ſalus ducum*.

4. "Sable, a Bend Argent between two Cotices indented Or;" borne by the name of *French*.

5. "Paly of ſix Or and Sable, a Bend counterchanged;" borne by the right hon. Frederick Calvert, baron Baltimore. The original of this family is from an ancient and noble houſe of that ſurname in the earl-

dom of Flanders, whereof Sir George Calvert, knight, among other honourable employments, was ſecretary of ſtate to king James I. by whom he was created a baron, Feb. 20. 1624, and from whom he had a grant to him, and his heirs, of the province of Maryland and Avalon in America.

6. "Party per Bend crenelle Argent and Gules;" borne by the right hon. Edmund Boyle, earl of Cork and Orrery, &c. in the kingdom of Ireland. This noble lord is ſaid to be deſcended from Sir Philip Boyle, a knight of Arragon, who, in the reign of king Henry VI. tilted at a tournament with Sir Joſeph Aſtley, knight of the Garter.

7. "Argent, three Bendlets *enhanſed* Gules," as the Engliſh expreſs it, but the phraſe *enhanſed* is uſed by no other nation. The proper blazon of this arms is, Parted per bend, 1ſt bendy of ſix gules, and argent; 2d of the laſt. Borne by the right hon. William Byron, lord Byron. From Doomſday-book it appears, that this family was poſſeſſed of numerous manors and lands in the reign of the Conqueror; and that Sir John Byron, one of his lordſhip's anceſtors, attended king Edward III. in his wars in France.

8. "Ermine, a Bend voided Gules;" borne by the name of *Ireton*.

9. "Argent three Bendlets wavy Azure;" borne by the name of *Wilbraham*.

10. "Bendy of ſix pieces Argent and Azure". Obſerve, that when the ſhield is filled with an equal number of bendlets of metal and colour, it is called *bendy;* but if the number of them is unequal, they are to be blazoned by the name *bendlets*, and their number ſpecified.

11. "Party per Bend Azure and Argent, two Bendlets engrailed counterchanged"; borne by the name of *Frenes*.

12. "Quarterly, Or and Gules, a Bend over-all Vair;" borne by his grace Lionel Cranfield Sackville, duke of Dorſet and earl of Middleſex, &c. The anceſtors of this family were lords of the town and ſeigniory of Sackville in Normandy, and came over with the Conqueror when he invaded England in 1066.

13. "Gules on a Bend Argent, three Trefoils ſlipped proper;" borne by the right hon. George William Hervey, earl of Briſtol, &c. This noble lord derives his pedigree from Robert Fitz-Hervey, a younger ſon of Hervey duke of Orleans, who came over from France with William the Conqueror.

14. "Argent, on a bend Gules cotiſed Sable, three pairs of Wings conjoined of the firſt;" borne by the right hon. Richard Wingfield, viſcount Powerſcourt, in the kingdom of Ireland. This noble lord is denominated from the manor of Wingfield in Suffolk, where they had a ſeat before the Norman conqueſt, called *Wingfield-caſtle*.

15. "Gules, on a Bend contre Ermine cotiſed Or, three Boars Heads couped Argent;" borne by the right hon. George Edgcumbe, lord Edgcumbe, &c. The anceſtors of this noble lord received their name from the manor of Edgcumbe in Devonſhire. One of this lord's anceſtors was Sir Richard Edgcumbe, who came over to England with the earl of Richmond, having a great ſhare in the victory he obtained over king Richard III. at Boſworth, by which the earl made his way to the throne of England.

16. "Argent, a Bend-ſiniſter Gules."

17. "Or, a Bendlet Gules."

18. "Argent, a Ribband Gules.—The name of this bearing correſponds well with its form, being both long and narrow, which is the ſhape of a ribband.

19. "Azure, a Scarpe Or."—This bearing, as Guillim obſerves, is that kind of ornament called now a-days *a Scarf*, which is uſed by officers on duty, and uſually worn after the ſame manner.

20. This contains three Batons. The firſt is compony ermine and azure; ſet over the royal arms, for his grace William Fitzroy duke of Cleveland. The ſecond is compony argent and azure; ſet over the royal arms, for his grace Auguſtus Henry Fitzroy, duke of Grafton. The third is Gules, charged with three roſes argent, ſeeded and barbed proper; ſet over the royal arms, for his grace George Beauclerk, duke of St Albans. The grandfathers of theſe noble dukes being natural ſons of king Charles II. is what entitles them to the royal arms.

Art. IV. Of the Feſs and Bar.

The Feſs is an ordinary which is produced by two parallel lines drawn horizontally acroſs the centre of the field, and contains in breadth the third part thereof. Some Engliſh writers ſay it has no diminutive, for the bar is a diſtinct ordinary of itſelf.

The Bar, according to their definition, is formed of two lines, and contains but the fifth part of the field: which is not the only thing wherein it differs from the feſs; for there may be more than one in an eſcutcheon, placed in different parts thereof, whereas the feſs is limited to the centre-point; but in this the French differ from them. The bar has two diminutives: the barulet, which contains the half of the bar; and the cloſet, which is the half of the barulet. When the ſhield contains a number of bars of metal and colour alternate, of even number, that is called *barry* of ſo many pieces, expreſſing their number. See the examples, Fig. viii.

Nº 1. is "Argent, a Feſs indented Sable;" borne by the right hon. John Weſt, earl Delawarr, &c. This noble family is deſcended from the Weſts, a great family in the weſt of England; but in the reign of Edward II. they appear to have been ſeized of manors and lands in the county of Warwick. Sir Thomas de Weſt, knight, one of his lordſhip's anceſtors, being at the battle of Creſſy, and there taking John the French king priſoner, had granted him, for that remarkable action, an augmentation to his atchievement, viz. a crampette or, diſtinguiſhed by the chape of a ſword in the middle; the chape being given him by the ſaid king, as an acknowledgment of his becoming his priſoner: his cognizance was a roſe parted per pale, argent, and gules; which two badges are ſtill borne in the atchievement of the preſent lord Delawarr.

Plate CXLVI

2. "Argent, a Feſs wreathed Azure and Gules;" borne by the right hon. John Carmichael, earl of Hyndford. Of this ancient family, which is ſaid to aſſume their ſurname from the lands of Carmichael, in the county of Lanark, in Scotland, where they ſtill have their chief ſeat, was Sir John Carmichael, who accompanied Archibald, earl of Douglas, to the

aſſiſtance of Charles VI. of France, againſt the Engliſh; and ſignalizing his valour at the battle of Baughey in April 1421, and breaking his ſpear when the French and Scots got the victory, had thereupon added to his paternal coat, a dexter arm holding a broken ſpear, which is now the creſt of the family.

3. "Party per Feſs Or and Argent, a Feſs nebule Gules;" borne by the name of *Anteſhed*.

4. "Party per Feſs indented Or and Azure;" borne by the name of *Saunders*.

5. "Checky Or and Azure on a Feſs Gules, a Creſcent argent for difference;" borne by the right hon. Hugh Clifford, lord Clifford, of Chudley. This noble lord is deſcended from Walter de Clifford, of Clifford-caſtle, in the county of Hereford, who came over into England with the Conqueror; of which family was fair Roſamond, miſtreſs to king Henry II.

6. "Argent on a Feſs Azure three Lozenges Or;" borne by the right hon. Baſil Fielding, earl of Denbigh and Deſmond, &c. This noble earl is deſcended from the earls of Hapſburg, in Germany. Geoffrey earl of Hapſburg, being oppreſſed by Rodolph emperor of Germany, came over into England, and one of his ſons ſerved king Henry III. in his wars, whoſe anceſtors laying claim to the territories of Lauffenburg and Rhin-Filding, in Germany, he took the name of *Fielding*.

7. "Or, on a Feſs Gules, three Fleur-de-lis of the firſt;" borne by the name of *Lennard*. This is in the firſt and fourth quarters of the right hon. Thomas Barret Lennard lord Dacre's arms.

8. "Ermine, on a Feſs Gules, a Lion paſſant Or;" borne by the right hon. John Proby, baron Carysfort, &c. in the kingdom of Ireland.

9. "Sable, a Feſs Ermine, between three Creſcents Or;" borne by the right hon. George-William Coventry, earl of Coventry, &c. This noble earl is deſcended from John Coventry, a native of the city of Coventry, and afterwards mercer and lord mayor of London, in the reign of Henry V.; from whom deſcended Thomas Coventry, one of the juſtices of the court of common-pleas, in the reign of queen Elizabeth; whoſe ſon Thomas was recorder of London, and afterwards lord keeper of the great ſeal in the the reign of king Charles I.

"10. Sable, a Feſs checky, Or and Azure, between three Beſants;" borne by the right hon. Ridgeway Pitt, earl and baron of Londonderry, &c." Of this noble family, which were anciently of Bandfort, in the county of Dorſet, was Thomas Pitt, eſq; who, in the reign of Queen Anne, was made governor of fort St George in the Eaſt Indies, where he reſided many years, and purchaſed a diamond, which he ſold to the king of France for 125,000l. Sterling, weighing 136 carats, and commonly known at this day by the name of *Pitt's diamond*.

11. "Or, on a Feſs Sable, between three Muſcovy Ducks proper, a Roſe of the Field;" borne by the right hon. John Bateman, viſcount Bateman, &c. Of this noble family, which was anciently ſeated at Haleſbrook, near St Omers in Flanders, was Giles Bateman, eſq; whoſe ſon was a merchant of London, and was father to Sir James Bateman, knight, who, in 1712, was choſen member of parliament for Ilcheſter in the county of Somerſet, and re-choſen in 1713.

12. "Sable, on a Feſs Argent, between three Leopards paſſant guardant Or, three Eſcalops Gules;" borne by the right hon. Wills Hill, earl of Hillſborough, &c. Of this family, which, in the reign of Queen Elizabeth, were of note in the county of Downe, was Sir Moſes Hill, who, during O'Neile's rebellion, was one of thoſe gentlemen who aſſociated under the earl of Eſſex to ſuppreſs it; and afterwards ſerved under Arthur, lord Chicheſter, lord deputy, and by king James I. was appointed provoſt-marſhal of the whole province of Ulſter in Ireland.

13. "Gules, two Bars Or;" borne by the right hon. Simon Harcourt, earl of Harcourt, &c. This noble earl is deſcended from the Harcourts of Normandy, who took their name from a place called *Harcourt*, in that province, where the family uſually reſided. Gervaiſe, count de Harcourt, with his two ſons Jeffrey and Arnold, came over with the conqueror, when he invaded England, in 1066.

14. "Ermine, two Bars Gules;" borne by the right hon. Thomas Nugent, earl of Weſtmeath, and baron Delvin.

15. "Argent, two Bars indented Sable;" borne by the right hon. Godart Ginkle, earl of Athlone. Godart, who was the firſt earl, was deſcended of a very ancient family in the united provinces of Holland, where he was baron de Reede and Ginkle, &c. In 1691, he was a lieutenant-general of king William's forces in Ireland; where, in June the ſame year, he took Ballymore for the Engliſh; and, in July following, the Iriſh town of Athlone, which laſt exploit is one of the greateſt recorded in hiſtory.

16. "Argent, three Bars gemels Gules;" borne by the right hon. Richard Barry, earl of Barrymore, &c. This noble family, who have been renowned for their loyalty and valour, are ſaid to derive their ſurname from the iſland of Barry, in the county of Glamorgan, in Wales; and from their riches and eſtates have been called by the people *Barrymore*, or the Great Barry.

17. "Or, a Feſs-couped Gules, between two Lions paſſant Sable;" borne by the right hon. Samuel Maſham, lord Maſham, &c. This noble lord is deſcended from Sir John Maſham, who flouriſhed in the reign of king Henry VI. and was buried at Thorneham, in the county of Suffolk, in 1455.

18. "Argent, a Lion rampant guardant Gules, debruiſed by a Feſs Azure, between three Etoiles iſſuing out of as many Creſcents of the ſecond;" borne by the right hon. Robert Dillon, earl of Roſcommon, &c. in the kingdom of Ireland. This noble family is derived from Logan, ſurnamed *Dilune* or *Delion*, which ſignifies brave and valiant, to whom the duke of Aquitaine gave his daughter in marriage, in whoſe right, after her father's death, he became prince and ſovereign of Aquitaine, which continued in his poſterity till Henry II. married Alionora, daughter and heir to William V. duke of Aquitaine, and about 1172 obtained that principality by ſuperior force; and, to prevent any diſturbance, brought Sir Henry Delion or Dillon, and his brother Thomas, then infants, to England, their father being ſlain.

19. "Or, two Bars Azure, a Chief quarterly of the ſecond and Gules, the 1ſt and 4th charged each with two Fleur-de-lis of France; the 2d and 3d with

a Lion of England;" borne by his grace John Manners, duke of Rutland, marquis of Granby, &c. This chief was anciently Gules;-and the charge thereon is an honorary augmentation, ſhewing his grace's deſcent from the blood royal of king Edward IV.

20. "Barry of ten pieces Argent and Azure, over all ſix Eſcutcheons; 3, 2, 1, Sable, each charged with a Lion rampant of the firſt, armed, and langued Gules, a Creſcent for difference;" borne by the right hon. James Cecil, earl of Saliſbury, &c. This noble earl is deſcended from the famous *William* Cecil lord Burleigh, ſtateſman in the reigns of Edward VI. and Elizabeth. This great man left two ſons, Thomas and Robert, who were both made earls in one day, May 4. 1603. Robert, the younger ſon, anceſtor of the preſent noble lord, was created earl of Saliſbury in the morning; and Thomas, the eldeſt, earl of Exeter in the afternoon.

Art. V. Of the Cheveron.

The Cheveron, which repreſents two rafters of a houſe well jointed together, or a pair of compaſſes half open, takes up the fifth part of the field with the Engliſh, but the French give it the third. Its diminutives are, The cheveronel, which contains the half of a cheveron; and the couple-cloſe, which is the half of a cheveronel, that is, its breadth is but the fourth part of a cheveron. Leigh obſerves, that this laſt diminutive is never borne but in pairs, or with a cheveron between two of them. The French have but one diminution of this ordinary called *Etaye*, containing the third part of its breadth.

Examples of cheverons are given in fig. ix. viz.

Plate CXLVI.

1. "Argent, a Cheveron Gules between three Torteaux;" borne by the right hon. Bennet Sherrard, earl of Harborough, &c. This noble earl is lineally deſcended from Scherard, who was poſſeſſed of manors and lands to a great value in the counties of Cheſhire and Lancaſhire in the reign of William the Conqueror. Geoffrey, another of this earl's anceſtors, was three times ſheriff of Rutlandſhire, in the reigns of king Edward IV. and king Richard III.

2. "Sable, a Cheveron between three Etoiles Argent;" borne by the right hon. Marmaduke Langdale, lord Langdale. This noble lord is deſcended from the Langdales of Yorkſhire, who reſided at the town of Langdale, from whence they took their name, in the reign of king John; but his anceſtor, who makes the greateſt figure in hiſtory, is Sir Marmaduke Langdale, who raiſed forces in the north of England in defence of king Charles I. was victorious in numberleſs battles and ſieges, and when his Majeſty, by the united forces of England and Scotland, was at length overpowered, he attended king Charles II. in his exile, and returned to England with his Majeſty at the reſtoration.

3. "Sable, a Cheveron between three Leopards Heads Or;" borne by the right hon. William Wentworth, earl of Strafford, &c. All genealogiſts agree, that the name of *Wentworth* is of Saxon original, and taken from the manor of Wentworth in Yorkſhire, where, in the reign of William the Conqueror, lived Reginald de Wenteworde, as it is ſpelt in doomſday-book.

4. "Argent, a Cheveron between three Griffons paſſant Sable, a Creſcent for difference;" borne by the right hon. Heneage Finch, earl of Ailesford, &c. This family is deſcended from Herbert Fitz-Herbert, earl of Pembroke, and chamberlain to king Henry I. They took the name of *Finch* in the reign of king Edward I. One of the anceſtors of the preſent earl was the right hon. Heneage Finch, earl of Nottingham, who was conſtituted lord high-chancellor of England in 1675; and lord high-ſteward on the trials of Philip earl of Pembroke, and William viſcount Stafford, in 1680.

5. "Azure, a Cheveron Ermine, between three Eſcalops Argent;" borne by the right hon. George Townſhend, viſcount Townſhend, &c. This family is of Norman extraction, and came into England about the time of the conqueſt. Charles, lord viſcount Townſhend, grandfather of the preſent viſcount, was appointed principal ſecretary of ſtate in the reign of king George I. in 1720, and continued ſo to the end of his majeſty's reign; when, upon reſigning the ſeals, they were returned to him again by his late majeſty king George II. who continued him in that honourable office to the year 1730.

6. "Azure, a Cheveron between three Mullets Or;" borne by the right hon. John Chetwind, viſcount Chetwind, &c. of the kingdom of Ireland. Of this family, which hath been of great antiquity in the county of Salop, taking their ſurname from Chetwynd in that county, was Adam de Chetwynd, who married Agnes daughter of John lord Lovel, baron of Dockinges, and lord of Minſter Lovel in Oxfordſhire; and by her had iſſue Sir John de Chetwynd, who, in the 37th of Henry III. had a charter of free-warren thro' all his demeſne in the counties of Salop, Stafford, and Warwick.

7. "Argent, a Cheveron Gules, between three ſquare Buckles Sable;" borne by the right hon. Matthew Ducie-Morton, lord Ducie, &c. This noble lord is deſcended from the Ducies in Normandy. After they came into England, king Edward I. conferred on them the lordſhip of Morton in Staffordſhire, and ſeveral other lordſhips and manors, which the family enjoyed for many years. Sir Robert Ducie, one of his lordſhip's anceſtors, was lord-mayor of London in the reign of king Charles I. and though he lent his majeſty L. 80,000, which was loſt by the king's being driven out of London, he died, however, worth L. 400,000.

8. "Argent, a Cheveron Checky Gules, and of the Field, between three Bugle-horns ſtrung Sable, garniſhed of the ſecond;" borne by the right hon. lord Hugh Semple, lord Semple. The principal family of this name was Semple of Elliotſton in Renfrew, where they had large poſſeſſions and offices, as ſtewards and bailiffs under the family of Stewart, proprietors of that county before they came to the crown. The firſt lord Semple was Sir Robert, who, being much in favour with king James IV. was by him created lord Semple in 1489.

9. "Argent, a Cheveron engrailed between three Lions paſſant Sable;" borne by the right hon. and the reverend Philip Smithe, viſcount Strangford. One of this lord's anceſtors was John Smithe, eſq; who acquired a conſiderable eſtate whilſt he was farmer of the cuſtoms in the reign of Henry VIII. He left two

Of the Cheveron.

ſons, John and Sir Thomas, which laſt was ſent ambaſſador by king James I. to the empreſs of Ruſſia.

10. "Quarterly Argent and Azure, a Cheveron engrailed counter-changed;" borne by the name of *Chamber*.

11. "Party per Cheveron engrailed Gules and Argent, three Talbots Heads eraſed counter-changed;" borne by the right hon. Anthony Duncombe, lord Feverſham, &c. His lordſhip is deſcended from the Duncombes of Barley-end in Buckinghamſhire. Sir Charles Duncombe, uncle to the preſent lord, was lord-mayor of London in 1709; and this nobleman was created lord Feverſham and baron of Dowton in Wiltſhire, June 23, 1744.

12. "Paly of ſix, Argent and Gules, on a Cheveron Azure, three Croſs-croſlets Or;" borne by the right hon. George Carpenter, baron Carpenter, of Killaghy in Ireland. This ancient and noble family are of great antiquity in the county of Hereford, and have been lords of the manor of the Home in the pariſh of Delwyn, near Weobly, for above 300 years. George, the firſt lord Carpenter, was ſo created May 4. 1719.

13. "Azure, on a Cheveron Or, between three Beſants, a Bay Leaf Proper;" borne by the right hon. James Hope, earl of Hopeton, &c. This noble family is deſcended from Henry Hope, a native of Holland, who, about two centuries ago, came over and ſettled in Scotland. Charles Hope, eſq; father of the preſent earl, was created an earl by queen Anne, April 15. 1703.

14. "Vert, on a Cheveron between three Unicorns Heads eraſed Argent, horned and maned Or, three Mullets Sable;" borne by the name of *Ker*, being the 1ſt and 4th quarters in the arms of his grace John Ker, duke of Roxburgh, &c. This ancient family is ſaid to come from Normandy. John Ker, marquis of Beaumont and Ceſford, the firſt duke of Roxburgh, was ſo created April 27. 1707.

15. "Azure, on a Cheveron Or, between three Bears Heads couped Argent, muzzled Gules, a Roebuck's Head eraſed, between two Hands holding Daggers all proper;" borne by the right hon. Donald Mackay, lord Reay. This family is ſaid to derive their deſcent from Alexander, a younger ſon of Ochonacker, who, about the end of the twelfth century, came from Ireland; and the fourth in deſcent from him was Donald of Strathnavern, whoſe ſon was named *Y More:* and from him began the ſurname of *Mac Y*, *Mackie*, or *Mackay*. Donald, the firſt lord of this family, was created baronet in 1625, and on June 20. 1628, was created baron Reay of the county of Caithneſs, by Charles I.

16. "Ermine, on a Cheveron Azure, three Foxes Heads eraſed Or, and in a Canton of the ſecond a Fleur-de-lis of the third;" borne by the right hon. Stephen Fox, earl of Ilcheſter, &c. Of the family of Fox there have been many perſons of note living in the counties of Dorſet, Somerſet, Wilts, and Hants, particularly Richard Fox, biſhop of Wincheſter. His lordſhip was created lord Ilcheſter and baron Strangeways, May 11. 1741, 14 Geo. II. and earl of Ilcheſter in June 1756.

17. "Or, two Cheveronels Gules;" borne by the right hon. John Monſon, lord Monſon. This noble lord is deſcended from John Monſon, who flouriſhed in the reign of king Edward III. from whom deſcended another John, who attended king Henry V. in his wars in France. Sir John Monſon, bart. father of the preſent lord, was created lord Monſon, May 28, 1728.

Of the Croſs.

18. "Or, on a Feſs, between two Cheveronels Sable, three Croſs-croſlets of the firſt;" borne by the right hon. George Walpole, earl of Orford, &c. This family took their name from Walpole in Norfolk, where they reſided before the conqueſt. Sir Robert Walpole was, in king George II.'s reign, elected knight of the garter in 1726, and created earl of Orford, February 9. 1741-2.

19. "Azure, three Cheveronels interlaced Or, and a Chief of the laſt;" borne by the name of *Fitz-Hugh*.

"19. Argent, three Cheveronels Gules, in Chief a Label Azure;" borne by the right hon. William Wildman Barrington, viſcount Barrington, &c. This family is of Norman extraction; in which duchy, whilſt it continued annexed to the Engliſh crown, there were to be ſeen the remains of a caſtle bearing the name of *Chute* or *Shute*, and formerly in the family, with other monuments in ſeveral towns of that dutchy. John Shute, the late viſcount Barrington, was in 1708 made a commiſſioner of the cuſtoms, and ſucceeded to the eſtates of Francis Barrington, Eſq; and of John Wildman of the county of Berks, who made him their heir; and, in purſuance of the will of the former, he took the name and arms of *Barrington*. On June 11, 1720, he was created viſcount Barrington, with a reverſionary grant of the office of maſter of the rolls in Ireland.

ART. VI. Of the Croſs.

THE *Croſs* is an ordinary formed by the meeting of two perpendicular with two horizontal lines in the feſs-point, where they make four right-angles; the lines are not drawn throughout, but diſcontinued the breadth of the ordinary, which takes up only the fifth part of the field when not charged; but if charged, then the third. It is borne as well engrailed, indented, &c. as plain.

There is ſo great a variety of croſſes uſed in heraldry, that it would be a very difficult taſk to treat of them all. Guillim has mentioned 39 different ſorts; De la Columbiere, 72; Leigh, 46; and Upton declares he dares not aſcertain all the various croſſes borne in arms, for that they are almoſt innumerable: therefore, as all their forms cannot be expected here, we will only take notice of ſuch as are moſt commonly ſeen at preſent in coats-of-arms. See Fig. x.

Plate CXLVII.

The firſt is "Quarterly, Ermine and Azure, a Croſs Or;" borne by his grace Thomas Oſborne duke of Leeds, &c. This noble duke is deſcended from the honourable family of the Oſbornes of Aſhford, in the county of Kent; Sir Thomas Oſborne, the grandfather to the preſent duke, was advanced to the peerage by king Charles II.

2. "Gules, a Croſs engrailed Argent, a Lozenge in the dexter-chief of the ſecond;" borne by the right hon. Edward Leigh, lord Leigh. This family took their ſurname from the town of High-Leigh in Cheſhire, where they reſided before the Norman Conqueſt. Sir Thomas Leigh, the firſt lord of this family, was created

Of the Croſs.

created baron Leigh of Stonely, by king Charles I. on July 1, 1643.

3. "Gules, a Croſs Argent fretty Azure;" borne by the right hon. Nicholas Taaffe, viſcount Taaffe, of Corran, &c. in Ireland. Of this noble and ancient family was Richard Taaffe, who lived in 1282; as in 1306 did John Taaffe, who was archbiſhop of Armagh; and, in 1479, the order of the Garter being eſtabliſhed in Ireland, Sir Nicholas Taaffe was one of the firſt members; and John, his ſon and heir, was created a baron and viſcount by Charles I. Auguſt 1, 1628.

4. "Sable, a Croſs raguly Or;" borne by the name of *Stoway*.

5. "Argent, on a Croſs Sable a Leopard's-face Or;" borne by his grace Henry Brydges duke of Chandos, &c. The anceſtors of this noble family took their name from the city of Bruges in Flanders; and one of them came over with William the Conqueror, and had a conſiderable ſhare in the victory obtained near Haſtings in Suſſex, 1066. James, the father of the preſent duke, was created viſcount Wilton and earl of Caernarvon, October 19, 1714; and marquis of Cearnarvon and duke of Chandos, —— 30, 1719.

6. "Or, on a Croſs Sable, a patriarchal Croſs of the Field;" borne by the right hon. Thomas Veſey, baron of Knapton in the kingdom of Ireland. The truly noble family of Veſcey or Veſey, derives its origin from Charles the Great, king of France, and emperor of the weſt, who died at Aix-la-Chapelle in Germany, Jan. 28, 814. His lordſhip's father was created a peer April 10, 1750.

7. "Argent, on a Croſs Gules, five Eſcalops Or;" borne by the right hon. William Villiers earl of Jerſey, &c. This noble earl is deſcended from the family of Villiers in Normandy, ſome whom came over to England with the Conqueror; ſeveral manors and lands in England being ſoon after granted to Pagan de Villiers, one of this earl's anceſtors. The firſt peer of this family was created a baron and viſcount, March 20, 1690.

8. "Sable, on a Croſs within a Bordure engrailed Or, five Pellets;" borne by the right hon. Francis Greville, earl of Brooke and Warwick, &c. The anceſtors of this noble family are of Norman extraction, and came over with William the Conqueror, who conferred manors and land on them in England, of a conſiderable value; and at length they obtained the government of the caſtle of Warwick, the preſent ſeat of the family. Sir Fulke, the firſt peer of this family, was created baron Brooke by king James I. Jan. 9, 1620.

9. "Argent, a Croſs botonny Sable;" borne by the name of *Winwood*.

10. "Or, a Croſs-croſlet Gules;" borne by the name of *Taddington*.

11. "Azure, a Croſs potent fitchy Or." This enſign is ſaid to have been borne by Ethelred king of the Weſt-Saxons; and croſſes of this ſort are frequently met with in coats-of-arms.

12. "Party per pale, Gules and Argent; a Croſs potent quadrate in the centre, between four Croſſes pattee counter-changed;" the arms of the epiſcopal ſee of Litchfield and Coventry. This ſee was originally fixed at Litchfield; from thence removed to Cheſter, and from both to Coventry. It contains the whole county of Stafford, except two pariſhes; all Derbyſhire; the better part of Warwickſhire, and near half Shropſhire; divided into the four archdeaconries of Coventry, Stafford, Derby, and Salop. The pariſhes are 557 in number; but, including chapels, they amount to 643.

Of the Croſs.

13. "Azure, a Croſs moline Argent;" borne by his grace William Henry Bentick, duke of Portland, &c. This noble duke is deſcended from a very ancient and diſtinguiſhed family in the United Provinces of Holland, of which was William Bentick, Eſq. who, in his youth was page of honour to William prince of Orange, afterwards William III. king of Great Britain, and, on the acceſſion of William and his conſort, was made groom of the ſtole, privy-purſe to his majeſty, lieutenant-general of his majeſty's army, &c. and alſo created baron of Cirenceſter, viſcount Woodſtock, and earl of Portland, April 19. 1689.

14. "Argent, a Croſs patonce Sable;" borne by the name of *Rice*.

15. "Sable, a Croſs patee Argent;" borne by the name of *Mapleſden*.

16. "Azure, a Croſs flowery Or;" borne by the name of *Cheney*.—This is ſaid to have alſo been the arms of Edwine, the firſt Chriſtian king of Northumberland.

17. "Argent, ſix Croſs croſlets fitchy 3, 2, 1, Sable, on a Chief Azure, two Mullets pierced Or;" borne by his grace Henry Clinton, duke of Newcaſtle, &c. This noble family is deſcended from Jeffrey de Clinton, lord chamberlain and treaſurer to king Henry I. grandſon to William de Tankerville, chamberlain of Normandy; from whom deſcended William de Clinton, chief juſtice of Cheſter, governor of Dover caſtle, lord Warden of the king's foreſts ſouth of Trent. Edward, lord Clinton, another of this noble earl's anceſtors, was conſtituted lord high-admiral of England for life, in the reign of queen Elizabeth, who created him earl of Lincoln, May 4. 1572.

18. "Gules, a Cheveron between ten Croſſes patee, ſix above and four below, Argent;" borne by the right hon. Frederick-Auguſtus Berkely, earl of Berkeley, &c. This noble family is deſcended from Robert Fitz-Harding, who obtained a grant of Berkeley-caſtle in Glouceſterſhire, which the family ſtill inherits, and from whence they obtained the ſurname of *Berkeley*, from Henry duke of Normandy, afterwards king of England; the ſaid Robert Fitz-Harding was deſcended from the royal line of the kings of Denmark.

19. "Azure, three Mullets Or, accompanied with ſeven Croſs-croſlets fitchy Argent, three in Chief, one in Feſs, two in Flanks, and the laſt in Baſe;" borne by the right hon. James Somerville, lord Somerville. The firſt of this name on record is Sir Walter de Somerville, lord of Wichnore, in the county of Stafford, who came to England with William the Conqueror. About the beginning of the reign of king William, in 1170, the Somervilles were poſſeſſed of a fair eſtate in the county of Lanark and elſewhere.

20. "Gules, three Croſſes recercelée, voided Or, a Chief vairy ermine and contre ermine;" borne by the

Fig. 7.

BENDS &c.

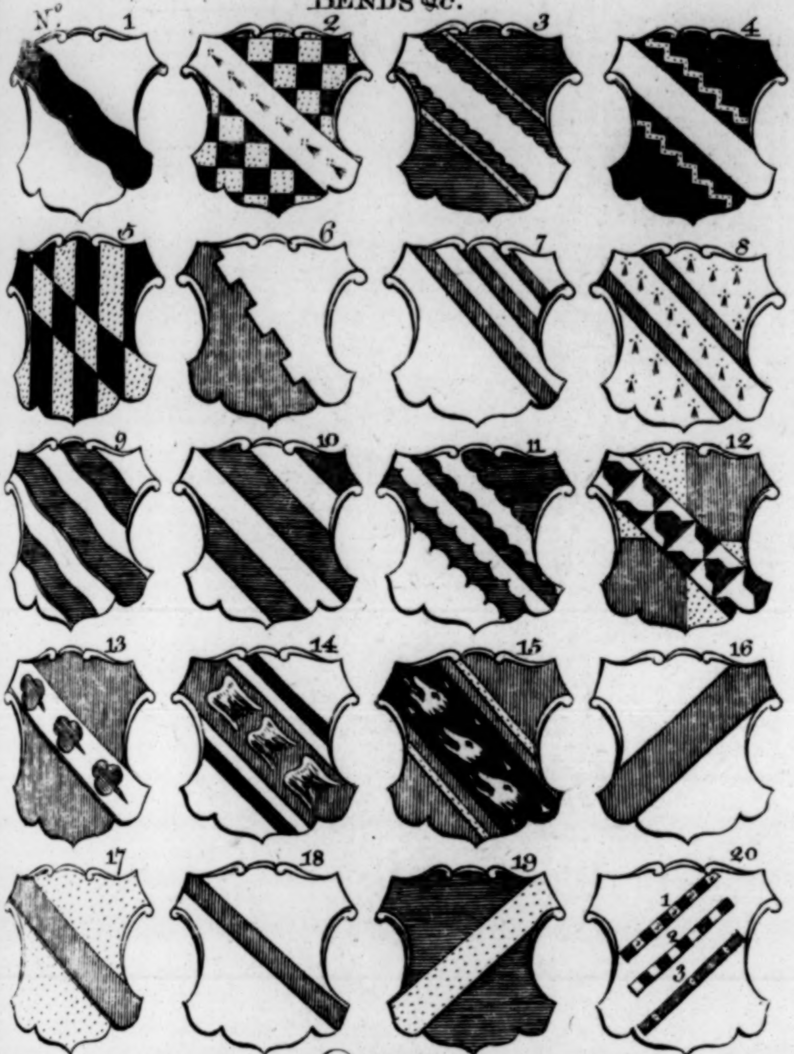
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Fig. 8.

FESSES & BARS.

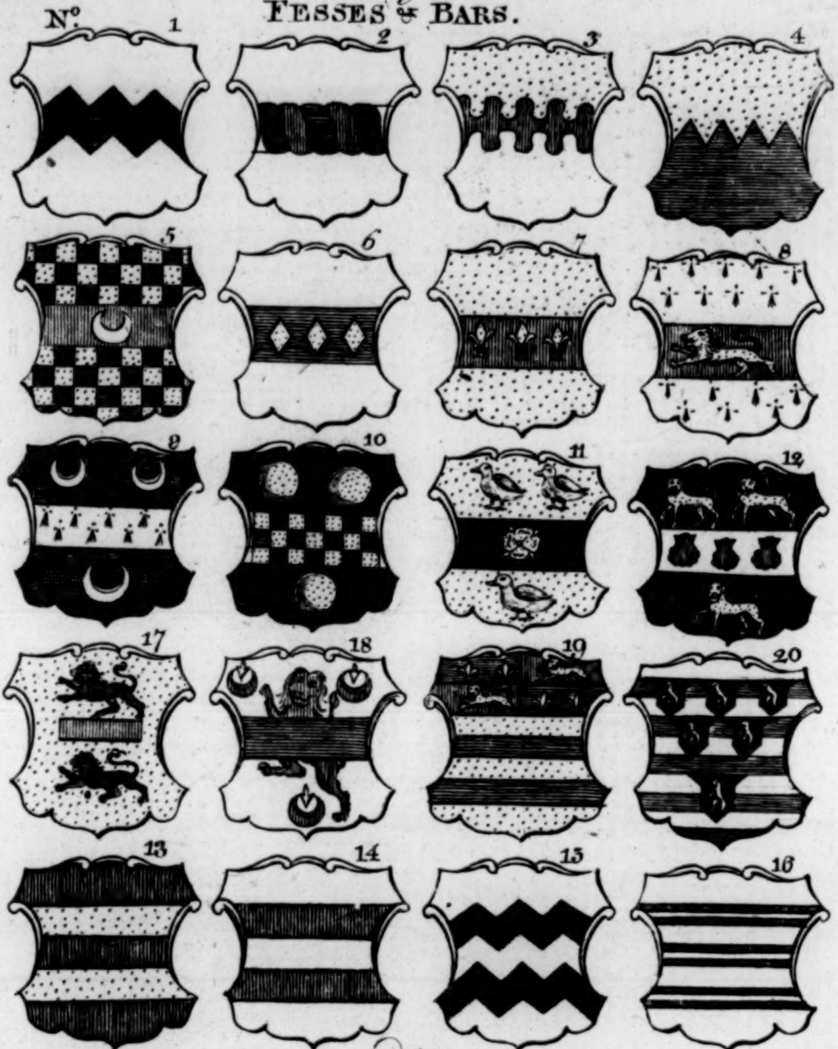
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Fig. 9.

CHEVRONS &c.

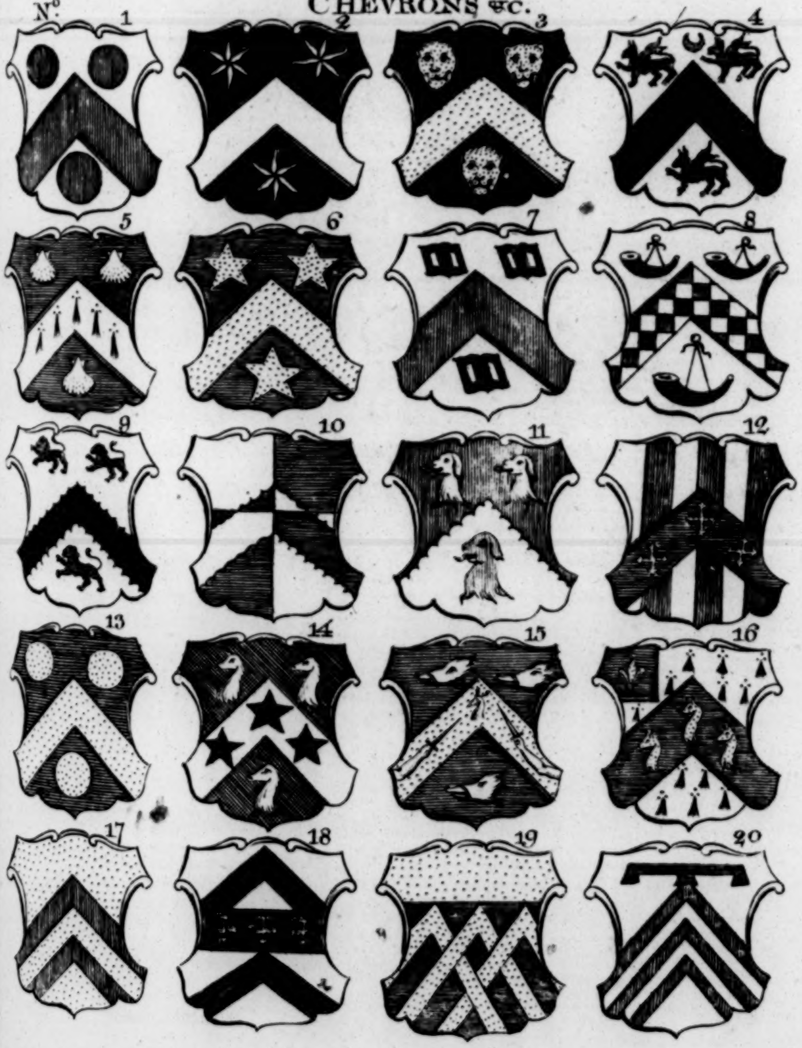
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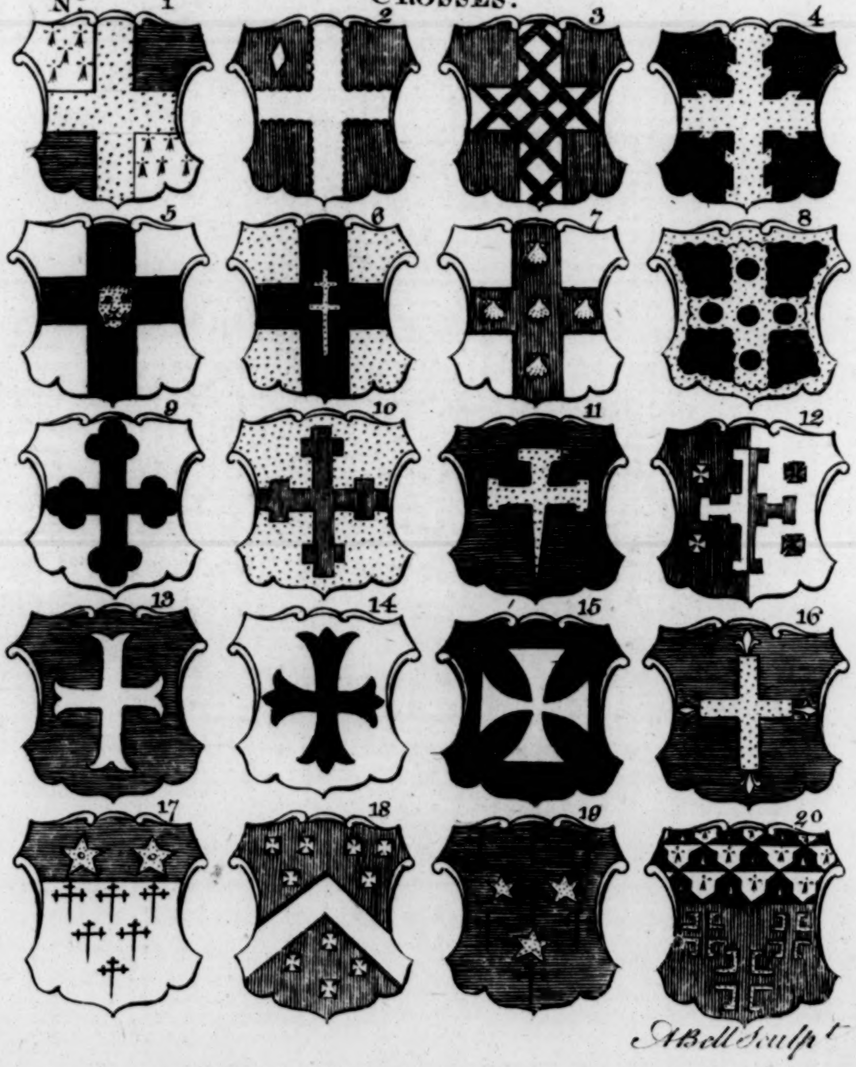
Fig. 10.

CROSSES.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the right hon. John-Peyto Verney, baron Willoughby de Broke. This noble lord is deſcended from William de Vernai, who flouriſhed in the reign of king Henry I. 1419.

Art. VII. Of the Saltier.

The Saltier, which is formed by the bend and bend-ſiniſter croſſing each other in right angles, as the interſecting of the pale and feſs forms the croſs, contains the fifth part of the field, but if charged then the third. In Scotland, this ordinary is frequently called a *St Andrew's croſs*. It may, like the others, be borne engrailed, wavy, &c. as alſo between charges or charged with any thing. See examples, fig. xi.

Plate XLVII.

N° 1. is " Argent, a Saltier Gules ;" borne by his grace James Fitz-Gerald, duke of Leinſter, &c. This noble lord is deſcended from Otho, or Other, a rich and powerful lord in the time of king Alfred, deſcended from the dukes of Tuſcany ; who paſſing from Florence into Normandy, and thence into England, there the family flouriſhed, until Richard Strongbow, earl of Pembroke, their kinſman, engaged them to partake in his expedition to Ireland, in which Maurice Fitz-Gerald embarked, and was one of the principal conquerors of that kingdom, for which he was rewarded with a great eſtate in lands in the province of Leinſter, and particularly the barony of Offaley, and the caſtle of Wicklow; and died, covered with honours, in the year 1177, 24 Henry II.

2. " Gules, a Saltier Argent, between twelve Croſs croſlets Or ;" borne by the right hon. Other-Lewis Windſor Hickman, earl of Plymouth, &c. This noble earl is deſcended from Robert Fitz-Hickman, lord of the manor of Bloxham, Oxfordſhire, in the 56 Hen. III. 1272 ; and he is maternally deſcended from the noble family of the Windſors, who were barons of the realm at the time of the conqueſt.

3. " Vert, a Saltier wavy Ermine ;" borne by the name of *Wakeman* of Beckford, in Glouceſterſhire.

4. " Ermine, a Saltier counter-compony Or and Gules ;" borne by the name of *Ulmſton*.

5. " Argent, a Saltier Azure with a Bezant in the centre ;" borne by the right hon. Philip Yorke, earl of Hardwicke, &c. He was in October 1733 conſtituted lord chief-juſtice of the king's bench, and November 23, in the ſame year, created baron Hardwicke of Hardwicke.

6. " Argent on a Saltier Gules an Eſcallop Or ;" the arms of the biſhoprick of Rocheſter—This Dioceſe, the leaſt in England, comprehends only a ſmall part of Kent, in which there are 150 churches and chapels ; and the two pariſhes in Iſelham in Cambridgeſhire, and Frekenham in Suffolk. It has only one archdeacon, that of Rocheſter. For many years it was in the immediate patronage of the archbiſhop of Canterbury.

7. " Party per Saltier, Azure and Argent, on a Saltier Gules a Creſcent of the ſecond for difference ;" quartered by the right hon. William Hall Gage, viſcount Gage, of Caſtle-Iſland in Ireland. This noble family is of Norman extraction, and derives deſcent from de Gaga or Gage, who attended William I. in his expedition to England ; and, after the conqueſt thereof, was rewarded with large grants of lands in the foreſt of Dean, and county of Glouceſter, near which foreſt he fixed his reſidence, by building a ſeat at Clerenwell, in the ſame place where the houſe of Gage now ſtands : he alſo built a great houſe in the town of Cirenceſter, at which place he died, and was buried in the abbey there. Sir Thomas Gage, the eighth baronet, and father to the preſent lord Gage, was created baron of Caſtle-Bar, and viſcount Gage, 1721.

8. " Gules, on a Saltier Argent, a Roſe of the firſt barbed and ſeeded proper ;" borne by the right hon. George Neville, lord Abergavenny, premier baron of England.

9. " Or, on a Saltier Azure, nine Lozenges of the firſt ;" the paternal arms of the right hon. John Dalrymple, earl of Stair, &c. Of this family, which took their ſurname from the barony of Dalrymple, lying on the river Dun in Ayrſhire, Scotland, was Adam de Dalrymple, who lived in the reign of Alexander III.

10. " Argent, on a Saltier engrailed Sable, nine Annulets Or ;" borne by the name of Leak.

11. " Gules, a Saltier between four Creſcents Or ;" borne as the 2d and 3d quarters in the coat-of-arms of the right hon. Charles Kinnaird, lord Kinnaird. George Kinnaird, eſq; one of the preſent lord's anceſtors, being of great ſervice to king Charles II. during the uſurpation of Oliver Cromwell, he was by that prince, at his reſtoration, made one of the privy-council ; and December 28. 1682, created a baron.

12. " Argent, a Saltier engrailed between four Roſes Gules," for Lennox ; and borne as 1ſt and 4th quarters in the coat-of-arms of the right hon. Francis Napier, lord Napier. This family is ſaid to be deſcended from the ancient thanes or ſtewards of Lennox in Scotland, but took their ſurname of Napier from the following event. King David II. in his wars with the Engliſh, about the year 1344, convocating his ſubjects to battle, the earl of Lennox ſent his ſecond ſon Donald, with ſuch forces as his duty obliged him ; and, coming to an engagement, where the Scots gave ground, this Donald, taking his father's ſtandard from the bearer, and valiantly charging the enemy with the Lennox men, the fortune of the battle changed, and they obtained the victory ; whereupon every one advancing, and reporting their acts, as the cuſtom was, the king declared they had all behaved valiantly, but that there was one among them who had *na pier*, that is, no equal ; upon which the ſaid Donald took the name of Napier, and had, in reward for his good ſervices, the lands of Goſfield, and other eſtates in the county of Fife.

13. " Gules, a Saltier Or, ſurmounted of another Vert," for the name of *Andrews ;* and borne by Sir William Andrews, bart. of Denton in Northamptonſhire, who is deſcended from Sir Robert Andrews of Normandy, knight, who came into England with William the Conqueror. Sir William Andrews, the firſt baronet of this family, was created December 11, 1641.

14. " Azure, a Saltier quarterly quartered Or and Argent." The arms of the epiſcopal ſee of Bath and Wells.—The dioceſe of Bath and Wells contains all Somerſetſhire, except a few churches in Briſtol. And in it there are three archdeaconries, viz. thoſe of Wells, Bath, and Taunton. The number of the pariſhes is 388, though, according to ſome, the total number of the churches and chapels amounts to 503.

Sub-Ordinaries.

15. "Party per Saltier Argent and Gules, a Saltier counter-changed."

16. "Party per Pale indented Argent and Sable, a Saltier counter-changed;" borne by the name of *Scote*.

17. "Argent, three Saltiers couped and engrailed Sable;" borne by the name of *Benton*.

18. "Argent, a Saltier Gules, and a Chief Ermine;" borne by the right hon. Francis Thomas Fitz-Maurice, earl of Kerry, &c. This very ancient and noble family is a branch of the family of Kildare, who are originally deſcended from the great duke of Tuſcany, and of which was Otho, a noble baron of Italy, whoſe ſon Walter, attending the Norman Conqueror into England, was made conſtable of the caſtle of Windſor. Raymond, one of the preſent earl's anceſtor's, had a principal hand in the reduction of Ireland to the ſubjection of Henry II. and Dermoid MacCarty, king of Cork, ſought his aid againſt his ſon Cormac O'Lehanagh, which he undertook, and delivered the king from his rebellious ſon; for which that prince rewarded him with a large tract of land in the county of Kerry, where he ſettled his ſon Maurice, who gave his name to the county, which he called *Clan Maurice*, and is enjoyed by the preſent earl of Kerry, who is viſcount Clan Maurice. Thomas the firſt earl, and father of the laſt, was the 21ſt lord Kerry, who was created earl, January 17. 1722.

19. "Sable, a Saltier Argent, on a Chief Azure, three Fleurs-de-lis Or;" borne by the right hon. John Fitz-Patrick, earl of Upper Oſſory, and baron of Gowran in Ireland. This moſt ancient and princely family is deſcended from Heremon, the firſt monarch of the Mileſian race in Ireland; and after they had aſſumed the ſurname of Fitz-Patrick, they were for many ages kings of Oſſory, in the province of Leinſter. John, the firſt earl of this family, ſucceeded his father Richard as lord Gowran, June 9. 1727, was created earl, October 5. 1751, and died 1758.

20. "Party per Pale Argent and Gules, three Saltiers counter-changed;" borne by the name of *Lane*. Theſe arms are alſo borne, without the leaſt alteration, by the name of *Kingſman*; for which ſimilitude we can no otherwiſe account, than by ſuppoſing there has been ſome miſtake made through many tranſcriptions.

SECT. II. *Of Sub-Ordinaries.*

BESIDES the honourable ordinaries and the diminutions already mentioned, there are other heraldic figures, called *ſub-ordinaries*, or *ordinaries* only, which, by reaſon of their ancient uſe in arms, are of worthy bearing, viz. The Gyron, Franc-quarter, Canton, Pairle, Fret, Pile, Orle, Ineſcutcheon, Treſſure, Annulet, Flanches, Flaſques, Voiders, Billet, Lozenge, Gutts, Fuſil, Ruſtre, Maſcle, Papillone, and Diaper. See Plate CXLIV. fig. i. (A.)

The Gyron is a triangular figure formed by two lines, one drawn diagonally from one of the four angles to the centre of the ſhield, and the other is drawn either horizontal or perpendicular, from one of the ſides of the ſhield, meeting the other line at the centre of the field.

Gyronny is ſaid, when the field is covered with ſix, eight, ten, or twelve gyrons in a coat-of-arms: but a French author would have the true gyronny to conſiſt of eight pieces only, as in the fig. which repreſents the coat-of-arms of the right hon. John Campbell, earl of Loudon, &c. whoſe anceſtor was created baron of Loudon in 1604 by James VI. and earl of the ſame place, May 12. 1633, the 9th of Charles I.

The Franc-quarter is a ſquare figure, which occupies the upper dexter quarter of the ſhield. It is but rarely carried as a charge. Silveſtra Petra Sancta has given us a few inſtances of its uſe.

The Canton is a ſquare part of the eſcutcheon, ſomewhat leſs than the quarter, but without any fixed proportion. It repreſents the banner that was given to ancient knights-bannerets, and, generally ſpeaking, poſſeſſes the dexter-chief-point of the ſhield, as in the fig.; but ſhould it poſſeſs the ſiniſter-corner, which is but ſeldom, it muſt be blazoned a canton-ſiniſter.

James Coats reckons it as one of the nine honourable ordinaries, contrary to moſt heralds opinion. It is added to coats-of-arms of military men as an augmentation of honour: thus John Churchill, baron of Eymouth in Scotland, and one of the anceſtors of the preſent duke of Marlborough, being lieutenant general to king James II. received from him a canton argent, charged with the red croſs of England, added to his paternal coat, "which is Sable, a lion rampant Argent."

The pairle is a figure formed by the conjunction of the upper half of the ſaltier with the under half of the pale.

The fret is a figure repreſenting two little ſticks in ſaltier, with a maſcle in the centre interlaced. J. Gibbon terms it the *heralds true-lover's knot.*; but many diſſent from his opinion.

Fretty is ſaid when the field or bearings are covered with a fret of ſix, eight, or more pieces, as in the fig. The word *fretty* may be uſed without addition, when it is of eight pieces; but if there be leſs than that number, they muſt be ſpecified.

The pile, which conſiſts of two lines, terminating in a point, is formed like a wedge, and is borne engrailed, wavy, &c. as in the fig. It iſſues in general from the chief, and extends towards the baſe, yet there are ſome piles borne in bend, and iſſuing from other parts of the field, as may be ſeen in Plate CXLVII. fig. xii. n° 12, &c.

The Orle is an ordinary compoſed of two lines going round the ſhield, the ſame way as the bordure, but its breadth is but one half of the latter, and at ſome diſtance from the brim of the ſhield, as in the fig.

The Ineſcutcheon is a little eſcutcheon borne within the ſhield; which, according to Guillim's opinion, is only to be ſo called when it is borne ſingle in the feſs-point or centre; ſee the fig. on Plate CXLIV. but modern heralds, with more propriety, give the name of *ineſcutcheon* to ſuch as are contained in Plate CXLVII. fig. xii. n° 2. and call that which is fixed on the feſs-point *eſcutcheon of pretence*, which is to contain the arms of a wife that is an heireſs, as mentioned above.

The *Treſſure* is an ordinary commonly ſuppoſed to be the half of the breadth of an orle, and is generally borne flowery and counter-flowery, as it is alſo very often double, and ſometimes treble. See the fig. (Plate CXLIV.). This double treſſure makes part of the arms of Scotland, as marſhalled in the royal achievechievement, Plate CXLIX. fig. xxi. n° 7. and was granted to the Scots kings by Charlemagne, being then emperor and king of France, when he entered in a league with Achaius king of Scotland, to ſhew that the French lilies ſhould defend and guard the Scottiſh lion.

The Annulet, or ring, is a well-known figure, and is frequently to be found in arms through every kingdom in Europe.

The Flanches are formed by two curved lines, or ſemicircles, being always borne double. See the figure. G. Leigh obſerves, that on two ſuch Flanches two ſundry coats may be borne.

Plate CXLIV.

The Flaſques reſemble the flanches, except that the circular lines do not go ſo near the centre of the field; (ſee the figure). J. Gibbon would have theſe two ordinaries to be both one, and wrote *flank;* alleging, that the two other names are but a corruption of this laſt: but as G. Leigh and J. Guillim make them two diſtinct and ſubordinate ordinaries, we have inſerted them here as ſuch.

The Voiders are by Guillim conſidered as a ſubordinate ordinary, and are not unlike the flaſques, (ſee the figure,) but they occupy leſs of the field.

The Billet is an oblong ſquare figure, twice as long as broad. Some heralds imagine, that they repreſent bricks for building; others more properly conſider them as repreſenting folded paper or letters.

The Lozenge is an ordinary of four equal and parallel ſides, but not rectangular; two of its oppoſite angles being acute, and the other two obtuſe. Its ſhape is the ſame with thoſe of our window-glaſſes, before the ſquare came ſo much in faſhion. See the figure.

Gutts, or drops, are round at bottom, waved on the ſides, and terminate at the top in points. Heralds have given them different names according to their different tinctures: thus if they are

Yellow	they are called	*d' Or*
White		*de Eau*
Red		*de Sang*
Blue		*de Larmes*
Green		*de Vert*
Black		*de Poix*

The fuſil is longer than the lozenge, having its upper and lower part more acute and ſharp than the other two collateral middle parts, which acuteneſs is occaſioned by the ſhort diſtance of the ſpace between the two collateral angles; which ſpace, if the fuſil is rightly made, is always ſhorter than any of the four equal geometrical lines whereof it is compoſed. See the fig. *ibid.*

The Ruſtre is a lozenge pierced round in the middle; (ſee the figure.) They are called by the Germans, *rutten.* Meneſtrier gives an example of them in the arms of Lebaret in France, argent three ruſtres azure.

The Maſcle is pretty much like a lozenge, but voided or perforated through its whole extent, ſhewing a narrow border, as in the figure. Authors are divided about its reſemblance; ſome taking it for the maſh of a net, and others for the ſpots of certain flints found about Rohan; and as no writer has given a clearer account in ſupport of this laſt opinion than Colombiere, author of *La Science Heraldique*, we ſhall tranſcribe it for the ſatisfaction of the curious.

“ Rohan (ſays he) bears Gules, nine Maſcles Or, 3, 3, 3. Opinions have varied very much about the original of the maſcles or maſhes, as being ſomewhat like the maſhes of nets: but for my own part, having often obſerved that thoſe things which are remarkable and ſingular in ſome countries, have ſometimes occaſioned the lords thereof to repreſent them in their eſcutcheons, and to take them for their arms, I am of opinion, that the lords of Rohan, who, I believe, are the firſt that bore theſe figures in their arms, tho' deſcended from the ancient kings and princes of Bretagne, took them, becauſe in the moſt ancient viſcounty of Rohan, afterwards erected into a duchy, there are abundance of ſmall flints, which being cut in two, this figure appears on the inſide of them; as alſo the carps, which are in the fiſh-ponds of that duchy, have the ſame mark upon their ſcales; which, being very extraordinary and peculiar to that country, the ancient lords of the ſame had good reaſon, upon obſerving that wonder, to take thoſe figures for their arms, and to tranſmit them to their poſterity, giving them the name of *macles*, from the latin word *macula*, ſignifying a ſpot; whence ſome of that houſe have taken for their motto, *Sine macula macla*, that is, A maſcle without a ſpot.”

Papillone is an expreſſion uſed for a field or charge that is covered with figures like the ſcales of a fiſh. Monſ. Baron gives as an example of it the arms of Monti Gueules Papelone d'Argent. The proper term for it in Engliſh would he *ſcallop-work*.

Diapering is ſaid of a field or charge ſhadowed with flouriſhings or foliage with a colour a little darker than that on which it is wrought. The Germans frequently uſe it; but it does not enter into the blazoning or deſcription of an arms, it only ſerves to embelliſh the coat.

If the fore-mentioned ordinaries have any attributes, that is, if they are engrailed, indented, wavy, &c. they muſt be diſtinctly ſpecified, after the ſame manner as the honourable ordinaries.

See examples of ſub-ordinaries, &c. fig. xii.

Plate CXLVII.

1. “ Gules, an Orle Ermine;” borne by the name of *Humframville*.

2. “ Argent, three Ineſcutcheons Gules;” borne by the name of *Hay*, and the 2d and 3d quarters in the coat-of-arms of the right hon. Thomas Hay, earl of Kinnoul, &c.—The firſt of the name of Hay that bore theſe arms, got them, as Mr Niſbet obſerves, becauſe he and his two ſons, after having defeated a party of the Danes at the battle of Loncarty, *anno* 942, were brought to the king with their ſhields all ſtained with blood.

3. “ Argent, a Fret Sable;” borne by the right hon. Lionel Talmaſh, earl of Dyſart, &c. This family was advanced to the peerage by king Charles I. in 1646.

4. “ Or, fretty of Gules, a Canton Ermine;” borne by the right hon. Henry Noel, earl of Gainſborough, &c. This nobleman is deſcended from —— Noel, who came into England with William the Conqueror, and, in conſideration of his ſervices, obtained a grant of ſeveral manors and lands of very great value. Sir Edward, who was knighted by king James on his acceſſion to the throne, and created a baronet June 29, 1611, was the firſt advanced to the honour of baron Noel, March 23, 1616.

5. “ Girony of eight Pieces Or and Sable;” the

1ſt and 4th quarters of the coat-of-arms of the right hon. John Campbell, earl of Breadalbane, &c. This ancient and noble family is deſcended, in a regular ſucceſſion, from Duncan the firſt Lord Campbell, anceſtor of the family of Argyll. John, the firſt earl, in conſideration of his perſonal merit, was, from a baronet, created lord Campbell, viſcount Glenorchie, and earl of Breadalbane, Jan. 28. 1677, by Charles II.

6. " Lozengy Argent and Gules ;" borne by the right hon. George Fitz-William, earl Fitz-William, &c. This noble earl is deſcended from Sir William Fitz-William, marſhal of the army of William the Conqueror at the battle of Haſtings in Suſſex, by which victory that prince made his way to the throne.

7. " Sable, a Maſcle within a Treſſure flowery Argent ;" borne by the name of *Hoblethorne*.

8. " Gules, three Mullets Or, within a Bordure of the latter, charged with a double Treſſure flowery and counter-flowery with Fleurs-de-lis of the firſt ;" borne by the right hon. William Sutherland, earl of Sutherland, &c. According to the traditional account of ſome Scottiſh writers, this family, in the peerage, is older than any in North-Britain, if not in all Europe; the title of *earl* being conferred on one of their anceſtors in 1057.

9. " Azure, a Pile Ermine," for the name of *Wyche;* and is quartered as firſt and fourth in the coat-of-arms of Sir Cyril Wyche, bart. his majeſty's reſident at the Hans-Towns.

10. " Or, on a Pile engrailed Azure, three Croſs-croſlets fitchy of the firſt ;" borne by the name of *Rigdon*.

11. " Or, on a Pile Gules three Lions of England between ſix Fleurs-de-lis Azure ;" the firſt and fourth quarters of his grace Edward Seymour, duke of Somerſet, &c. granted him by king Henry VIII. on his marriage with the lady Jane Seymour.

12. " Ermine, two Piles iſſuing from the dexter and ſiniſter ſides, and meeting in Baſe Sable ;" for the name of *Holles*.

13. " Argent, three Piles, one iſſuing from the Chief between the others reverſed, Sable ;" for the name of *Hulſe*, and borne by Sir Edward Hulſe, bart. of Lincoln's-inn fields, Middleſex.

14. " Azure, a Pile wavy bendways Or ;" borne by the name of *Aldham*.—There is no mention made of its iſſuing out of the dexter-corner of the eſcutcheon, for this is ſufficiently determined by the term *bendways*.

15. " Or, three Piles in Bend, each point enſigned with a Fleur-de-lis Sable ;" borne by the name of *Norton*.

16. " Argent, three Piles meeting near the point of the Baſe Azure ;" borne by the name of *Bryan*.

17. " Party per Pale and per Bend Or and Azure counter-changed ;" borne by the name of *Johnſon*.—This bearing is equal to two gyrons ; ſee p. 3596. col. 1.

18. " Party per Pale and per Cheveron Argent and Gules counter-changed."

19. " Party per Pale chappé Or and Vert counter-changed." This is a bearing ſeldom to be met with.

20. " Party per Feſs Gules and Argent, a Pale counterchanged ;" borne by the name of *Lavider*.

SECT. III. *Of* COMMON CHARGES *borne in coats-of-arms.*

IT has been already obſerved, that in all ages men have made uſe of the repreſentation of living creatures, and other ſymbolical ſigns, to diſtinguiſh themſelves in war ; and that theſe marks, which were promiſcuouſly uſed for hieroglyphs, emblems, and perſonal devices, gave the firſt notion of heraldry. But nothing ſhews the extent of human wit more, than the great variety of theſe marks of diſtinction, ſince they are compoſed of all ſorts of figures, ſome natural, others artificial, and many chimerical ; in alluſion, it is to be ſuppoſed, to the ſtate, quality, or inclination of the bearer.

Hence it is, that the ſun, moon, ſtars, comets, meteors, &c. have been introduced to denote glory, grandeur, power, &c. Lions, leopards, tygers, ſerpents, ſtags, &c. have been employed to ſignify courage, ſtrength, prudence, ſwiftneſs, &c.

The application to certain exerciſes, ſuch as war, hunting, muſic, &c. has furniſhed lances, ſwords, pikes, arms, fiddles, &c. Architecture, columns, cheverons, &c.; and the other arts ſeveral things that relate to them.

Human bodies, or diſtinct parts of them, alſo clothes and ornaments, have, for ſome particular intention, found place in armory ; trees, plants, fruits, and flowers, have likewiſe been admitted to denote the rarities, advantages, and ſingularities, of different countries.

The relation of ſome creatures, figures, &c. to particular names, has been likewiſe a very fruitful ſource of variety in arms. Thus the family of Coningſby bears three coneys ; of Arundel, ſix ſwallows ; of Urſon, a bear ; of Lucie, three pikes, in Latin *tres lucios piſces ;* of Starkey, a ſtork ; of Caſtleman, a caſtle triple-towered ; of Shuttleworth, three weaver's ſhuttles, &c.

Beſides theſe natural and artificial figures, there are chimerical or imaginary ones uſed in heraldry, the reſult of fancy and caprice ; ſuch as centaurs, hydras, phenixes, griffons, dragons, &c. Which great variety of figures ſhews the impoſſibility of comprehending all common charges in a work of this nature ; therefore ſuch only ſhall be treated of as are moſt frequently borne in coats-of-arms.

ART. I. Of NATURAL FIGURES borne in coats-of-arms.

AMONG the multitude of natural things which are uſed in coats-of-arms, thoſe moſt uſually borne are, for the ſake of brevity as well as perſpicuity, diſtributed into the following claſſes, viz.

Celeſtial figures ; as the ſun, moon, ſtars, &c. and their parts.

Effigies of men, women, &c. and their parts.

Beaſts ; as lions, ſtags, foxes, boars, &c. and their parts.

Birds ; as eagles, ſwans, ſtorks, pelicans, &c. and their parts.

Fiſhes ; as dolphins, whales, ſturgeons, trouts, &c. and their parts.

Celeſtial Figures.

Reptiles and *inſects*; as tortoiſes, ſerpents, graſshoppers, &c. and their parts.

Vegetables; as trees, plants, flowers, herbs, &c. and their parts.

Stones; as diamonds, rubies, pebbles, rocks, &c.

Theſe charges have, as well as ordinaries, divers attributes or epithets, which expreſs their qualities, poſitions, and diſpoſitions. Thus the ſun is ſaid to be *in his glory*, *eclipſed*, &c. The moon *in her complement*, *increſcent*, &c. Animals are ſaid to be *rampant*, *paſſant*, &c. Birds have alſo their denominations, ſuch as *cloſe*, *diſplayed*, &c. Fiſhes are deſcribed to be *hauriant*, *naiant*, &c.

I. *Examples of Celeſtial Figures.*

Plate CXLVII. fig. xiii.

1. “Azure, a Sun in his Glory;” borne by the name of *St. Clere*; and is found in the 1ſt and 4th quarters of the coat-of-arms of the moſt noble William-Henry Ker, marquis of Lothian, &c. It is needleſs to expreſs the colour of the ſun, nothing being capable to denote it but gold.

2. “Azure, one Ray of the Sun, bendways Gules, between ſix Beams of that Luminary Argent;” borne by the name of *Aldam*. There is no mention made of their iſſuing out of the dexter-corner of the eſcutcheon; for this is implied in the term *bendways*, for the reaſon mentioned before.

3. “Argent, five Rays of the Sun iſſuing out of the ſiniſter-corner Gules;” borne by the name of *Mudtſhideler*, a family of diſtinction in Franconia.

4. “Or, a Sun eclipſed.” This bearing is ſeldom to be met with, except in emblematic or hieroglyphic figures; and might be expreſſed *Sable*, becauſe that hue is accidental and not natural.

5. “Gules, the Moon in her complement Or, illuſtrated with all her light proper.” This is ſufficient without naming the colour, which is *Argent*.

6. “Azure, a Moon decreſcent proper;” borne by the name of *Delaluna*.

7. “Gules, a Moon increſcent Or;” borne by the name of *Deſcus*.

8. “Argent, a Moon in her *detriment*, Sable.” This word is uſed in heraldry to denote her being *eclipſed*.

9. “Azure, a Creſcent Argent;” borne by the name of *Lucy*. This bearing is alſo uſed as a difference, it being aſſigned to the ſecond ſon, as beforementioned.

10. “Gules, three Creſcents Argent;” borne by the right hon. David Oliphant, lord Oliphant. Amongſt the anceſtors of this noble family was David de Oliphant, one of thoſe barons who, in 1142, accompanied king David I. into England with an army, to aſſiſt his niece Matilda againſt king Stephen; but, after raiſing the ſiege of Wincheſter, the ſaid king David was ſo cloſely purſued, that, had it not been for the ſingular conduct of this brave perſon, the king would have been taken priſoner.

11. “Azure, a Creſcent between three Mullets Argent;” borne by the right hon. John Arbuthnot, viſcount and baron Arbuthnot. In the year 1105, the firſt of this family marrying a daughter of the family of Oliphard, ſheriff of the county of Kincardin, with her he had the lands of Arbuthnot in that county, from whence he took his ſurname. Robert Arbuthnot was the firſt of this family who, for his loyalty to king Charles I. was, Nov. 16. 1641, dignified with the title of *baron* and *viſcount Arbuthnot*.

12. “Gules, a Star iſſuing from between the Horns of a Creſcent Argent.”

13. “Azure, a Star of 16 points Argent;” borne by the name of *Huitſon*.

14. “Argent, three Mullets pierced Sable;” borne by the name of *Wollaſton*.

15. “Azure, ſix Mullets 3, 2, 1, Or;” borne by the name of *Welſh*.

16. “Ermine, a Mullet of ſix points Gules, pierced;” borne by the name of *Huſſenhul*.—When a mullet has more than five points, their number muſt, in blazoning, be always named.

17. “Argent, a Rain-bow with a Cloud at each end proper.” This is part of the creſt to the earl of Hopeton's coat-of-arms, which is inſerted in fig. ix. n° 13. The whole of it is a globe ſplit on the top, and above it is the rain-bow, &c.

18. “Party per Feſs crenelle Gules and Azure, three Suns proper;” borne by the name of *Pierſon*.

19. “Gules, a Mullet between three Creſcents Argent;” borne by the name of *Oliver*.

20. “Gules, a Chief Argent, on the lower part thereof a Cloud, the Sun's reſplendent rays iſſuing throughout proper;” borne by the name of *Leeſon*.

Effigies of Men.

II. *Examples of Effigies of Men, &c. and their parts.*

Fig. xiv.

1. “Azure, the Virgin Mary crowned, with her Babe in her right arm, and a Sceptre in her left, all Or;” The coat-of-arms of the biſhopric of Saliſbury.—This biſhop's ſee was at firſt fixed at Sherborn in Dorſetſhire; and contained all that diſtrict which is now divided into the dioceſes of Saliſbury, Briſtol, Wells, and Exeter. In the year 905, the dioceſes of Wells, Crediton, and St Germans (now Exeter), were taken from it. And it was, moreover, parcelled out into the two biſhoprics of Sherborn and Wilton. The preſent dioceſe of Saliſbury, or Sarum, contains all Wiltſhire, except two pariſhes; and all Berkſhire, excepting one pariſh, and part of another. There are in it three archdeaconries, namely, of Saliſbury, Wilts, and Berks; and the number of pariſh-churches and chapels, in the whole, is about 550. It has ſeveral peculiars of its own in Dorſetſhire; though in Briſtol dioceſe.

2. “Azure, a Preſbyter, ſitting on a Tomb-ſtone, with a Crown on his Head and Glory Or, his right hand extended, and holding in his left an open Book Argent, with a Sword croſs his mouth Gules.” The coat-of-arms of the biſhopric of Chicheſter. The ſee of Chicheſter was anciently in the iſle of Selſey, but removed to Chicheſter by Stigand. This dioceſe contains the whole county of Suſſex (except 22 peculiars belonging to the archbiſhopric of Canterbury), wherein there are 250 pariſhes, and two archdeacons, thoſe of Chicheſter and Lewis. Some reckon the number of churches and chapels to be 302.

3. “Azure, a Biſhop habited in his pontificals, ſitting on a chair of ſtate, and leaning on the ſiniſter ſide thereof, holding in his left hand a croſier, his right being extended towards the dexter chief of the eſcutcheon, all Or; and reſting his feet on a cuſhion, Gules, taſſeled of the ſecond.” The coat-of-arms of the bi-

ſhopric of Clogher, in Ireland.

4. "Azure, a Biſhop habited in his pontificals, holding before him, in a Pale, a Crucifix proper." The coat-of-arms of the biſhopric of Waterford, in Ireland.

5. "Or, a Man's Leg couped at the midſt of the thigh Azure;" borne by the name of *Haddon*.

6. "Azure, three ſiniſter Hands couped at the wriſt, and erected Argent;" borne by the ancient family of Malmains.

7. "Argent, three ſiniſter Hands couped at the wriſt, and erected Gules;" borne by the name of *Maynard*. By theſe two laſt examples it appears, that different coats-of-arms may be eaſily made from the ſame figure or figures, by varying the colours only, without the addition of any other charge, counter-changings, partings, &c.

8. "Argent, a Man's Leg eraſed at the midſt of the thigh Sable;" borne by the name of *Prime*.

9. "Gules, three Legs armed proper, conjoined in the Feſs-point at the upper part of the thighs, flexed in triangle, garniſhed and ſpurred Or." This is the coat-of-arms of the Iſle of Man; and is quartered by the moſt noble John Murray, duke of Athole, titular lord or king of that iſle.

10. "Gules, three dexter Arms vambraced feſsways in Pale proper;" borne by the name of *Armſtrong*. This coat is very well adapted to the bearer's name, and ſerves to denote a man of excellent conduct and valour.

11. "Or, three Legs couped above the knee Sable;" borne by the name of *Hoſy*.

12. "Vert, three dexter Arms conjoined at the ſhoulders in the Feſs-point, and flexed in triangle Or, with fiſts clenched Argent;" borne by the name of *Tremain*.

13. "Argent, a Man's Heart Gules, within two equilateral triangles interlaced Sable;" borne by the name of *Villages*, a family of diſtinction in Provence.

14. "Azure, a ſiniſter Arm, iſſuing out of the dexter-chief, and extended towards the ſiniſter-baſe Argent."

15. "Argent, a dexter Hand couped at the wriſt and erected, within a Bordure engrailed Sable;" borne by the name of *Manley*.

16. "Argent, a Man's Heart Gules, enſigned with a Crown Or, and on a Chief Azure, three Mullets of the firſt." The paternal coat of the name of *Douglas*, and quartered in the arms of the dukes of Hamilton and Queenſbury; as alſo in thoſe of the earls of Morton and March, and the Lord Mordington.

17. "Gules, a Saracen's Head affrontée eraſed at the neck Argent, environed about the temples with a wreath of the ſecond and Sable;" borne by the name of *Mergith*.

18. "Argent, three Blackamoors Heads couped proper, banded about the head Argent and Gules;" borne by the name of *Tanner*.

19. "Gules, three Beſants each charged with a man's face affrontée proper;" borne by the name of *Gamin*.

20. "Or, a Blackamoor's Head couped proper, banded about the Head Argent;" borne by the name of *Uſtoc*.

Obſerve, that when half of the face, or little more, of human figures, is ſeen in a field, it is then ſaid to be *in profile*; and when the head of a man, woman, or other animal, is repreſented with a full face, then it is termed *affrontée*.

III. *Examples of the different Poſitions of Lions*, &c. *in coats-of-arms*.

Plate CXLVIII. fig. xv.

1. "Or, a Lion rampant Gules;" quartered by the right hon. Hugh Percy-Smithſon, earl of Northumberland, &c. This noble earl is deſcended from the family of the Smithſons of Newſham in Yorkſhire, which appears to have been poſſeſſed of lands in that county in the reign of king Richard II. His lordſhip, married July 18. 1740, the lady Elizabeth Seymour, only daughter of Algernon Seymour, late duke of Somerſet, and earl of Northumberland, on whoſe death he was created earl of the ſame county, Feb. 7. 1749-50, and duke of the ſame county Oct. 22. 1766.

2. "Azure, a Lion rampant-guardant Or;" borne by the name of *Fitz-Hammond*.

3. "Gules, a Lion rampant-reguardant Or;" quartered by the right hon. Charles Cadogan, lord Cadogan, &c. This noble lord is deſcended from Kehdlin, prince of Powis in Wales, from whom deſcended William Cadwyan or Cadogan of Llanbeder, in the county of Pembroke, another of the anceſtors of this preſent lord, who was created a peer of Great Britain on June 21. 1716.

4. "Ermine, a Lion ſaliant Gules;" borne by the name of *Worley*.

5. "Azure, a Lion ſtatant-guardant Or;" borne by the name of *Bromfield*.

6. "Or, a Lion paſſant Gules;" borne by the name of *Games*.

7. "Argent, a Lion paſſant-guardant Gules, crowned Or;" quartered by the right hon. James Ogilvy, earl of Findlater, &c.

8. Gules, a Lion ſejant Argent."

9. "Or, a Lion rampant double-headed Azure;" borne by the name of *Maſon*.

10. "Sable, two Lions rampant-combatant Or, armed and langued Gules;" borne by the name of *Carter*.

11. "Azure, two Lions rampant-adoſſee Or." This coat-of-arms is ſaid to have been borne by Achilles at the ſiege of Troy.

12. "Sable, two Lioncels counter-paſſant Argent, the uppermoſt towards the ſiniſter ſide of the eſcutcheon, both collared Gules;" borne by the name of *Glegg*.—It is the natural diſpoſition of the lion not to bear a rival in the field: therefore two lions cannot be borne in one coat-of-arms, but muſt be ſuppoſed to be lion's whelps, called *lioncels*; except when they are parted by an ordinary, as in fig. viii. n° 17. or ſo diſpoſed as that they ſeem to be diſtinctly ſeparated from each other, as in fig. xv. n° 20. In the two foregoing examples they are called *lions*, becauſe in the 10th they ſeem to be ſtriving for the ſovereignty of the field, which they would not do unleſs they were of full growth: and, in the 11th, they are ſuppoſed to repreſent two valiant men, whoſe diſpute being accommodated by the prince, are leaving the field, their pride not ſuffering them to go both one way.

13. "Argent, a Demi-lion rampant Sable;" borne by the name of *Mervin*.

14.

Fig. 11.

SALTIERS.

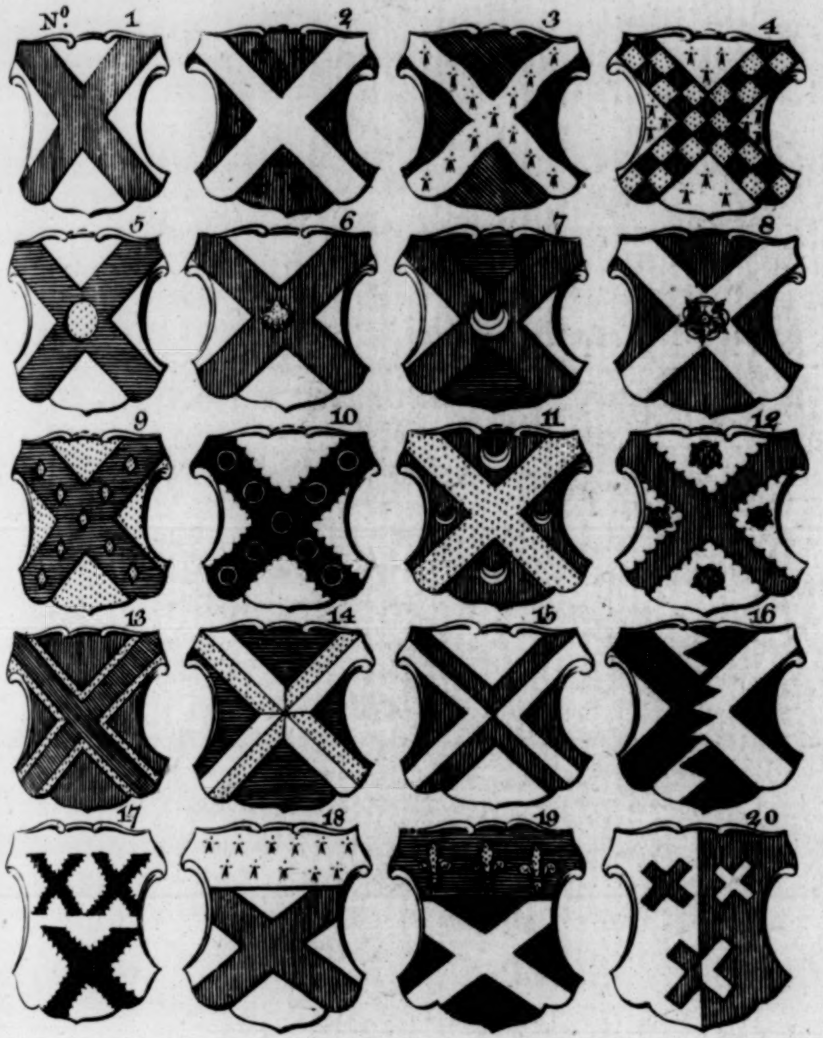
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Fig. 12.

ORDINARYS &c.

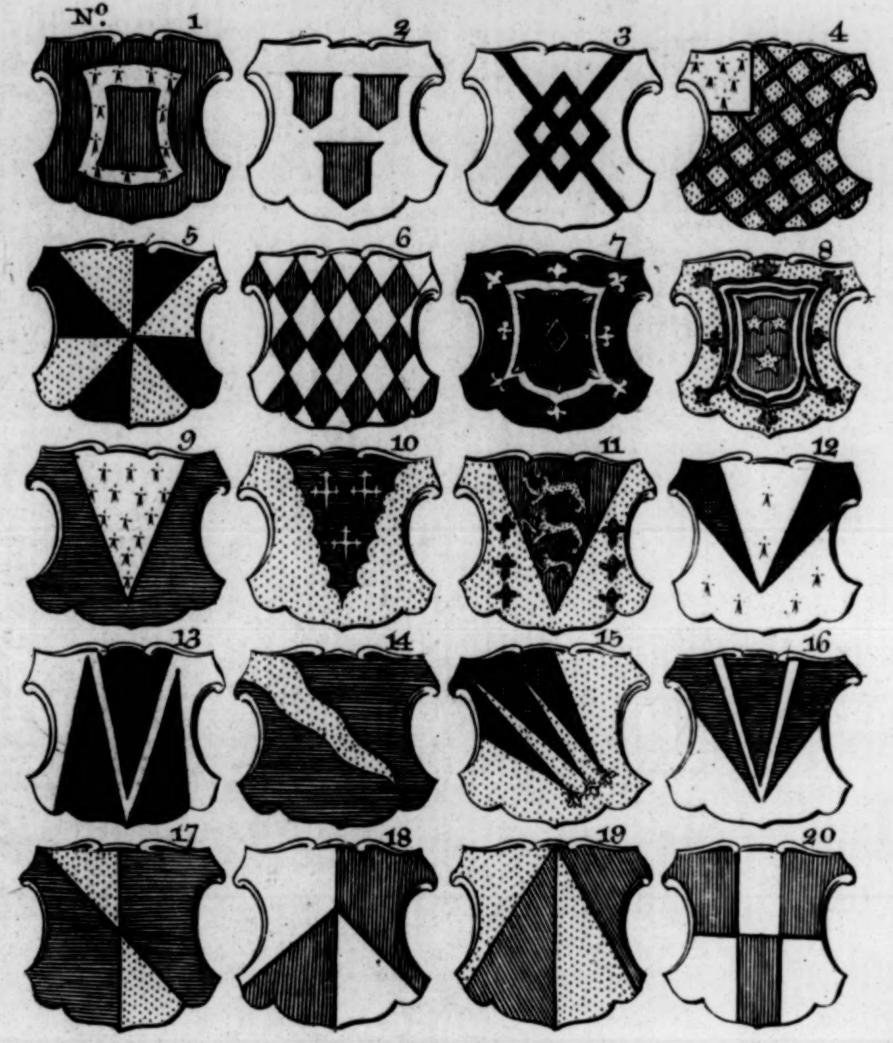
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Fig. 13.

CELESTIALS.

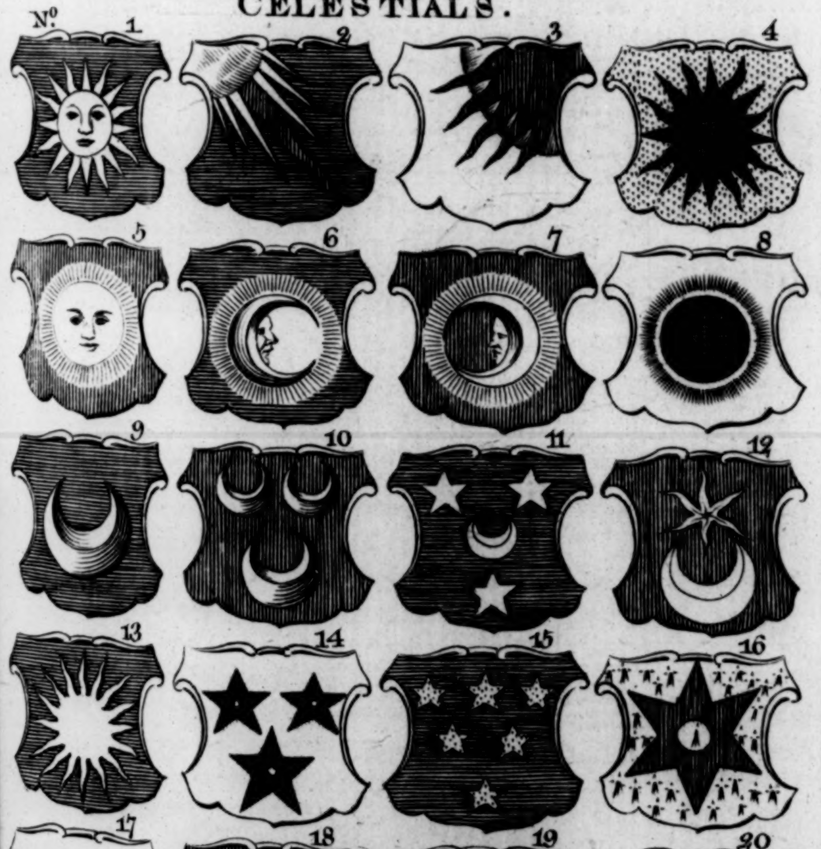
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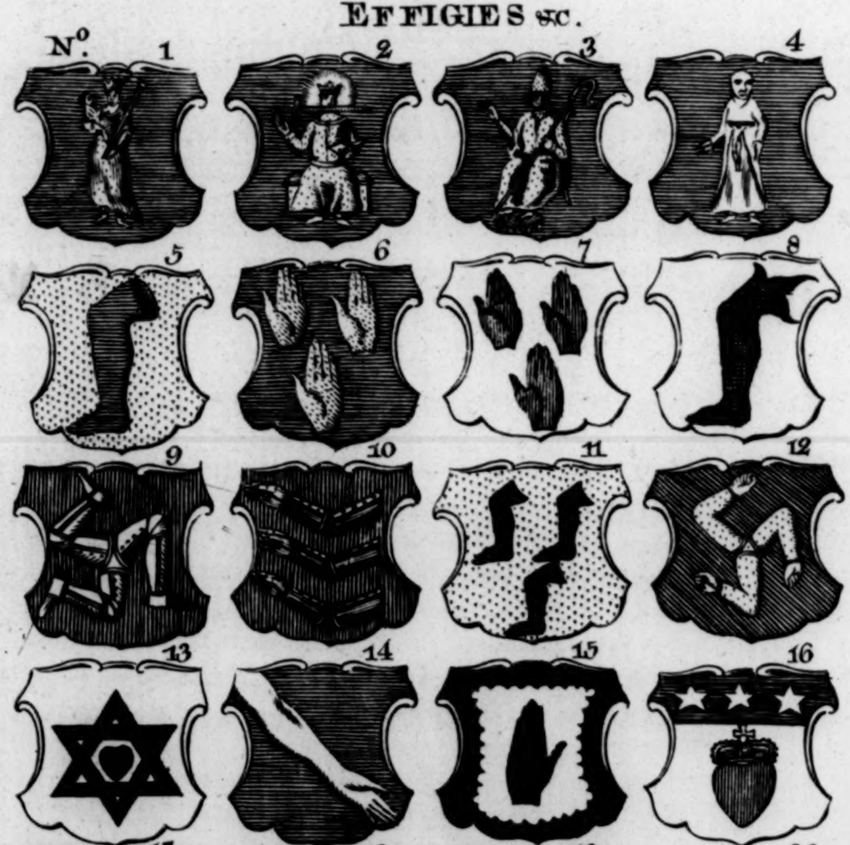
Fig. 14.

EFFIGIES &c.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Of Lions, &c. 14. "Gules, a lion couchant between ſix Croſs-croſlets, three in Chief, and as many in Baſe, Argent;" for the name of *Tynte;* and is the firſt and fourth quarter of the arms of Sir Charles-Kemys Tynte, bart. elected knight of the ſhire for the county of Somerſet to the four laſt and preſent parliaments, colonel of the ſecond battalion of the Somerſet militia, and LL.D.

15. "Azure, a Lion dormant Or."

16. "Or, out of the midſt of a Feſs Sable, a Lion rampant-naiſſant Gules;" borne by the name of *Emme.* This form of blazon is peculiar to all living things that ſhall be found iſſuing out of the midſt of ſome ordinary or other charge.

17. "Azure, three Lioncels rampant Or;" borne by the right hon. Richard Fienes, viſcount and baron Saye and Sele. This noble lord is deſcended from John, baron Fienes, hereditary conſtable of Dover-caſtle, and lord Warden of the Cinque-ports, in the 12th century.

18. "Gules, a tricorporated Lion iſſuing from three parts of the Eſcutcheon, all meeting under one Head in the Feſs-point Or, langued and armed Azure;" borne by the name of *Crouchback.* This coat appertained to Edmund Crouchback, earl of Lancaſter, in the reign of his brother king Edward I.

19. "Gules, a Beſant between three Demi-lions rampant Argent;" borne by the right hon. Charles Bennet, earl of Tankerville, &c. This noble earl is deſcended from the family of the Bennets in Berkſhire, who flouriſhed in the reign of king Edward III. Charles, lord Oſſulſton, grandfather of the preſent earl, was created earl of Tankerville, on October 19. 1714, by George I.

20. "Party per Pale Azure and Gules, three Lions rampant Argent;" borne by the right hon. Henry Herbert earl of Pembroke, &c. This noble family is deſcended from Henry Fitz-Roy, natural ſon to Henry I. Sir William Herbert, one of the anceſtors of the preſent earl, was maſter of the horſe to king Henry VIII. lord preſident of the marches of Wales, and knight of the garter. He was alſo, by that king, advanced to the dignity of baron Herbert of Caerdiff, October 10. 1551, and the very next day created earl of Pembroke.—Obſerve, that if a lion, or any other beaſt, is repreſented with its limbs and body ſeparated, ſo that they remain upon the field at a ſmall diſtance from their natural places, it is then termed *Debaché* or *couped in all its parts,* of which very remarkable bearing, there is an inſtance in armory, which is, "Or, a Lion rampant Gules, debaché, or couped in all its parts, within a double Treſſure flowery and counter-flowery of the ſecond;" borne by the name of *Maitland.*

IV. *Examples of other Quadrupeds, and their Parts, borne in Coats-of Arms.*

xvi. 1. "Sable, a Camel ſtatant Argent;" borne by the name of *Camel.*

2. "Gules, an Elephant ſtatant Argent, tuſked Or;"

3. "Argent, a Boar ſtatant Gules, armed Or;" borne by the name of *Trewarthen.*

4. "Sable, a Bull paſſant Or;" borne by the name of *Fitz-Geffrey.*

5. "Sable, three Nags Heads eraſed Argent;" borne by the right hon. and the reverend Charles-Talbot Blayney, baron Blayney of Monaghan, in Ireland. This noble family is deſcended in a direct line from Cadwallader, a younger ſon of the prince of Wales; and the firſt peer was Sir Edward Bleyney, knight, who was created a baron by king James I. July 29, 1621.

Different Animals.

6. "Argent, three Boars Heads eraſed and erect Sable, langued Gules," for the name of *Booth;* and borne by Sir George Booth, bart. the preſent rector of Aſhton-under-Line, in the county of Lancaſter.—Various are the traditions touching the original ſtem of this ancient family, which, like moſt others of long ſtanding, is ſo ingulfed in the obſcurity of all-devouring time, that no other light than conjecture is now to be had thereof. The moſt probable is, that their beginning was at a certain place called the *Booths,* in the county of Lancaſter, where being ſeated, they were thence ſurnamed, as the manner of thoſe ages was to ſtyle men from the places where they lived.

7. "Azure, three Boars Heads eraſed Or;" quartered by his grace Alexander Gordon duke of Gordon, &c. Of this great and noble family, which took their ſurname from the barony of Gordon in the county of Berwick, there have been, beſides thoſe in North-Britain, ſeveral of great diſtinction in Muſcovy; and in the time of king Malcolm IV. 1160, this family was very numerous, and flouriſhed in the county aforeſaid.

8. "Argent, three Bulls Heads eraſed, Sable, armed Or;" borne by the right hon. Clotworthy Skeffington, earl of Maſſareene, &c. of Ireland. This ancient and noble family derives its name from the village of Skeffington, in the county of Liceſter, of which place Simon Skeffington was Lord in the reign of Edward I. and from him deſcended Sir William Skeffington, knt. made ſo by king Henry VII.

9. "Argent, two Foxes counter-ſaliant, the dexter ſurmounted of the ſiniſter Gules;" for the name of *Kadrod-Hard,* an ancient Britiſh family, from which is deſcended Sir Watkyn-Williams Wynne, bart. who bears this quartered, ſecond and third, in his coat-of-arms.

10. "Argent, three Bulls paſſant Sable, armed and unguled Or;" for Aſhley, and quartered by the right hon. Anthony-Aſhley Cooper, earl of Shafteſbury, &c. This noble earl is deſcended from Richard Cooper, who flouriſhed in the reign of king Henry VIII. and purchaſed the manor of Paulet in the county of Somerſet; of which the family are ſtill proprietors. But his anceſtor, who makes the greateſt figure in hiſtory, is Sir Anthony-Aſhley Cooper, who was created baron Aſhley of Winbourn, April 20, 1661, and afterwards earl of Shafteſbury, April 23, 1672.

11. "Ermine, three Cats paſſant in Pale Argent," for the name of *Adams;* and borne by Sir Thomas Adams, bart. a captain of his majeſty's navy, who commanded ſeveral different ſhips in the laſt war with bravery and conduct.

12. "Gules, two Grehounds rampant Or, reſpecting each other;" borne by the name of *Dogget.*

13. "Or, an Aſs's Head eraſed Sable;" borne by the name of *Hackwell.*

14. "Gules, three Lions gambs eraſed Argent;" for the name of *Newdigate,* and borne by Sir Roger

Newdigate, bart. LL.D. and repreſentative in the preſent and three laſt parliaments for the univerſity of Oxford.

15. "Argent, three lions tails erected and eraſed Gules;" borne by the name of *Cork*.

16. "Azure, a Buck's Head caboſſed Argent;" borne by the right hon. William Legge, earl of Dartmouth, &c. This noble earl is deſcended from Signior de Lega, an Italian nobleman, who flouriſhed in Italy in the year 1297. What time the family came into England is uncertain; but it appears they were ſettled at Legge-place, near Tunbridge in Kent, for many generations; and Thomas, one of their anceſtors, was twice lord-mayor of London, viz. in 1346 and 1353.

17. "Argent, two Squirrels ſejant adoſſee Gules," for the name of *Samwell;* and borne by Sir Thomas Samwell, bart. of Upton, in Northamptonſhire, who is lineally deſcended from the ancient family of the Samwells in Cornwall.

18. "Gules, a Goat paſſant Argent;" borne by the name of *Baker*.

19. "Sable, a Stag ſtanding at gaze Argent;" borne by the name of *Jones*, of Monmouthſhire.

20. "Azure, three Holy-Lambs Or;" borne by the name of *Row*.

V. *Examples of Birds, Fiſhes, Reptiles,* &c.

Fig. xvii. 1. "Ermine, an Eagle diſplayed Sable; borne by the name of *Beddingfield*.

2. "Gules, a Swan cloſe proper;" borne by the name of *Leigham*.

3. "Argent, a Stork Sable, membred Gules;" borne by the name of *Starkey*.

4. "Gules, a Pelican in her neſt with wings elevated, feeding her young ones Or; vulned proper;" borne by the name of *Carne*.

5. "Argent, three Peacocks in their pride proper;" borne by the name of *Pawne*.

6. "Sable, a Goſhawk Argent, perching upon a ſtock in the Baſe point of the Eſcutcheon of the ſecond, armed, jeſſed, and belled Or;" borne by the name of *Weele*.

7. "Or, a Raven proper;" borne by the name of *Corbet*.

8. "Argent, three Cocks Gules, creſted and jowlopped Sable, a Creſcent ſurmounted of a Creſcent for difference, borne by the right hon. Charles Cockayne, viſcount Cullen, of Donegal in Ireland. Of this ancient family was Andreas Cockayne, of Aſhburne in the county of Derby, who lived in the 28th year of Edward I. Charles, ſon to Sir William Cockayne, lord-mayor of London, 1619, was the firſt who was advanced to the Peerage, by Charles I. Auguſt 11, 1642.

9. "Sable a Dolphin naiant embowed Or;" borne by the name of *Symonds*. This animal is borne by the eldeſt ſon of the French king, and next heir to the crown, no other ſubject in that kingdom being permitted to bear it. In England, where that rule cannot take place, there are ſeveral families that have dolphins in their coats-of-arms.

10. "Argent, three Whales Heads erect and eraſed Sable;" borne by the name of *Whalley*.

11. "Gules, three Eſcallops Argent;" borne by the right hon. George Keppel, earl of Albemarle, &c. This preſent earl is deſcended from Arnold Jooſt, van Keppel, a nobleman of the province of Gelderland in Holland, who came over into England with the prince of Orange in 1688, to whom he was then a page of honour, and afterwards maſter of the robes, and was by him created a peer of England, by the title of earl of Albemarle, in the duchy of Normandy in France, February 10. 1696.

12. "Azure, three Trouts fretted in Triangle Argent;" borne by the name of *Troutbeck*.

13. "Vert, a Graſshopper paſſant Or."

14. "Azure, three Bees two and one volant in pale Argent;" borne by the name of *Bye*.

15. "Vert, a Tortoiſe paſſant Argent;" borne by the name of *Gawdy*.

16. "Gules, an Adder nowed Or;" borne by the name of *Nathiley*. Adders, ſnakes, and ſerpents are ſaid to repreſent many things, which being according to the fancy of the ancients, and a few modern authors who have adopted their opinions, it is needleſs to enlarge upon. It is certain they often occur in armory; but the nobleſt is that of the dutchy of Milan, viz. "Argent, a Serpent gliding in Pale Azure, crowned Or, vorant an Infant iſſuing Gules." The occaſion of this bearing was thus: Otho, firſt viſcount of Milan, going to the Holy-land with Godfrey of Bouillon, defeated and ſlew in a ſingle combat the great giant Volux, a man of an extraordinary ſtature and ſtrength, who had challenged the braveſt of the Chriſtian army. The viſcount having killed him, took his armour, and among it his helmet, the creſt whereof was a ſerpent ſwallowing an infant, worn by him, to ſtrike a terror into thoſe who ſhould be ſo bold as to engage him.

17. "Ermine, a Roſe Gules barbed and ſeeded proper;" borne by the right hon. Hugh Boſcawen viſcount Falmouth, &c. This noble lord is deſcended from Richard Boſcawen, of the town of Boſcawen, in the county of Cornwall, who flouriſhed in the reign of king Edward VI. Hugh, the late viſcount, and the firſt peer of this ancient family, was created baron of Boſcawen-Roſe, and viſcount Falmouth, on the 13th of June, 1720, 6th of George I.

18. "Azure, three Laurel-leaves ſlipped Or;" borne by the name of *Leveſon*, and quartered by the right hon. Granville-Leveſon Gower, earl of Gower, &c.

19. "Azure, three Garbs Or;" borne by the name of *Cuming*. Theſe are ſheaves of wheat; but though they were barley, rye, or any other corn whatſoever, it is ſufficient, in blazoning, to call them *Garbs*, telling the tincture they are of.

20. "Gules, three Cinquefoils Argent;" borne by the right hon. lord Ford Lambart, baron of Cavan, &c. in Ireland. Of this ancient family, which is of French extraction, was Sir Oliver, who, in the reign of queen Elizabeth, attending the earl of Eſſex to Spain, was there knighted by him, and afterwards returning with that earl into Ireland, was, for his ſingular ſervice in the north againſt O'Neal earl of Tyrone, made camp-maſter general, and preſident of Connaught; and February 17. 1617, was created lord Lambart and baron of Cavan, by king James I.

It muſt be obſerved that trees and plants are ſometimes ſaid to be trunked, eradicated, fructuated, or raguled, according as they are repreſented in arms.

Art. 2. Of Artificial Figures borne in Coats-of-arms.

After the various productions of nature, artificial figures, the objects of arts and mechanics, claim the next rank. They may be diſtributed into the following claſſes, viz.

Warlike inſtruments, as ſwords, arrows, battering-rams, gauntlets, helmets, ſpears, pole-axes, &c.

Ornaments uſed in royal and religious ceremonies, as crowns, coronets, mitres, wreaths, croſiers, &c.

Architecture, as towers, caſtles, arches, columns, plummets, battlements, churches, portculliſſes, &c.

Navigation, as ſhips, anchors, rudders, pendants, ſails, oars, maſts, flags, galleys, lighters, &c.

All theſe bearings have different epithets, ſerving either to expreſs their poſition, diſpoſition, or make, viz. Swords are ſaid to be erect, pommeled, hilted, &c. Arrows, armed, feathered, &c. Towers, covered, embattled, &c.; and ſo on of all others, as will appear by the following examples.

Fig. xviii.

1. "Sable, three ſwords, their points meeting in the Baſe Argent, pommelled and hilted Or, a Creſcent in chief of the ſecond for difference;" borne by his grace Charles Powlet, duke of Bolton, &c. This noble duke is deſcended from Hercules, lord of Tournon in Picardy, who came over to England with Jeffrey Plantagenet earl of Anjou, third ſon of king Henry II. and among other lands had the lordſhip of Paulet in Somerſetſhire conferred on him. William Powlet, the firſt peer of this illuſtrious and loyal family, was treaſurer of the houſehold to king Henry VIII. and by him created baron St. John of Baſing, in the county of Southampton, March 9. 1538.

2. "Argent, three Battering-rams barways in Pale, headed azure and hooped Or, an Annulet for difference;" borne by the right hon. Willoughby Bertie, earl of Abington, &c. The firſt of the family of Bertie that bore the title of earl of Abington, was James Bertie lord Norris of Rycote, being created earl, November 30. 1682, by Charles II.

3. "Azure, three left-hand Gauntlets with their backs forward Or;" borne by the right hon. Thomas Fane, earl of Weſtmoreland, &c. This noble earl is deſcended from the Fanes, an ancient family which reſided at Badſal in Kent, from which deſcended Francis Fane, ſon and heir of Sir Thomas Fane, knight, by Mary his wife, ſole daughter and heireſs to Henry Nevil lord Abergavenny, afterwards created baroneſs Deſpenſer. The ſaid Francis was a knight of the Bath; and in the reign of king James I. was created baron Burgherſh, and earl of Weſtmoreland, December 29. 1624.

4. "Azure, three Arrows their points in baſe Or;" borne by the right hon. Thomas Archer, lord Archer, &c. This noble lord is deſcended from John de Archer, who came over from Normandy with William the Conqueror; and this family is one of the moſt ancient in Warwickſhire, being ſettled at Umberſlade, in that county, ever ſince the reign of Henry II. His lordſhip is the firſt peer; and was created lord Archer and baron of Umberſlade by king George II. July 14. 1747.

5. "Gules, two helmets in chief proper, garniſhed Or, in a Baſe of a Garb of the third;" borne by the right hon. George Cholmondeley, earl of Cholmondely, &c. This noble earl is deſcended from the ancient family of Egerton in Cheſhire, which flouriſhed in the time of the conqueſt, from whom alſo the duke of Bridgewater is deſcended. The firſt Engliſh peer of this branch was Hugh, viſcount Cholmondeley of Kells, in Ireland, who, joining with thoſe who oppoſed the arbitrary meaſures of king James II. was on the acceſſion of king William and queen Mary, created lord Cholmondeley of Nampt-wich, in the county of Cheſter.

6. "Argent, a Ship with its Sails furled up Sable;" quartered by the right hon. James Hamilton, earl of Abercorn, &c. The deſcent of this noble family is from that of the duke of Hamilton: for James, the fourth lord Hamilton and ſecond earl of Arran, marrying lady Margaret Douglas, daughter of James the third earl of Morton, by her had four ſons, James, John, Claud, and David; whereof Claud was progenitor of the lord we are now ſpeaking of; and in conſideration of his merit and loyalty to Mary queen of Scots, James VI. created him lord Paiſley in 1591, as alſo earl of Abercorn, baron of Hamilton, &c. July 10. 1606.

7. "Or, an Anchor in pale Gules;" quartered by the moſt noble George Johnſton, marquis of Annandale, &c. The Johnſtons are an ancient and warlike family, and derive their ſurname from the barony of Johnſton in Annandale.

8. "Sable, three Spears Heads erect Argent, imbrued Gules, on a chief Or, as many Pole-axes Azure;" borne by the right hon. William King, lord King, &c. Peter King, eſq; the firſt lord of this ancient family, was choſen recorder of the city of London, July 27. 1708, and on the 12th of September following had the honour of knighthood conferred on him. He was conſtituted lord-chief-juſtice of the common-pleas in the firſt year of king George I. 1714; on the 5th of April following was ſworn of his majeſty's moſt hon. privy council; and on May 19. 1723, was created a peer of this kingdom by the title of lord King, baron of Ockham.

9. "Gules, three Clarions Or;" quartered by the right hon. Robert Carteret, earl of Granville, &c. This ancient and worthy family derives its pedigree from Offerey de Carteret, who attended William the Conqueror in his deſcent upon England, and contributed to the victory he obtained over king Harold, at Haſtings in Suſſex, 1066, he had manors and lands in England conferred on him by that prince, as a reward for his eminent ſervices. George Carteret, grandfather to the preſent earl, was, in conſideration of his own merit and the ſervices of his anceſtors, created a peer of Great Britain, October 19th 1681.

10. "Argent, a Maunch Sable;" borne by the right hon. Francis Haſtings, earl of Huntingdon, &c. This noble earl is deſcended from Hugh de Haſtings, a younger ſon of the ancient and noble family of the Haſtings, earl of Pembroke, of which family was William de Haſtings, ſteward of the houſehold to king Henry I.—William, the firſt lord Haſtings, was created a baron on July 6, 1461, by king Edward IV.

11. "Azure, a circular Wreath Argent and Sable, with four Hawk's Bells joined thereto in quadrature Or;"

"Or;" borne by the right hon. Robert Jocelyn, viſcount Jocelyn, &c. This noble family is of great antiquity; for, after the Romans had been maſters of Britain 500 years, wearied with the wars, they took their final farewel of it, and carried away with them a great many of their brave old Britiſh ſoldiers, who had ſerved them in their wars both at home and abroad, to whom they gave Amorica in France, for their former ſervices, which country was from them afterwards called *Little Britain*. It is ſuppoſed that there were ſome of this family amongſt them; and that they gave the name of *Jocelyn* to a town in this country, which ſtill preſerves that name: and it is thought probable that they returned with William the Conqueror; for we find, in 1066, mention made of Sir Gilbert Jocelyn. This preſent nobleman, the firſt lord of the family, was created baron Newport, of Newport in Ireland, on November 29, 1743, and viſcount in November 1751.

12. "Gules, three Towers Argent;" quartered by the right hon. William Fowler, viſcount Aſhbrook, &c. William Fowler, eſq; father to this preſent lord, was advanced to the peerage by king George II. and created baron of Caſtle-Durrow, in the county of Kilkenny, October 27, 1733, and his ſon was created viſcount Aſhbrook, of Aſhbrook in Ireland, on Sept. 30, 1751, now extinct.

13 "Gules, two keys in Saltier Argent, in Chief a Royal Crown proper;" the arms of the archbiſhopric of York. This archbiſhopric comprehends only the biſhoprics of Carliſle, Cheſter, and Durham. And the dioceſe contains about three parts in four of Yorkſhire, all Nottinghamſhire, and Hexham peculiar juriſdiction; divided into 903 pariſhes and chapels; and into four archdeaconries, of York, Eaſt-Riding, Cleveland, and Nottingham.

14. "Gules, two Swords in Saltier Argent, pommeled and hilted Or;" the arms of the biſhopric of London. This dioceſe contains London, the counties of Middleſex and Eſſex, and part of Hertfordſhire, in which there are about 665 churches and chapels. In it are alſo five archdeaconries, viz. thoſe of London, Middleſex, Eſſex, Colcheſter, and St Albans.

15. "Sable, a Key in Bend, ſurmounted by a Croſier in Bend ſiniſter, both Or;" the arms of the biſhopric of St Aſaph. This dioceſe contains no one whole county; but part of Denbigh, Flint, Montgomery, and Merioneth ſhires, and ſome towns in Shropſhire, wherein are to the number of 121 pariſhes; but there are in all 131 churches and chapels, moſt of which are in the immediate patronage of the biſhops. It hath but one archdeaconry, called *of St Aſaph*, which is united to the biſhopric, for the better ſupport of it.

16. "Gules, two Keys adoſſee in Bend, the uppermoſt Argent, the other Or, a Sword interpoſed between them in Bend-ſiniſter of the ſecond, pommeled and hilted of the third;" the arms of the biſhopric of Wincheſter. This dioceſe contains the whole county of Southampton, with the Iſle of Wight, and the iſles of Jerſey, Guernſey, Sark, and Alderney. It alſo contains one pariſh in Wiltſhire, and all Surry, except eleven peculiars belonging to Canterbury. The number of churches and chapels in it are 415; and it has two archdeacons, viz. of Wincheſter and Surry.

17. "Gules, three Mitres with their pendants Or;" the arms of the biſhopric of Cheſter. The biſhopric of Cheſter was anciently part of the dioceſe of Litchfield; one of whoſe biſhops, removing his ſee hither in the year 1075, occaſioned his ſucceſſors being frequently called *biſhops of Cheſter*. But it was not erected into a diſtinct biſhopric till the year 1541, by king Henry VIII. It contains the entire counties of Cheſter and Lancaſter; part of Weſtmoreland, Cumberland, and Yorkſhire; two chapelries in Denbighſhire, and five churches and chapels in the county of Flint: in all, 506 churches and chapels. It is divided into two archdeaconries, viz. Cheſter and Richmond.

18. "Sable, three Ducal Coronets paleways Or;" the arms of the biſhopric of Briſtol. The biſhopric of Briſtol was founded by king Henry VIII. and taken out of the dioceſes of Saliſbury, Wells, and Worceſter. It contains the city of Briſtol, and the county of Dorſet; in which there are 276 churches and chapels; and one archdeaconry, viz. that of Dorſet.

19. "Gules, a Sword erect in pale Argent, pommeled and hilted Or, ſurmounted by two Keys in Saltier of the laſt;" the arms of the biſhopric of Exeter. When Chriſtianity was firſt planted in theſe parts, Cornwall and Devonſhire were placed under the juriſdiction of the biſhop of Dorcheſter; but, that epiſcopal ſeat being removed to Wincheſter in the year 660, theſe weſtern parts were made ſubject to that new ſee. When the monaſtery of Sherbourn was turned into a cathedral about the year 705, theſe counties were included in that dioceſe, which continued about 200 years; and then Plegmund, archbiſhop of Canterbury, at the command of king Edward the Elder, erected three new biſhoprics; one at Wells, for Somerſetſhire; another at Bodmin, for Cornwall; and the laſt at Tawton-Biſhops, for Devon, which was after removed to Crediton, and at length ſettled at Exeter. That dioceſe contains the entire counties of Devon and Cornwall; in which there are 725 churches and chapels, and four archdeaconries, viz. thoſe of Exeter, Barnſtable, Totneſs, and Cornwall.

20. "Gules, three Ducal Coronets, Or;" the arms of the biſhopric of Ely. The biſhopric of Ely was taken from that of Lincoln by king Henry I. anno 1109. It contains all Cambridgeſhire, and the iſle of Ely, excepting Iſelham, which belongs to the ſee of Rocheſter, and 15 other pariſhes that are in the dioceſe of Norwich: but it has one pariſh, viz. Emneth, in Norfolk. The whole number of the churches and chapels within the dioceſe of Ely are 164. It hath only one archdeacon, viz. that of Ely.

ART. III. Of CHIMERICAL FIGURES.

THE laſt and the oddeſt kind of bearings in coats-of-arms, is comprehended under the name of *chimerical figures*; that is to ſay, ſuch as have no real exiſtence, but are mere fabulous and fantaſtical inventions. Theſe charges, griffons, martlets, and unicorns excepted, are ſo uncommon in Britiſh coats, that in order to make up the ſame number of examples hitherto contained in each collection, ſeveral foreign bearings are introduced here;

HERALDRY.

Plate CXLVIII.

Fig. 15.

Lions &c.

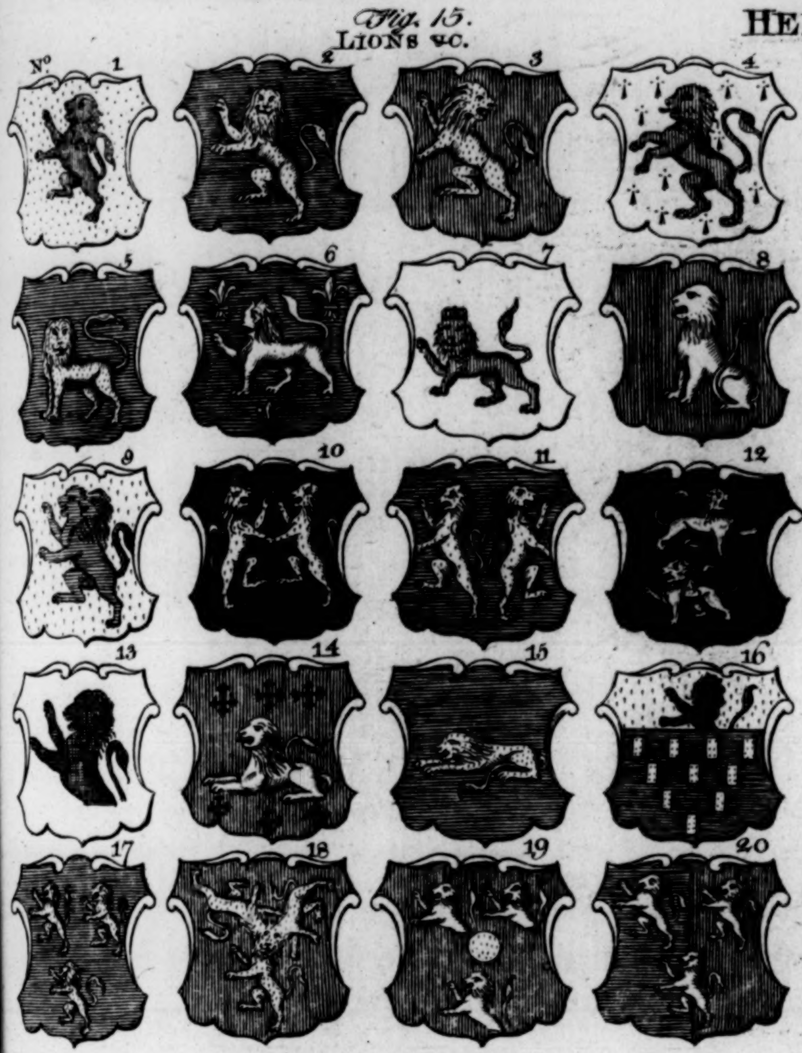

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Fig. 16.

Animals &c.

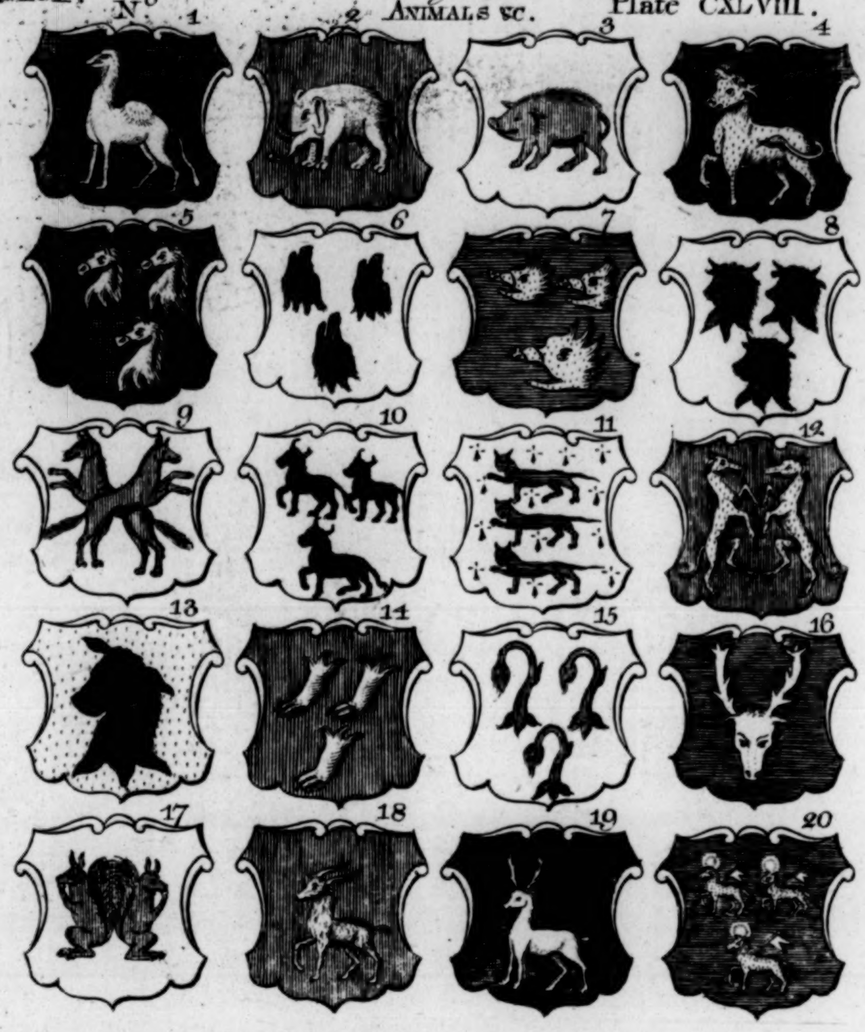

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Fig. 17.

Birds &c.

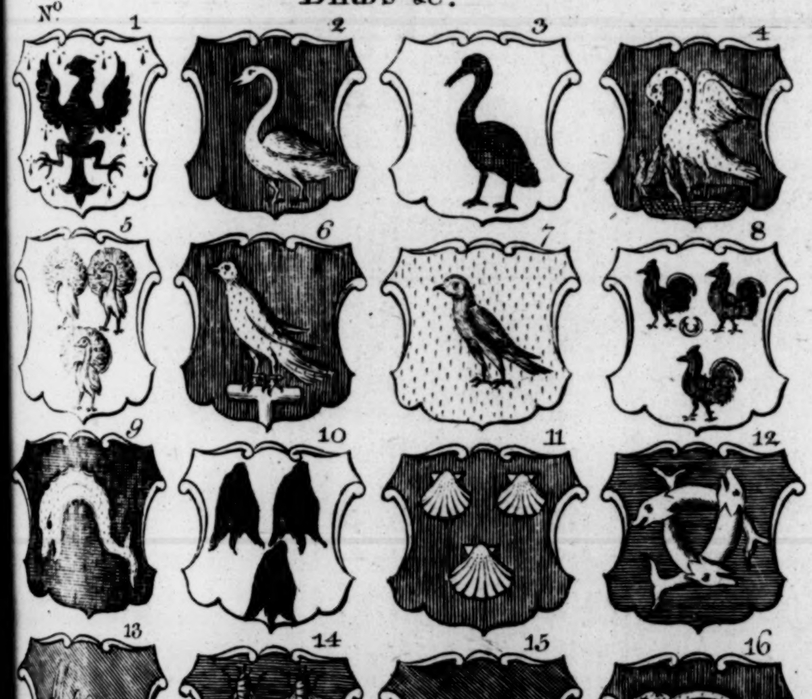

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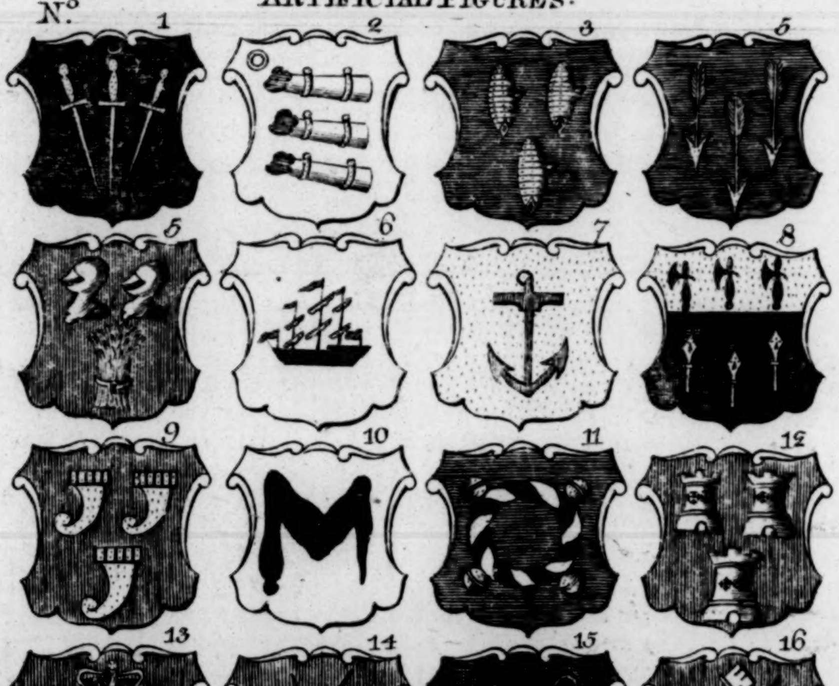
Fig. 18.

Artificial Figures.



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A. Bell Sculpt.

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here; which, however, as they are conform to the laws of heraldry, will alſo contribute both to entertain and inſtruct the reader. Thoſe moſt in uſe are the following, viz.

Angels, Cherubim, Tritons, Centaurs, Martlets, Griffons, Unicorns, Dragons, Mermaids, Satyrs, Wiverns, Harpies, Cockatrices, Phenixes.

Theſe, like the foregoing charges, are ſubject to various poſitions and diſpoſitions, which, from the principles already laid down, will be plainly underſtood. See the examples, fig. xix.

N° 1. is “ Gules, an Angel ſtanding affrontée, with his hands conjoined and elevated upon his breaſt, habited in a long Robe cloſe girt Argent, his Wings diſplayed Or;” borne by the name of *Brangor de Cereviſia*, a foreign prelate, who aſſiſted at the council of Conſtance 1412. This example is quoted by Guillim, Sect. III. Chap. i.

2. “ Sable, a Cheveron between three Cherubim Or;” borne by the name of *Chaloner*, of Yorkſhire and Cheſhire.

3. “ Azure, a Feſs indented between three Cherubim Argent.” Theſe arms were granted to John Ayde, eſq; of Doddington in Kent, by Sir William Segar, garter.

4. “ Gules, a Cherub having three pair of Wings, the uppermoſt and lowermoſt counter-croſſed Saltierways, and the middlemoſt diſplayed Argent;” borne by the name of *Buocafoco*, a foreign prelate. This example is copied from Meneſtrier's *Methode du Blaſon*, p. 120, N° viii.

5. “ Azure, a Griffon ſegreant Or, armed and langued Gules, between three Creſcents Argent;” quartered by the right hon. John Bligh, lord Clifton, &c. The great grandfather of this noble lord, who lived in London, going over to Ireland in the time of Oliver Cromwell, as an agent to the adventurers there, acquired a good eſtate, and laid the foundation for the grandeur of this family.

6. “ Gules, three Martlets Or;” borne by the name of *Macgill*. Guillim obſerves, that this bird, which is repreſented without feet, is given for a difference to younger brothers, to put them in mind, that, in order to raiſe themſelves, they are to truſt to their wings of virtue and merit, and not to their legs, having but little land to ſet their feet on.

7. “ Azure, three Mullets Argent within a double Treſſure counter-flowery Or, in the centre a Martlet of the laſt;” borne by the right hon. Patrick Murray, lord Elibank. Sir Gideon Murray, knighted by king James VI. by whom he was made treaſurer-depute, was third ſon of Sir Andrew Murray of Blackbarony. His ſon Patrick, in reſpect of his loyalty to Charles I. was, on May 16. 1628, made a baronet, and, in 1643, created lord Elibank.

8. “ Sable, a Cockatrice diſplayed Argent, creſted, membred, and jowllopped Gules.”

9. “ Argent, a Mermaid Gules, crined Or, holding in her right hand a Comb, and in her left a Mirror, both proper;” borne by the name of *Ellis*.

10. “ Argent, a Wivern, his Wings elevated, and his Tail nowed below him Gules;” borne by the name of *Drakes*.

11. “ Or, a Dragon paſſant Vert.”

12. “ Gules, a Centaur or Sagittary in full ſpeed reguardant proper.” This was the coat-of-arms of Stephen, ſurnamed of *Blois*, ſon to Adela daughter of William the Conqueror, and of Stephen earl of Blois; and on this deſcent grounding his pretenſion to the crown of England, he was proclaimed king in 1135, and reigned to the 25th of October 1154.

13. “ Argent, an Unicorn ſejant Sable, unguled and horned Or;” borne by the name of *Harling*.

14. “ Argent, a Dragon's Head eraſed Vert, holding in his Mouth a ſiniſter Hand couped at the Wriſt Gules;” borne by the name of *Williams*.

15. “ Gules, three Unicorns Heads couped Or;” borne by the name of *Paris*.

16. “ Argent, a Wivern volant Bendways Sable;” borne by the name of *Raynon*.

17. “ Azure, a Lion ſejant guardant winged Or, his Head encircled with a Glory, holding in his forepaws an open Book, wherein is written, *Pax tibi, Marce, Evangeliſta meus*; over the dexter ſide of the Book a Sword erect, all proper.” Theſe are the arms of the republic of Venice.

18. “ Azure, a Bull ſaliant and winged Or;” borne by the name of *Cadenet*, a family of diſtinction in Provence.

19. “ Argent, a Wyvern with a human Face affrontée hooded, and winged Vert;” borne by the name of *Buſeraghi*, an ancient and noble family of Luques.

20. “ Azure, a Harpy diſplayed, armed, crined, and crowned Or.” Theſe are the arms of the city of Noremberg in Germany.

To the forementioned figures may be added the montegre, an imaginary creature, ſuppoſed to have the body of a tyger with a Satyr's head and horns; alſo thoſe which have a real exiſtence, but are ſaid to be endowed with extravagant and imaginary qualities, viz. the ſalamander, beaver, cameleon, &c.

CHAP. IV.

Of the EXTERNAL ORNAMENTS *of* ESCUTCHEONS.

THE ornaments that accompany or ſurround eſcutcheons were introduced to denote the birth, dignity, or office, of the perſons to whom the coat-of-arms appertaineth; which is practiſed both among the laity and clergy. Thoſe moſt in uſe are of ten ſorts, *viz.* Crowns, Coronets, Mitres, Helmets, Mantlings, Chapeaux, Wreaths, Creſts, Scrolls, Supporters.

SECT. I. *Of Crowns.*

THE firſt crowns were only diadems, bands, or fillets; afterwards they were compoſed of branches of divers trees, and then flowers were added to them.

Among the Greeks, the crowns given to thoſe who carried the prize at the Iſthmian games, were of pine; at the Olympick, of laurel; and at the Nemean, of ſmallage.

The Romans had various crowns to reward martial exploits and extraordinary ſervices done to the republic: for which ſee the detached article CROWN in this Dictionary, and Plate LXXXII.

Examples of ſome of theſe crowns are frequently met with in modern atchievements, *viz.* 1. The *mural* crown in that of lord Montfort, which was conferred on Sir John Bromley, one of his lordſhip's anceſtors, as an augmentation to his arms, for his great courage at the battle of Le Croby. Part of the creſt of lord Archer is alſo a mural crown. And there are no leſs than ten Engliſh baronets, whoſe arms are ornamented with the ſame crown. 2. The *naval* or roſtral crown, is ſtill uſed with coats-of-arms, as may be ſeen in thoſe of Sir William Burnaby, bart. now admiral of the red ſquadron, and of John Clerke, eſq; as part of their creſts. 3. Of the *caſtrenſe* or vallary crown, we have inſtances in the coat-of-arms of Sir Reginald Graham, and of Iſaac Akerman, eſq. 4. The creſt of Grice Blakeney, eſq; is encompaſſed with a *civic* crown. 5. The *radiated* crown, according to J. Yorke, was placed over the arms of the kings of England, till the time of Edward III. It is ſtill uſed, as a creſt, on the arms of ſome private families; thoſe, for example, borne by the name of *Whitfield*, are ornamented with it. The celeſtial crown is formed like the radiated, with the addition of a ſtar on each ray; and is only uſed upon tomb-ſtones, monuments, and the like.—Others of the ancient crowns are ſtill borne, as creſts, by the right hon. Jeffrey Amherſt, baron Amherſt of Holmeſdale, in Kent; Sir James Gray, bart.; Thomas Sheriff, eſq; and others.

But modern crowns are only uſed as an ornament, which emperors, kings, and independent princes ſet on their heads, in great ſolemnities, both to denote their ſovereign authority, and to render themſelves more awful to their ſubjects. Theſe are the moſt in uſe in heraldry, and are as follows:

Plate CXLX. fig. xx.

The imperial crown, (n° 1.) is made of a circle of gold, adorned with precious ſtones and pearls, heightened with fleurs-de-lis, bordered and ſeeded with pearls, raiſed in the form of a cap voided at the top, like a creſcent. From the middle of this cap riſes an arched fillet enriched with pearls, and ſurmounted of a mound, whereon is a croſs of pearls.

The crown of the kings of Great Britain (2.), is a circle of gold, bordered with ermine, enriched with pearls and precious ſtones, and heightened up with four croſſes pattee and four large fleurs-de-lis alternately; from theſe riſe four arched diadems adorned with pearls, which cloſe under a mound, ſurmounted of a croſs like thoſe at bottom. Mr Sandford, in his Genealogical Hiſtory, p. 381. remarks, that Edward IV. is the firſt king of England that in his ſeal, or on his coin, is crowned with an arched diadem.

The crown of the kings in France (3.) is a circle enamelled, adorned with precious ſtones, and heightened up with eight arched diadems, riſing from as many fleurs-de-lis, that conjoin at the top under a double fleur-de-lis, all of gold.

The crowns of Spain, Portugal, and Poland, are all three of the ſame form, and are, amongſt others, thus deſcribed by colonel Parſons, in his Genealogical Tables of Europe, *viz.* A ducal coronet, heightened up with eight arched diadems that ſupport a mound, enſigned with a plain croſs. Thoſe of Denmark and Sweden are both of the ſame form; and conſiſt of eight arched diadems, riſing from a marquis's coronet, which that conjoin at the top under a mound enſigned with a croſs-bottony.

The crowns of moſt other kings are circles of gold, adorned with precious ſtones, and heightened up with large trefoils, and cloſed by four, ſix, or eight diadems, ſupporting a mound, ſurmounted of a croſs.

The Great Turk (4.), bears over his arms a turband, enriched with pearls and diamonds, under two coronets, the firſt of which is made of pyramidical points heightened up with large pearls, and the uppermoſt is ſurmounted with creſcents.

The Pope, or biſhop of Rome, appropriates to himſelf a Tiara (n° 5.), or long cap of golden cloth, from which hang two pendants embroidered and fringed at the ends, *ſemée* of croſſes of gold. This cap is incloſed by three marquis's coronets; and has on its top a mound of gold, whereon is a croſs of the ſame, which croſs is ſometimes repreſented by engravers and painters pometted, recroſſed, flowery, or plain.—It is a difficult matter to aſcertain the time when theſe haughty prelates aſſumed the three forementioned coronets. A patched up ſucceſſion of the holy pontiffs, engraved and publiſhed a few years ago by order of Clement XIII. the late Pope, for the edification of his good ſubjects in Great Britain and Ireland, repreſents Marcellus, who was choſen biſhop of Rome *anno* 310, and all his ſucceſſors, adorned with ſuch a cap: but it appears, from very good authority, that Boniface VIII. who was elected into the ſee of Rome *anno* 1295, firſt compaſſed his cap with a coronet; Benedict XII. in 1335, added a ſecond to it; and John XXIII. in 1411, a third; with a view to indicate by them, that the Pope is the ſovereign prieſt, the ſupreme judge, and the ſole legiſlator amongſt Chriſtians.

SECT. II. *Of Coronets.*

THE Coronet of the prince of Wales, or eldeſt ſon of the king of Great Britain, (n° 7.), was anciently a circle of gold ſet round with four croſſes-pattee, and as many fleurs-de-lis alternately; but ſince the reſtoration, it has been cloſed with one arch only, adorned with pearls, and ſurmounted of a mound and croſs, and bordered with ermine like the king's.

Beſides the aforeſaid coronet, his royal highneſs the prince of Wales has another diſtinguiſhing mark of honour, peculiar to himſelf, called by the vulgar the *prince's arms*, viz. A plume of three oſtrich-feathers, with an ancient coronet of a prince of Wales. Under it, in a ſcroll, is this motto, *Ich Dien*, which in the German or old Saxon language ſignifies "I ſerve;" (ſee n° 6). This device was at firſt taken by Edward prince of Wales, commonly called the *black prince*, after the famous battle of Creſſy, in 1346, where having with his own hand killed John king of Bohemia, he took from his head ſuch a plume, and put it on his own.

The coronet of the preſent dukes of Glouceſter and Cumberland, and of all the immediate ſons and brothers of the kings of Great Britain, is a circle of gold, bordered with ermine, heightened up with four fleurs-de-lis, and as many croſſes-pattee alternate, (ſee n°8).—The particular and diſtinguiſhing form of ſuch coronets as are appropriated to princes of the blood-royal, is deſcribed and ſettled in a grant of Charles II. the 13th of his reign.

The coronet of the princeſſes of Great Britain is a circle of gold. bordered with ermine, and heightened up with croſſes-pattee, fleurs-de-lis and ſtrawberry leaves alternate (n° 9.); whereas a prince's coronet has only fleurs-de-lis and croſſes.

A duke's coronet is a circle of gold, bordered with ermine, enriched with precious ſtones and pearls, and ſet round with eight large ſtrawberry or parſley leaves; (n° 10).

A marquis's coronet is a circle of gold, bordered with ermine, ſet round with four ſtrawberry leaves, and as many pearls on pyramidical points of equal height, alternate; (n° 11).

An earl's coronet is a circle of gold, bordered with ermine, heightened up with eight pyramidical points or rays, on the tops of which are as many large pearls, and are placed alternately with as many ſtrawberry-leaves, but the pearls much higher than the leaves; (n° 12).

A viſcount's coronet differs from the preceding ones as being only a circle of gold bordered with ermine, with large pearls ſet cloſe together on the rim, without any limited number, which is his prerogative above the baron, who is limited: (ſee n° 13).

A baron's coronet, (n° 14), which was granted by king Charles II. is formed with ſix pearls ſet at equal diſtance on a gold circle, bordered with ermine, four of which only are ſeen on engravings, paintings, &c. to ſhew he is inferior to the viſcount.

The eldeſt ſons of peers, above the degree of a baron, bear their father's arms and ſupporters with a label, and uſe the coronet appertaining to their father's ſecond title; and all the younger ſons bear their arms with proper differences, but uſe no coronets.

As the crown of the king of Great Britain is not quite like that of other potentates, ſo do moſt of the coronets of foreign noblemen differ a little from thoſe of the Britiſh nobility: as for example, the coronet of a French earl is a circle of gold with 18 pearls ſet on the brim of it; a French viſcount's coronet is a circle of gold only enamelled, charged with four large pearls; and a French baron's coronet is a circle of gold enamelled and bound about with a double bracelet of pearls: and theſe coronets are only uſed on French noblemens coats-of-arms, and not worn on their heads, as the Britiſh noblemen and their ladies do at the king's coronation.

SECT. III. *Of Mitres.*

THE archbiſhops and biſhops of England and Ireland place a mitre over their coats-of-arms. It is a round cap pointed and cleft at the top, from which hang two pendants fringed at both ends; with this difference, that the biſhop's mitre is only ſurrounded with a fillet of gold, ſet with precious ſtones, (ſee fig. 23. n° 6.) whereas the archbiſhop's iſſues out of a ducal coronet, (ſee fig. 20. n° 15).

This ornament, with other maſquerade garments, is ſtill worn by all the archbiſhops and biſhops of the church of Rome, whenever they officiate with ſolemnity; but it is never uſed in England, otherwiſe than on coats of arms, as before mentioned.

SECT. IV. *Of Helmets.*

THE Helmet was formerly worn as a defenſive weapon, to cover the bearer's head; and is now placed over a coat-of-arms as its chief ornament, and the true mark of gentility. There are ſeveral ſorts, diſtinguiſhed, 1ſt, by the matter they are made of; 2dly, by their form; and, 3dly, by their poſition.

1ſt, As to the matter they are, or rather were, made of: The helmets of ſovereigns were of burniſhed gold damaſked; thoſe of princes and lords, of ſilver figured with gold; thoſe of knights, of ſteel adorned with ſilver; and thoſe of private gentlemen, of poliſhed ſteel.

2dly, As to their form: Thoſe of the king and the royal family, and noblemen of Great Britain, are open-faced and grated, and the number of bars ſerves to diſtinguiſh the bearers quality; that is, the helmet appropriated to the dukes and marquiſes is different from the king's, by having a bar exactly in the middle, and two on each ſide, making but five bars in all, (ſee fig. xxi. n° 1.) whereas the king's helmet has ſix bars, viz. three on each ſide, (ibid. n° 7.) The other grated helmet with four bars is common to all degrees of peerage under a marquis. The open-faced helmet without bars denotes baronets and knights. The cloſe helmet is for all eſquires and gentlemen.

3dly, Their poſition is aſo looked upon as a mark of diſtinction. The grated helmet in front belongs to ſovereign princes. The grated helmet in profile is common to all degrees of peerage. The helmet ſtanding direct without bars, and the beaver a little open, denotes baronets and knights. Laſtly, the ſide-ſtanding helmet, with the beaver cloſe, is the way of wearing it amongſt eſquires and gentlemen. See n° 1, 2, 3, 4, and 7, inſerted in fig. xxi. *Ornaments*.

SECT. V. *Of Mantlings.*

MANTLINGS are pieces of cloth jagged or cut into flowers and leaves, which now-a-days ſerve as an ornament for eſcutcheons. They were the ancient covering of helmets, to preſerve them, or the bearer, from the injuries of the weather, as alſo to prevent the ill conſequences of their too much dazzling the eye in action. But Guillim very judiciouſly obſerves, that their ſhape muſt have undergone a great alteration ſince they have been out of uſe, and therefore might more properly be termed *flouriſhings* than *mantlings*. See the examples annexed to the helmets repreſented in fig. xxi.

The French heralds aſſure us, that theſe mantlings were originally no other than ſhort coverings which commanders wore over their helmets, and that, going into battles with them, they often, on their coming away, brought them back in a ragged manner, occaſioned by the many cuts they had received on their heads; and therefore the more hacked they were, the more honourable they were accounted; as our colours in time of war are the more eſteemed, for having been ſhot through in many places.

Sometimes ſkins of beaſts, as lions, bears, &c. were thus borne, to make the bearer look more terrible; and that gave occaſion to the doubling of mantlings with furs.

SECT. VI. *Of Chapeaux.*

A CHAPEAU is an ancient hat, or rather cap, of dig-

Wreaths, Creſts, &c.

nity worn by dukes, generally ſcarlet-coloured velvet on the outſide lined and turned up with fur; of late frequently to be met with above an helmet, inſtead of a wreath, under gentlemens and noblemens creſts. Heretofore they were ſeldom to be found, as of right appertaining to private families; but by the grants of Robert Cooke, Clarencieux, and other ſucceeding heralds, theſe, together with ducal coronets, are now frequently to be met with in families, who yet claim not above the degree of gentlemen. See the repreſentation of the chapeau, n° 5. fig. xxi.

SECT. VII. *Of Wreaths.*

THE Wreath is a kind of roll made of two ſkains of ſilk of different colours twiſted together, which ancient knights wore as a head-dreſs when equipped for tournaments. The colours of the ſilk are always taken from the principal metal and colour contained in the coat-of-arms of the bearer. They are ſtill accounted as one of the leſſer ornaments of eſcutcheons, and are placed between the helmet and the creſt; (ſee fig. xxi. n° 6). In the time of Henry I. and long after, no man, who was under the degree of a knight, had his creſt ſet on a wreath; but this, like other prerogatives, has been infringed ſo far, that every body now-a-days wears a wreath.

SECT. VIII. *Of Creſts.*

THE Creſt is the higheſt part of the ornaments of a coat-of-arms. It is called *creſt*, from the Latin word *criſta*, which ſignifies comb or tuft, ſuch as many birds have upon their heads, as the peacock, pheaſant, &c. in alluſion to the place on which it is fixed.

Creſts were formerly great marks of honour, becauſe they were only worn by heroes of great valour, or by ſuch as were advanced to ſome ſuperior military command, in order that they might be the better diſtinguiſhed in an engagement, and thereby rally their men if diſperſed; but they are at preſent conſidered as a mere ornament. The creſt is frequently a part either of the ſupporters, or of the charge borne in the eſcutcheon. Thus the creſt of the royal atchievement of Great Britain is a "Lion guardant crown'd," as may be ſeen in fig. xxi. n° 7. The creſt of France is "a double Flower-de-luce." Out of the many creſts borrowed from ſupporters, are the following, viz. The duke of Montagu's, "A Griffon's head coup'd Or, back'd and wing'd Sable:" the marquis of Rockingham's, "A Griffon's head Argent, gorg'd with a ducal coronet;" the earl of Weſtmoreland's, "a Bull's head Argent, py'd Sable, armed Or;" and lord Archer's, which is, "Out of a mural crown Or, a Wyvern's head Argent." There are ſeveral inſtances of creſts that are relative to alliances, employments, or names; and which on that account have been changed.

SECT. IX. *Of the Scroll.*

THE Scroll is the ornament placed above the creſt, containing a motto, or ſhort ſentence, alluding thereto, or to the bearings; or to the bearer's name, as in the two following inſtances. The motto of the noble earl of Cholmondeley is, *Caſſis tutiſſima virtus*; i. e. "Virtue is the ſafeſt helmet;" on account of helmets in the coat-of-arms. The motto of the right hon. lord Forteſcue is, *Forte ſcutum ſalus ducum*; i. e. "A ſtrong ſhield is the ſafety of the commanders;" alluding to the name of that ancient family. Sometimes it has a reference to neither, but expreſſes ſomething divine or heroic; as that of the earl of Scarborough, which is, *Murus æreus conſcientia ſana*; i. e. "A good conſcence is a wall of braſs." Others are ænigmatical; as that of the royal atchievement, which is *Dieu et mon droit*, i. e. "God and my right;" introduced by Edward III. in 1340, when he aſſumed the arms and title of *king of France*, and began to proſecute his claim, which occaſioned long and bloody wars, fatal, by turns, to both kingdoms: or that of the prince of Wales, which is *Ich Dien*, "I ſerve," the origin of which has been already mentioned. Mottos, though hereditary in the families that firſt took them up, have been changed on ſome particular occaſions, and others appropriated in their ſtead, inſtances of which are ſometimes met with in the hiſtory of families.

Of Supporters.

SECT. X. *Of Supporters.*

SUPPORTERS are figures ſtanding on the ſcroll, and placed at the ſide of the eſcutcheon; they are ſo called, becauſe they ſeem to ſupport or hold up the ſhield. The riſe of ſupporters is, by F. Meneſtrier, traced up to ancient tournaments, wherein the knights cauſed their ſhields to be carried by ſervants or pages under the diſguiſe of lions, bears, griffons, blackamoors, &c. who alſo held and guarded the eſcutcheons, which the knights were obliged to expoſe to public view for ſome time before the liſts were opened. Sir George Mackenzie, who diſſents from this opinion, ſays, in his *Treatiſe on the ſcience of heraldry*, chap. xxxi. p. 93. "That the firſt origin and uſe of them was from the " cuſtom which ever was, and is, of leading ſuch as " are inveſted with any great honour to the prince " who confers it: thus, when any man is created a " duke, marquis, or knight of the garter, or any " other order, he is ſupported by, and led to the " prince betwixt two of the quality, and ſo receives " from him the ſymbols of that honour; and in re- " membrance of that ſolemnity, his arms are there- " after ſupported by any two creatures he chooſes." Supporters have formerly been taken from ſuch animals or birds as are borne in the ſhields, and ſometimes they have been choſen as bearing ſome alluſion to the names of thoſe whoſe arms they are made to ſupport. The ſupporters of the arms of Great Britain, ſince king James the firſt's acceſſion to the throne, are *a Lion rampant guardant crowned Or, on the dexter-ſide*, and *an Unicorn Argent, crowned, armed, unguled, maned and gorged with an antique Crown, to which a chain is affixed, all Or*, on the ſiniſter; as it appears by fig. xxi. n° 7.

This laſt figure repreſents the coat-of-arms of the king of Great Britain, or the royal atchievement, as it has been marſhalled ſince the acceſſion of king George I. in 1714, and is blazoned as follows, viz.

ARMS. *Quarterly, in the firſt grand quarter Gules, three Lions rampant guardant in pale Or*, the imperial enſigns of England; *impaled with Or, a Lion rampant, within a double treſſure flowery and counter-flowery Gules*, the royal arms of Scotland. *The ſecond is Azure, three Fleurs-de-lis Or*, the arms of France. *The third is Azure, a Harp Or, ſtringed Argent*, the enſign of Ireland. *The fourth grand quarter*

quarter is Gules, two Lions paſſant guardant in pale Or, for Brunſwick; *impaled with Or ſemée of Hearts proper, a Lion rampant Azure,* for Lunenburgh; *with grafted in baſe Gules, a Horſe current Argent,* for ancient Saxony; *and in a ſhield ſurtout Gules, the Crown of Charlemagne Or,* as arch-treaſurer of the empire; *the whole within a Garter, inſcribed with this motto,* HONI SOIT QUI MAL Y PENSE, as ſovereign of that noble order, given by the founder king Edward III.

CREST. *On a Helmet full-faced, grated and ſurmounted of a Crown, a Lion guardant crowned Or; the mantlings of the laſt, and lining Ermine.*

SUPPORTERS. *On the Dexter ſide, a Lion rampant guardant Or, crowned as the Creſt. On the Siniſter-ſide an Unicorn Argent, crowned, armed, maned, and unguled Or, gorged with an antique Crown; a Chain affixed thereto, reflecting over the back, and paſſing over the hind legs of the laſt, both ſtanding on a Scroll inſcribed with this motto,* DIEU ET MON DROIT, *from which iſſue the two Royal Badges of his Majeſty's chief Dominions, viz. on the Dexter-ſide a Roſe party per Pale Argent and Gules, ſtalked and leaved proper,* for England; *and on the Siniſter-ſide a Thiſtle proper,* for Scotland; being ſo adorned by king James I. upon his ſucceeding to the crown of England. As king of Scotland, he bore two unicorns, as above, for his ſupporters; but upon the union of that kingdom with England, 1603, he introduced one of the above ſupporters on the ſiniſter-ſide of the royal atchievement, and which continues to this day.

It is to be obſerved, that bearing coats-of-arms ſupported, is, according to the heraldrical rules of England, the prerogative, 1ſt, Of thoſe called *nobiles majores*, viz. dukes, marquiſes, earls, viſcounts, and barons; 2d, Of all knights of the garter, though they ſhould be under the degree of barons; 3d, Of knights of the Bath, who both receive on their creation a grant of ſupporters. And, laſtly, of ſuch knights as the king chooſes to beſtow this honour upon; as in the inſtance of Sir Andrew Fountain, who was knighted by Philip earl of Pembroke, when lord-lieutenant of Ireland, Fountain being then his ſecretary; and on his return to England, king William granted him ſupporters to his arms, viz. *two Griffons Gules and Or.* In Scotland, all the chiefs of clans or names have the privilege of claiming ſupporters; alſo the baronets. But by act of parliament, 10th September, 1672, none are allowed to uſe either arms or ſupporters, under a penalty and confiſcation of all moveables whereon arms are put, without the lord Lyon's authority.

CHAP. V.

Of the Rules or Laws of HERALDRY.

THE ſeveral eſcutcheons, tinctures, charges, and ornaments of coats-of-arms, and their various properties, being now explained; it may not be improper to ſubjoin ſuch rules for blazoning the ſame, as the ancient uſage and laws of heraldry have eſtabliſhed amongſt us.

I. The *firſt* and moſt general rule is, to expreſs one's ſelf in proper terms, ſo as not to omit any thing that ought to be ſpecified, and at the ſame time to be clear and conciſe without tautology; as in Ex. xiv. p. 3588. and alſo in Ex. ix. p. 3595. wherein theſe expreſſions, *of the Field*, or *of the Firſt*, prevent the repetition of the forementioned tincture.

II. One muſt begin with the tincture of the field, and then proceed to the principal charges which poſſeſs the moſt honourable place in the ſhield, ſuch as Feſs, Cheveron, &c. always naming that charge firſt which lies next and immediately upon the field; as in Ex. xv. p. 3593.

III. After naming the tincture of the field, the honourable ordinaries, or other principal figures, you muſt ſpecify their attributes, and afterwards their metal or colour, as in Ex. xvi. p. 3601.

IV. When an honourable ordinary, or ſome one figure, is placed upon another, whether it be a Feſs, Cheveron, Croſs, &c. it is always to be named after the ordinary or figure over which it is placed, with one of theſe expreſſions, *ſurtout*, or *over-all*, as in Ex. xx. p. 3592.

V. In the blazoning of ſuch ordinaries as are plain, the bare mention of them is ſufficient; but if an ordinary ſhould be made of any of the crooked lines mentioned above, its form muſt be ſpecified; that is, whether it be Engrailed, Wavy, &c. as in Ex. i. ii. iii. &c. p. 3588.

VI. When a principal figure poſſeſſes the centre of the field, its poſition is not to be expreſſed: or (which amounts to the ſame thing) when a bearing is named, without ſpecifying the point where it is placed, then it is underſtood to poſſeſs the middle of the ſhield; as in Ex. xv. p. 3602.

VII. The number of the points of mullets or ſtars muſt be ſpecified when more than five; and alſo if a mullet or any other charge be pierced, it muſt be mentioned as ſuch, to diſtinguiſh it from what is plain; as in Ex. xiii. and xiv. p. 3599.

VIII. When a ray of the ſun, or other ſingle figure, is borne in any other part of the eſcutcheon than the centre, the point it iſſues from muſt be named; as in Ex. iii. p. 3599. col. 1.,

IX. The natural colour of trees, plants, fruits, birds, &c. is no otherwiſe to be expreſſed in blazoning but by the word *proper*, as in Exam. ii. vii. p. 3602.: but if diſcoloured, that is, if they differ from their natural colour, it muſt be particularized; as in Ex. i. ii. &c. p. 3600.

X. When three figures are in a field, and their poſition is not mentioned in the blazoning, they are always underſtood to be placed two above, and one below; as fig. xxii. n° 3.

XI. When there are many figures of the ſame ſpecies borne in a coat-of-arms, their number muſt be obſerved as they ſtand, and diſtinctly expreſſed; as in Ex. i. p. 3603.

But for the better underſtanding of this laſt rule, we have inſerted examples of the *different diſpoſitions of figures*, wherein they are properly repreſented; viz.

Two may be ranged in Pale, in Feſs, &c. See fig. xxii. n° 1 and 2.

Three, may be 2 and 1, as alſo in bend, &c. See n° 3 and 4.

Four, are placed 2 and 2, or cantoned, as in n° 5.

Five, 1, 3, 1, in Croſs; or 2, 1, 2, in Saltier. See n° 6 and 7.

Six, 3, 2, 1, in Pile; or 2, 2, 2, Paleways. See n° 8 and 9.

Eight, in Orle, or on a Bordure. See n° 10.

Nine, 3, 3, 3, Barways; or 3, 3, 2, 1, in Pile. See n° 11 and 12.

Ten, 4, 3, 2, 1, in Pile; or elſe 4, 2, 4, Barways. See n° 13 and 14.

Twelve, are placed 4, 4, 4, Barways. See n° 15.

There are other poſitions called *irregular;* as for example, when three figures which are naturally placed 2 and 1, are diſpoſed 1 and 2, &c. It muſt alſo be obſerved, that when the field is ſtrewed with the ſame figures, this is expreſſed by the word *ſemée:* but, according to a French armoriſt's opinion, if the figures ſtrewed on the field are whole ones, it muſt be denoted by the words *ſans nombre;* whereas, if part of them is cut off at the extremities of the eſcutcheon, the word *ſemée* or *ſemi* is then to be uſed.

CHAP. VI.

Of MARSHALLING *Coats-of-arms.*

BY *marſhalling* coats-of-arms, is to be underſtood the art of diſpoſing divers of them in one eſcutcheon, and of diſtributing their contingent ornaments in proper places.

Various cauſes may occaſion arms to be thus conjoined, which J. Guillim compriſes under two heads, viz. *manifeſt* and *obſcure*.

What this learned and judicious herald means by *manifeſt cauſes* in the marſhalling of coats-of-arms, are ſuch as betoken marriages, or a ſovereign's gift, granted either through the ſpecial favour of the prince, or for ſome eminent ſervices. Concerning marriages, it is to be obſerved,

I. When the coats-of-arms of a married couple, deſcended of diſtinct families, are to be put together in one eſcutcheon, the field of their reſpective arms is conjoined Paleways, and blazoned *parted per Pale, Baron and Femme, two coats; firſt, &c.* In which caſe the baron's arms are always to be placed on the dexter-ſide, and the femme's arms on the ſiniſter-ſide, as in n° 1 and 2, and fig. xxiii. *Of arms marſhalled*, which are,

1. The coat-of-arms of the rev. Edward Barnard, D. D. chaplain in ordinary to his majeſty, provoſt of Eton-college, canon of Windſor, &c. impaled with that of S. Haggatt, his late ſpouſe.

2. The coat-of arms of the rev. Thomas Dampier, D. D. chaplain in ordinary to his majeſty, prebendary of Durham, canon of Windſor, &c. impaled with that of F. Walker, his ſpouſe.

If a widower marry again, his late and preſent wife's arms are, according to G. Leigh, "to be both placed on the ſiniſter-ſide, in the eſcutcheon with his own, and parted per Pale. The firſt wife's coat ſhall ſtand on the Chief, and the ſecond on the Baſe; or he may ſet them both in Pale with his own, the firſt wife's coat next to himſelf, and his ſecond outermoſt. If he ſhould marry a third wife, then the two firſt matches ſhall ſtand on the Chief, and the third ſhall have the whole Baſe. And if he take a fourth wife, ſhe muſt participate one-half of the Baſe with the third wife, and ſo will they they ſeem to be ſo many coats quartered." But it muſt be obſerved, that theſe forms of impaling are meant of hereditary coats, whereby the huſband ſtands in expectation of having the hereditary poſſeſſions of his wife united to his patrimony.

II. In the arms of femmes joined to the paternal coat of the baron, the proper differences by which they were borne by the fathers of ſuch women muſt be inſerted.

III. If a coat-of-arms that has a Bordure be impaled with another, as by marriage, then the Bordure muſt be wholly omitted in the ſide of the arms next the centre.

IV. The perſon that marries an heireſs, inſtead of impaling his arms with thoſe of his wife, is to bear them in an eſcutcheon placed in the centre of his ſhield, after the ſame manner as the baronet's badge is marſhalled in n° 3. and which, on account of its ſhewing forth his pretenſion to her eſtate, is called *an eſcutcheon of pretence*, and is blazoned *ſur-tout*, i. e. *over-all*, as the ineſcutcheon borne in the fourth quarter of the royal atchievement. But the children are to bear the hereditary coat-of-arms of their father and mother *quarterly*, which denotes a fixed inheritance, and ſo tranſmit them to poſterity. The firſt and fourth quarters generally contain the father's arms, and the ſecond and third the mother's; except the heirs ſhould derive not only their eſtate, but alſo their title and dignity, from their mother.

V. If a maiden or dowager lady of quality marry a commoner, or a nobleman inferior to her rank, their coats-of-arms may be ſet aſide of one another in two ſeparate eſcutcheons, upon one mantle or drapery, and the lady's arms ornamented according to her title; ſee n° 4 and 5, which repreſent the coats-of-arms of Gen. C. Montagu, and lady Elizabeth Villiers viſcounteſs Grandiſon.

VI. Archbiſhops and biſhops impale their arms differently from the fore-mentioned coats, in giving the place of honour, that is, the dexter-ſide, to the arms of their dignity, as it is expreſſed in n° 6, which repreſents the coat-of-arms of Dr Philip Yonge, lord biſhop of Norwich. It may be obſerved of the above prelates, that they thus bear their arms parted per Pale, to denote their being joined to their cathedral church in a ſort of ſpiritual marriage.

With reſpect to ſuch armorial enſigns as the ſovereign thinks fit to augment a coat-of-arms with, they may be marſhalled various ways, as may be ſeen by the arms of his grace the duke of Rutland, inſerted in fig. viii. n° 19. and the example contained in fig. xii. n° 11.

To thoſe augmentations may be added, 1ſt, The baronet's mark of diſtinction, or the arms of the province of Ulſter in Ireland, granted and made hereditary in the male line by king James I. who erected this dignity on the 22d of May, 1611, in the 9th year of his reign, in order to propagate a plantation in the fore-mentioned province. This mark is *Argent, a ſiniſter Hand couped at the Wriſt, and erected Gules;* which may be borne either in a canton, or in an eſcutcheon, as will beſt ſuit the figures of the arms. See fig. xxiii. n° 3. which repreſents the coat-of-arms of Sir William Lorrayne, of Kirk-harle, Northumberland, and are thus blazoned: *Quarterly, Sable and Argent, a plain Croſs counter-quartered of the Field.*

HERALDRY.

Plate CXLIX.

Fig. 19.

CHIMERICAL FIGURES.

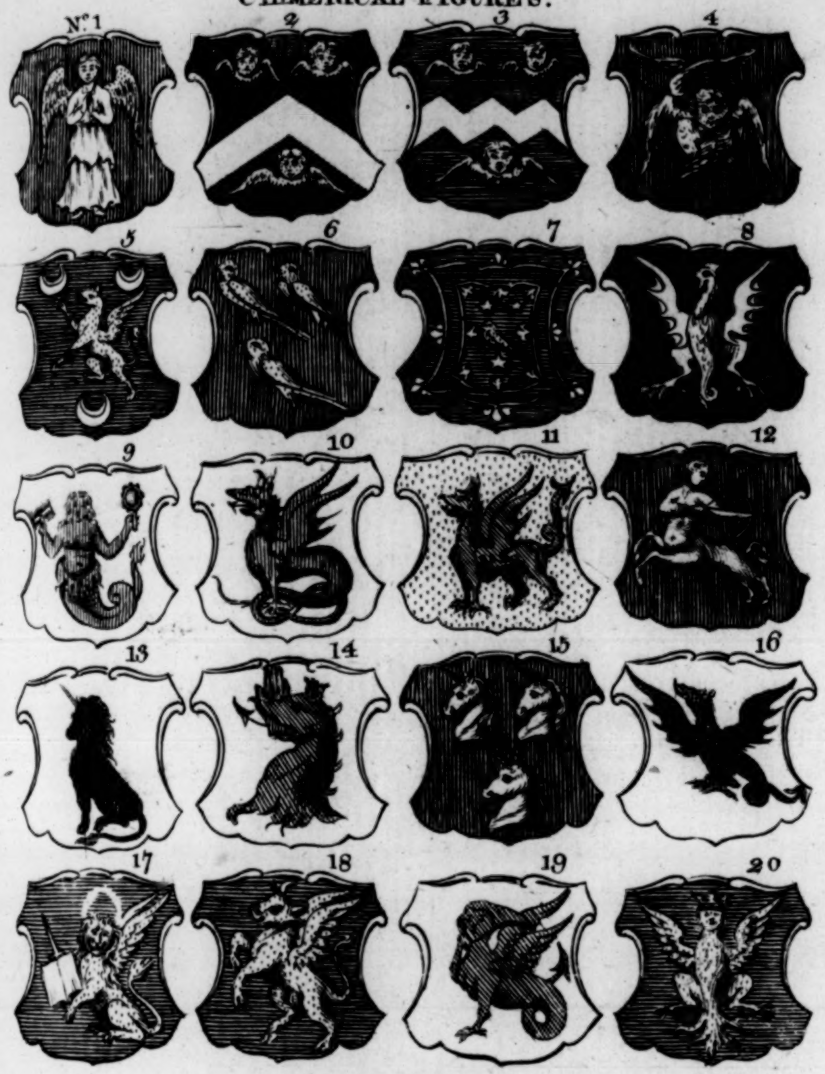

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Fig. 20.

CROWNS.

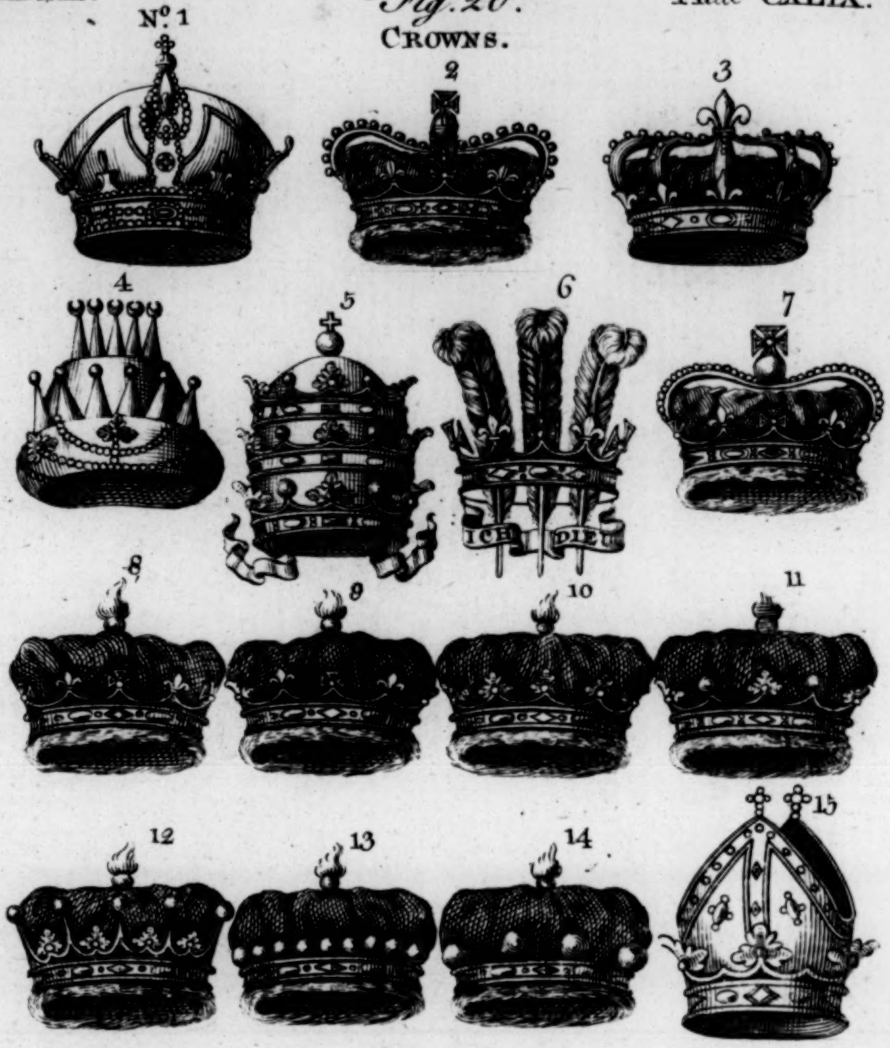

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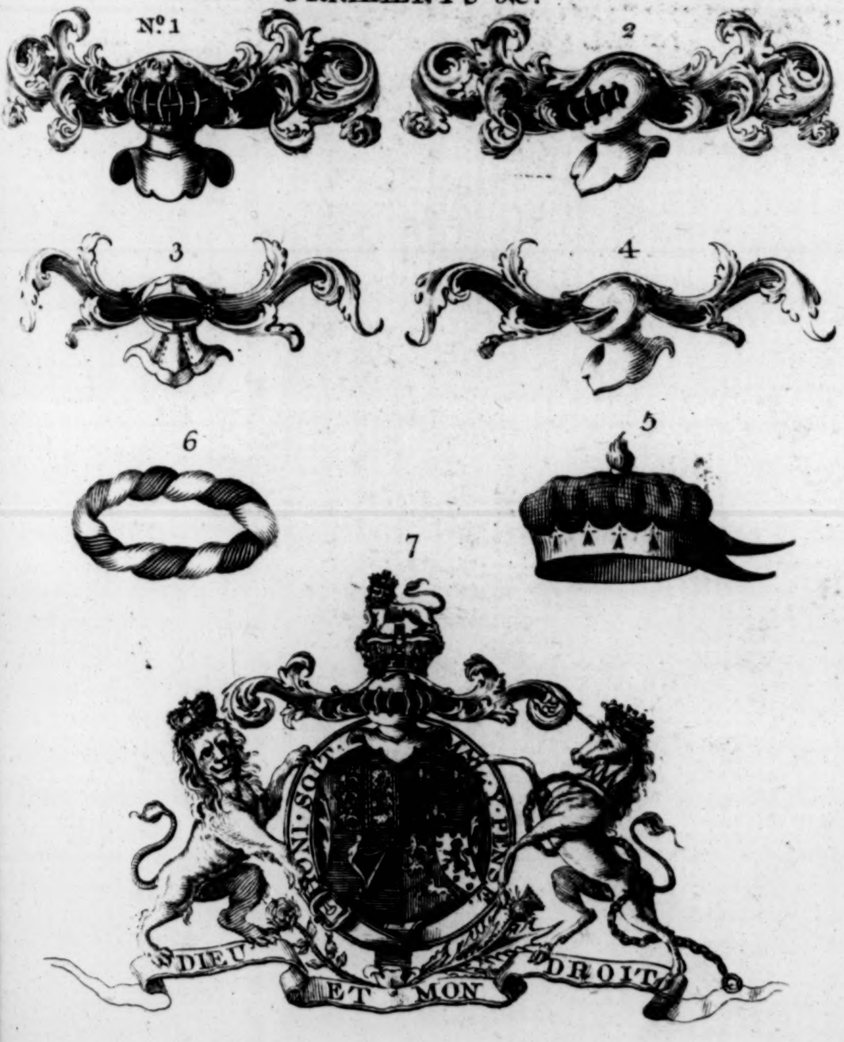
Fig. 21.

ORNAMENTS &C.



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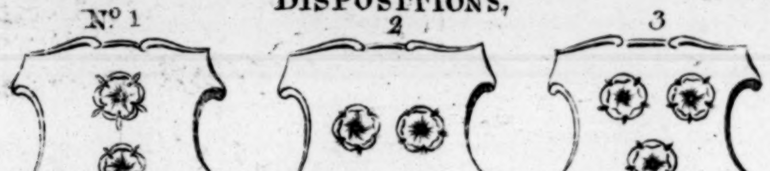
HONI SOIT QUI MAL Y PENSE
DIEU ET MON DROIT

Fig. 22.

DISPOSITIONS,



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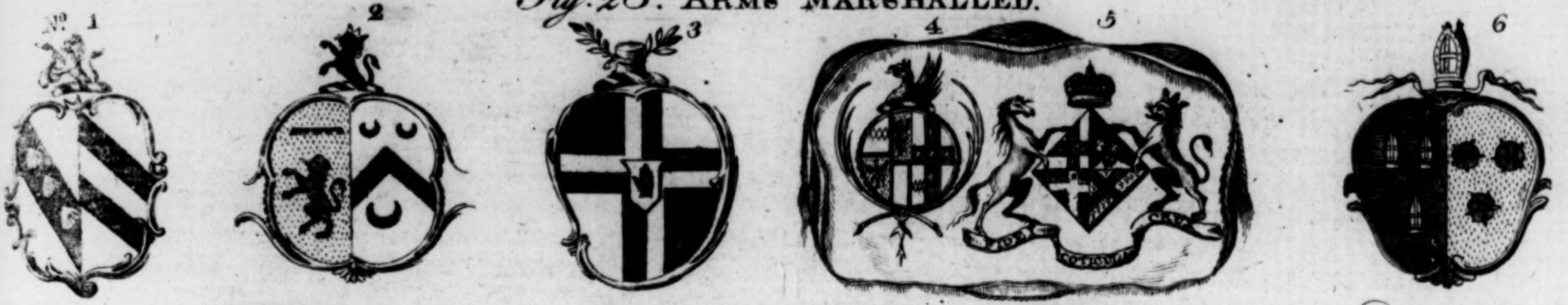
A. Bell Sculpt.

3 MA 55

Fig. 23. ARMS MARSHALLED.



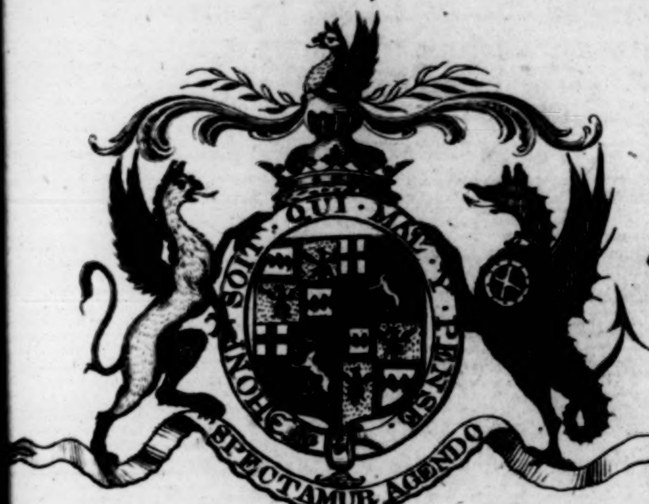

7
HONI SOIT QUI MAL Y PENSE
SPECTAMUR AGENDO

Fig. 25.
Theban
HARP.

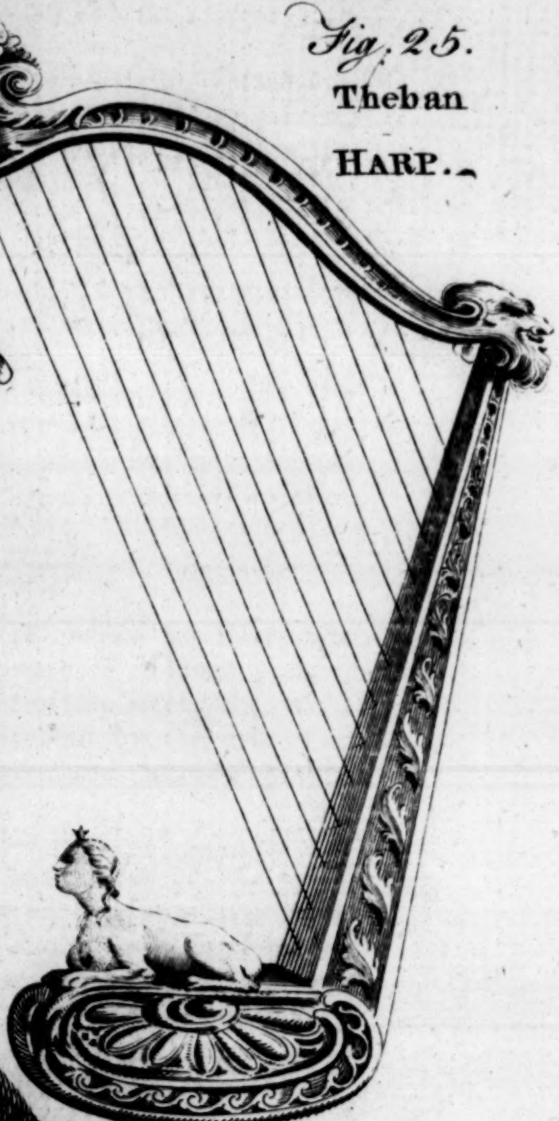
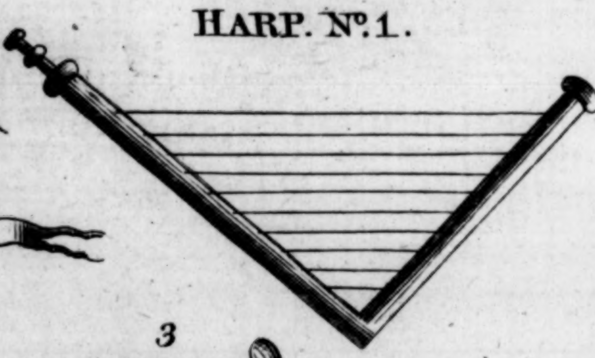


Fig. 26.
The Trigonum, or Triangular.
HARP. No. 1.



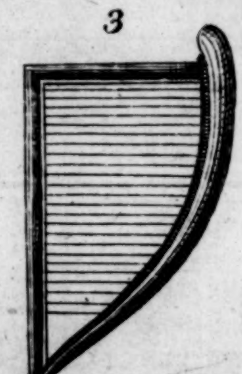
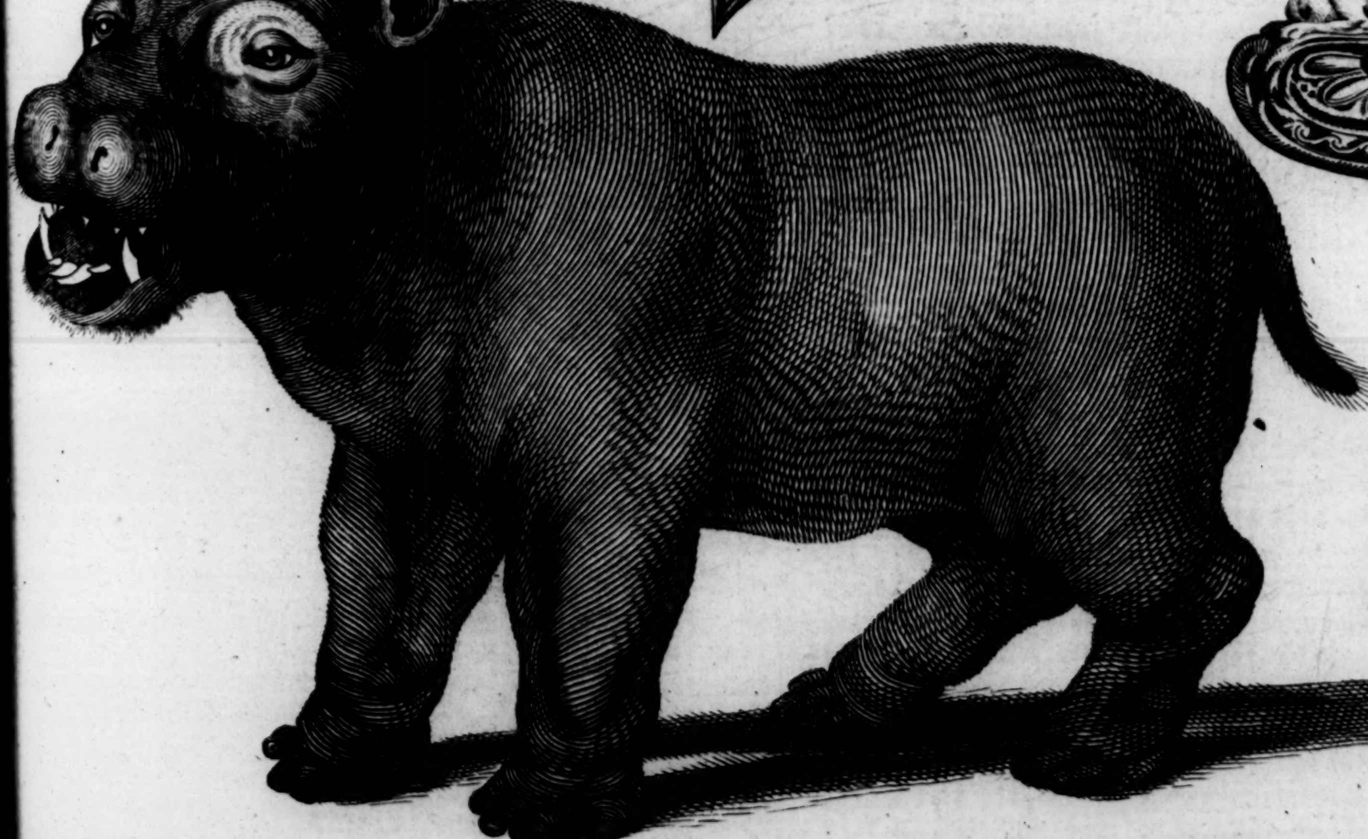
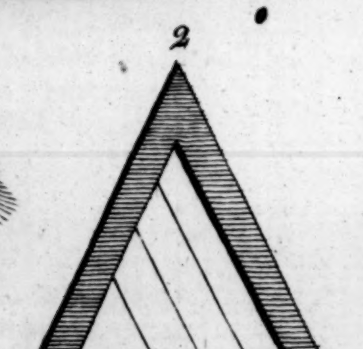


Fig. 24.
HIPPOPOTAMUS.





A. Bell Sculpt.

3 MA 53

The Creſt,—*A Laurel-tree couped, two branches ſprouting out proper, and fixed to the lower part thereof with a Belt Gules, edged and buckled Or.* This, according to tradition in the family, was granted for ſome worthy action in the field.

2dly. The ancient and reſpectable badge of the moſt noble order of the Garter, inſtituted by king Edward III. 1349, in the 27th year of his reign; and which, ever ſince its inſtitution, has been looked upon as a great honour beſtowed on the nobleſt perſons of this nation and other countries. This honourable augmentation is made to ſurround, as with a garter, the arms of ſuch knights, and is inſcribed with this motto, *Honi ſoit qui mal y penſe:* See n° 7. which repreſents the coat-of-arms of his grace the duke of Montagu, earl of Cardigan, baron Brudenel of Stanton-Wivil, conſtable and lieutenant of Windſor-caſtle, knight of the moſt noble order of the Garter, and baronet, preſident of St Luke's Hoſpital, and F. R. S.

This nobleman, whoſe arms were *Argent, a Cheveron Gules between three Morions proper*, has, ſince the deceaſe of John duke of Montagu, taken the name and arms of *Montagu*, on account of his being married to lady Mary Montagu, youngeſt daughter and one of the co-heireſſes of his grace.

So far the cauſes for marſhalling divers arms in one ſhield, &c. are *manifeſt*. As to ſuch as are called *obſcure*, that is, when coats-of-arms are marſhalled in ſuch a manner, that no probable reaſon can be given why they are ſo conjoined, they muſt be left to heralds to explain, as being the propereſt perſons to unfold theſe and other myſteries of this ſcience.

CHAP. VII.

Of FUNERAL ESCUTCHEONS.

Of Hatchments.

AFTER having treated of the eſſential parts of the coats-of-arms, of the various charges and ornaments uſually borne therewith, of their attributes and diſpoſitions, and of the rules for blazoning and marſhalling them, we ſhall next deſcribe the ſeveral funeral eſcutcheons, uſually called *hatchments;* whereby may be known, after any perſon's deceaſe, what rank either he or ſhe held when living; and if it be a gentleman's hatchment, whether he was a batchelor, married man, or widower, with the like diſtinctions for gentlewomen.

The hatchment, N° 1. repreſents ſuch as are affixed to the fronts of houſes, when any of the nobility and gentry dies; the arms therein being thoſe of a private gentleman and his wife parted per pale; the dexter-ſide, which is Gules, three Bars Or, for the huſband; having the ground without the eſcutcheon black, denotes the man to be dead; and the ground on the ſiniſter-ſide being white, ſignifies that the wife is living, which is alſo demonſtrated by the ſmall hatchment, n° 2. which is here depicted without mantling, helmet, and creſt, for perſpicuity's ſake only.

When a married gentlewoman dies firſt, the hatchment is diſtinguiſhed by a contrary colour from the former; that is, the arms on the ſiniſter-ſide have the ground without the eſcutcheon black; whereas thoſe on the dexter-ſide, for her ſurviving huſband, are upon a white ground: the hatchment of a gentlewoman is, moreover, differenced by a cherub over the arms inſtead of a creſt. See n° 3.

When a batchelor dies, his arms may be depicted ſingle or quartered, with a creſt over them, but never impaled as the two firſt are, and all the ground without the eſcutcheon is alſo black. See n° 4.

When a maid dies, her arms, which are placed in a lozenge, may be ſingle or quartered, as thoſe of a batchelor; but, inſtead of a creſt, have a cherub over them, and all the ground without the eſcutcheon is alſo black. See n° 5.

When a widower dies, his arms are repreſented impaled with thoſe of his deceaſed wife, having a helmet, mantling, and creſt over them, and all the ground without the eſcutcheon black. See n° 6.

When a widow dies, her arms are alſo repreſented impaled with thoſe of her deceaſed huſband, but incloſed in a lozenge, and, inſtead of a creſt, a cherub is placed over them; all the ground without the eſcutcheon is alſo black. See n° 7.

If a widower or batchelor ſhould happen to be the laſt of his family, the hatchment is depicted as in n° 6.; and that of a maid or widow, whoſe family is extinct by her death, is depicted as in n° 7. with this difference only, that a death-head is generally annexed to each hatchment, to denote, that death has conquered all.

By the forementioned rules, which are ſometimes neglected through the ignorance of illiterate people, may be known, upon the ſight of any hatchment, what branch of the family is dead; and by the helmet or coronet, what title and degree the deceaſed perſon was of.

The ſame rules are obſerved with reſpect to the eſcutcheons placed on the hearſe and horſes uſed in pompous funerals, except that they are not ſurmounted with any creſt, as in the foregoing examples of hatchments, but are always plain. It is neceſſary, however, to enſign thoſe of peers with coronets, and that of a maiden lady with a knot of ribbands.

In *Scotland*, a funeral eſcutcheon not only ſhews forth the arms and condition of the defunct, but is alſo a proof of the gentility of his deſcent; and ſuch perſons for whom this ſpecies of eſcutcheon can be made out, are legally entitled to the character of gentlemen of blood, which is the higheſt ſpecies of gentility. The Engliſh hatchment above deſcribed exhibits no more than a right to a coat-of-arms which may be acquired by purchaſe, and is only the firſt ſtep towards eſtabliſhing gentility in a family.

The funeral eſcutcheon as exhibited in Scotland, France, and Germany, is in form of a lozenge, above ſix feet ſquare, of black cloth; in the centre of which is painted, in proper colours, the complete atchievement of the defunct, with all its exterior ornaments and additional marks or badges of honour; and round the ſides are placed the ſixteen arms of the families from which he derives his deſcent, as far back as the grandfather's grandfather, as the proofs of his gentility: they exhibit the armorial bearings of his father and mother, his two grandmothers, his four great-grandmothers, and his eight great-grandmothers mothers; if all theſe families have acquired a legal right to bear arms, then the gentility of the perſon whoſe proof it is muſt be accounted complete, but not otherwiſe. On the four corners are placed mort-heads, and the initials of his name and titles or deſignation; and the black interſtices are ſemée or powdered with tears, as in the figure, n° 8. which is the eſcutcheon of the right hon. James 5th earl of Balcarras, chief of the ancient ſurname of *Lindeſay*.

On the morning of the interment, one of theſe is placed on the front of the houſe where the deceaſed lies; and another on the church in which he is to be buried, which after the burial is fixed above the grave. The pall, too, is generally adorned with theſe proofs of gentility, and the horſes of the hearſe with the defunct's arms.

CHAP. VIII.

Of PRECEDENCY.

THE order of precedency, which is obſerved in general, is thus, That perſons of every degree of honour or dignity take place according to the ſeniority of their creation, and not of years, unleſs they are deſcended from the blood-royal; in which caſe, they have place of all others of the ſame degree.

The younger ſons of the preceding rank take place from the eldeſt ſon of the next mediate, viz. the younger ſons of dukes from the eldeſt ſons of earls; the younger ſons of earls from the eldeſt ſons of barons. All the chain of precedency is founded upon this gradation, and thus ſettled by act of parliament, 31 Henry VIII. cap. 10. *anno* 1539.

But there have been ſince ſome alterations made in this act by ſeveral decrees and eſtabliſhments in the ſucceeding reigns, whereby all the ſons of viſcounts and barons are allowed to precede baronets. And the eldeſt ſons and daughters of baronets have place given them before the eldeſt ſons and daughters of any knights, of what degree or order ſoever, though ſuperior to that of a baronet; theſe being but temporary dignities, whereas that of baronets is hereditary: and the younger ſons of baronets are to have place next after the eldeſt ſons of knights.

Obſerve alſo, that as there are ſome great officers of ſtate, who take place, although they are not noblemen, above the nobility of higher degree; ſo there are ſome perſons, who, for their dignities in the church, degrees in the univerſities, and inns of court, officers in the ſtate, or army, although they are neither knights, nor gentlemen born, yet take place amongſt them. Thus, all colonels and field-officers who are honourable, as alſo the maſter of the ordnance, quarter-maſter general, doctors of divinity, law, phyſic, and muſic; deans, chancellors, prebendaries, heads of colleges in univerſities, and ſerjeants at law, are, by courteſy, allowed place before ordinary eſquires. And all bachelors of divinity, law, phyſic, and muſic; maſters of arts, barriſters in the inns of courts; lieutenant-colonels, majors, captains, and other commiſſioned military officers; and divers patent officers in the king's houſehold, may equal, if not precede, any gentleman that has none of theſe qualifications.

In towns corporate, the inhabitants of cities are preferred to thoſe of boroughs; and thoſe who have borne magiſtracy, to all others. And herein a younger alderman takes not precedency from his ſenior by being knighted, or as being the elder knight, as was the caſe of Alderman Craven, who, though no knight, had place as ſenior alderman, before all the reſt who were knights, at the coronation of king James. This is to be underſtood as to public meetings relating to the town; for it is doubted whether it will hold good in any neutral place. It has been alſo determined in the earl marſhal's court of honour, that all who have been lord mayors of London, ſhall every where take place of all knights-batchelors, becauſe they have been the king's lieutenants.

It is alſo quoted by Sir George Mackenzie, in his obſervations on precedency, that in the caſe of Sir John Crook, ſerjeant at law, it was adjudged by the judges in court, that ſuch ſerjeants as were his ſeniors, though not knighted, ſhould have preference notwithſtanding his knighthood.—The precedency among men is as follows:

The KING, and Prince of WALES.

PRINCES of the BLOOD, viz. Sons, Grandſons, Brothers, Uncles, &c. of the king.

The following precede all Dukes by authority of the aforementioned Act of Parliament.

Archbiſhop of Canterbury.
Lord Chancellor, or Lord-Keeper.
Archbiſhop of York.
Lord Treaſurer of England.
Lord Preſident of the Privy-council.
Lord Privy-Seal.

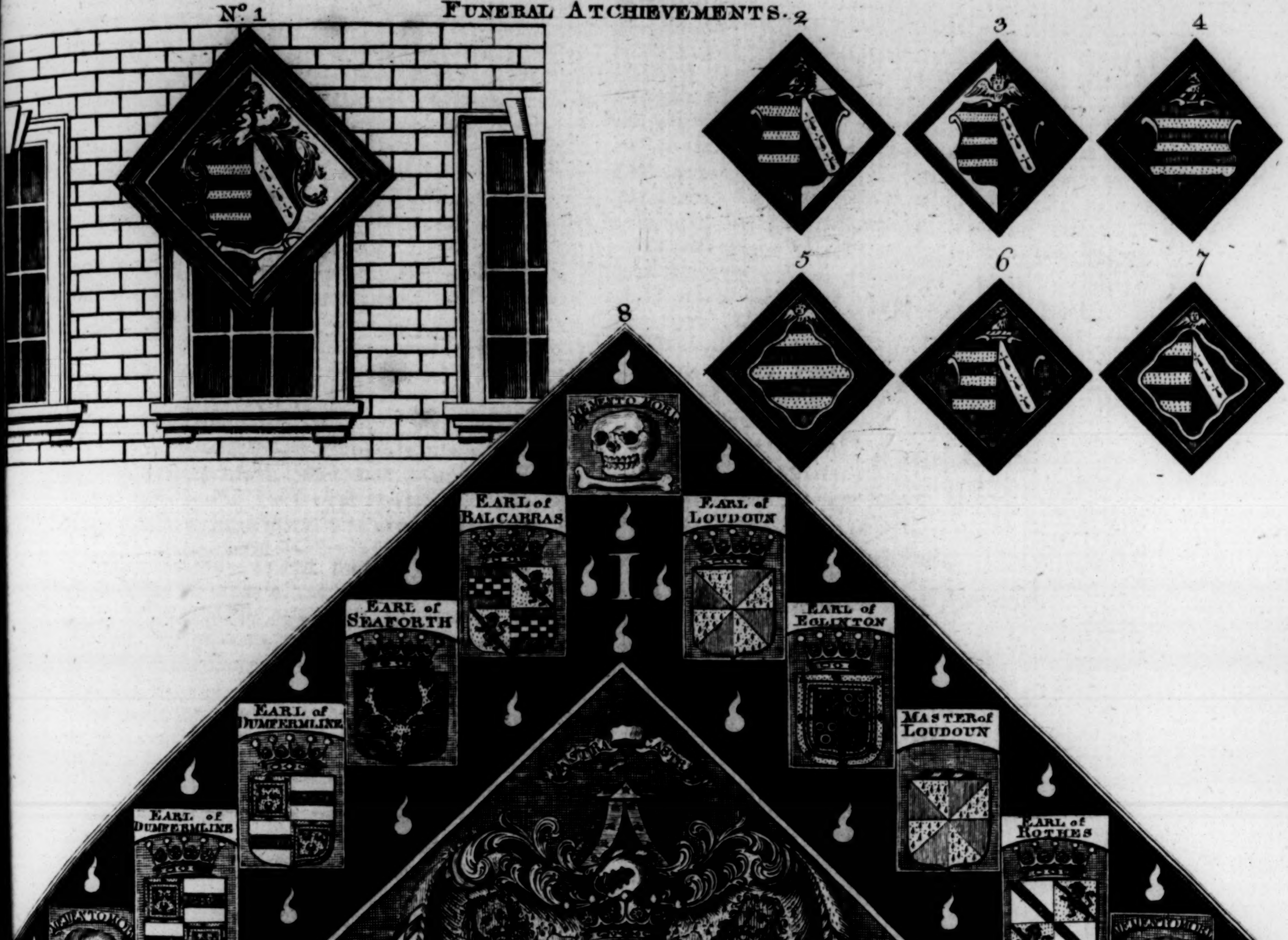
Theſe alſo precede all of their own Degree.

Lord Great-Chamberlain.
Lord High-Conſtable.
Lord Earl-Marſhal.
Lord High-Admiral.
Lord Steward of the Houſhold.
Lord Chamberlain of the Houſhold.
Secretaries of State.

Then, according to their reſpective Creations,

Dukes.
Marquiſes.
Dukes eldeſt ſons.
Earls.
Marquiſes eldeſt ſons.
Dukes younger ſons.
Viſcounts.
Earls eldeſt ſons.
Marquiſes younger ſons.
Biſhops.
Barons.
Speaker of the Houſe of Commons.
Viſcounts eldeſt ſons.
Earls younger ſons.
Barons eldeſt ſons.
Knights of the Garter.
Privy-counſellors, who are ſtyled Right Honourable.
Chancellor and Under-treaſurer of the Exchequer.
Chancellor of the dutchy of Lancaſter.
Lord Chief-juſtice of the King's-bench.
Maſter of the Rolls.
Lord Chief-juſtice of the Common-pleas.
Lord Chief-baron of the Exchequer.
Juſtices and Barons in the Courts of Law.
Viſcounts younger ſons.
Barons younger ſons.

Funeral Atchievements.


N.º 1
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MEMENTO MORI
EARL of BALCARRAS
EARL of LOUDOUN
I
EARL of SEAFORTH
EARL of EGLINTON
EARL of DUMFERMLINE
MASTER of LOUDOUN
EARL of DUMFERMLINE
EARL of ROTHES
MEMENTO MORI
MEMENTO MORI
E
B
GUTHRIE of LUNEN
LORD COLVIL
ROSS of BALNAGOWAN
EARL of LINLITHGOW
NUMEN LUMEN MUNIMEN
LORD DRUMMOND
EARL of WIGTON
LORD DRUMMOND
EARL of MARR
MEMENTO MORI

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3 MA 53

Baronets of England.
Baronets of Scotland.
Baronets of Ireland.
Knights of the Bath.
Field *and* Flag-officers.
Knights-bachelors.
Maſters in Chancery.
Doctors, Deans, &c.
Serjeants at law.
Baronets eldeſt ſons.
Knights of the Garter's eldeſt ſons.
Knights of the Bath's eldeſt ſons.
Knights-Bachelors eldeſt ſons.
Baronets younger ſons.
Eſquires by creation.
Eſquires by office.
Gentlemen.
Citizens.
Burgeſſes, &c.

The eſquires attending on knights of the Bath take place alſo from thoſe gentlemen who are reputed eſquires only during the time they are in office, and no longer; ſuch as high ſheriffs, juſtices of the peace, &c.

The precedency among men being known, that which is due to women, according to their ſeveral degrees, will be eaſily demonſtrated: but it is to be obſerved, that women, before marriage, have precedency by their father; with this difference between them and the male children, that the ſame precedency is due to all the daughters that belongs to the eldeſt; which is not ſo among the ſons; and the reaſon of this diſparity ſeems to be, that daughters all ſucceed equally, whereas the eldeſt ſon excludes all the reſt.

By marriage, a woman participates of her huſband's dignities; but none of the wife's dignities can come by marriage to her huſband, but are to deſcend to her next heir.

If a woman have precedency by creation, or birth, ſhe retains the ſame though ſhe marry a commoner: but if a woman nobly born marry any peer, ſhe ſhall take place according to the degree of her huſband only, though ſhe be a duke's daughter.

A woman, privileged by marriage with one of noble degree, ſhall retain the privilege due to her by her huſband, though he ſhould be degraded by forfeiture, &c.; for crimes are perſonal.—Sir G. Mackenzie, *Of Precedency*, chap. ix.

The wife of the eldeſt ſon of any degree takes place of the daughters of the ſame degree, who always have place immediately after the wives of ſuch eldeſt ſons, and both of them take place of the younger ſons of the preceding degree. Thus, the lady of the eldeſt ſon of an earl takes place of an earl's daughter, and both of them precede the wife of the younger ſon of a marquis; alſo the wife of any degree precedes the wife of the eldeſt ſon of the preceding degree. Thus, the wife of a marquis precedes the wife of the eldeſt ſon of a duke.

This holds not only in comparing degrees, but alſo families of the ſame degree amongſt themſelves; for inſtance, the daughter of a ſenior earl yields place to the wife of a junior earl's eldeſt ſon: Though, if ſuch daughter be an heireſs, ſhe will then be allowed place before the wives of the eldeſt ſons of all younger earls. (W. Segar, *Of Honourable Places*, chap. xxii.) The precedency among women is as follows:

The QUEEN, and Princeſs of WALES.
PRINCESSES, and DUCHESSES of the BLOOD.
DUCHESSES.
Wives of the eldeſt ſons; Daughters, } of Dukes of the Blood.
MARCHIONESSES.
Wives of the eldeſt ſons; Daughters, } of Dukes.
COUNTESSES.
Wives of the eldeſt ſons; Daughters, } of Marquiſes.
Wives of the younger ſons of Dukes.
VISCOUNTESSES.
Wives of the eldeſt ſons; Daughters, } of Earls.
Wives of the younger ſons of Marquiſes.
BARONESSES.
Wives of the eldeſt ſons; Daughters, } of Viſcounts.
Wives of the younger ſons of Earls.
Wives of the eldeſt ſons; Daughters, } of Barons.
Wives of the younger ſons of Viſcounts.
Wives of the younger ſons of Barons.
WIVES of BARONETS.
WIVES of KNIGHTS of the Garter.
WIVES of KNIGHTS of the Bath.
WIVES of KNIGHTS Bachelors.
Wives of the eldeſt ſons; Daughters, } of Baronets.
Wives of the eldeſt ſons; Daughters, } of Knights of the Garter.
Wives of the eldeſt ſons; Daughters, } of Knights of the Bath.
Wives of the eldeſt ſons; Daughters, } of Knights-Bachelors.
Wives of the younger ſons of Baronets.
WIVES of ESQUIRES, by creation.
WIVES of ESQUIRES, by office.
WIVES of GENTLEMEN.
Daughters of Eſquires.
Daughters of Gentlemen.
Wives of Citizens.
Wives of Burgeſſes, &c.

The Wives of Privy-counſellors, Judges, &c. are to take the ſame place as their huſbands do. See the former liſt.

HERB, in botany; a name by which Linnæus denominates that portion of every vegetable which ariſes from the root, and is terminated by the fructification. It comprehends, 1. The trunk, ſtalk, or ſtem. 2. The leaves. 3. Thoſe minute external parts called by the ſame author the *fulcra*, or ſupports of plants. 4. The buds, or, as he alſo terms them, the *winter-quarters* of the future vegetable.

HERBACEOUS *Plants*, are thoſe which have ſucculent ſtems or ſtalks that die down to the ground every year.

Of herbaceous plants, thoſe are annual which periſh ſtem and root and all every year; biennial, which ſubſiſt by the roots two years; perennial which are perpetuated by their roots for a ſeries of years, a new ſtem being produced every ſpring.

HERBAGE, in law, ſignifies the paſture provided by nature for the food of cattle; alſo the liberty to feed cattle in the foreſt, or in another perſon's ground.

HERBAL, ſignifies a book that treats of the claſſes, genera, ſpecies, and virtues of plants.

Herbal is ſometimes alſo uſed for what is more uſually called *hortus ſiccus*. See Hortus.

HERBELOT (Bartholomew d'), a French writer, eminent for his oriental learning, was born at Paris in 1625. He travelled ſeveral times into Italy, where he obtained the eſteem of ſome of the moſt learned men of the age. Ferdinand II. grand duke of Tuſcany, gave him many marks of his favour: a library being expoſed to ſale at Florence, the duke deſired him to examine the manuſcripts in the oriental languages, to ſelect the beſt of them, and to mark the price; which being done, that generous prince purchaſed them, and made him a preſent of them. M. Colbert being at length informed of Herbelot's merit, recalled him to Paris, and obtained a penſion for him of one thouſand five hundred livres: he afterwards became ſecretary and interpreter of the oriental languages, and royal profeſſor of the Syriac tongue. He died at Paris in 1695. His principal work is intitled *Bibliotheque Orientale*, which he firſt wrote in Arabic, and afterwards tranſlated into French. It is greatly eſteemed. M. Herbelot's modeſty was equal to his erudition; and his uncommon abilities were accompanied with the utmoſt probity, piety, and charity, which he practiſed through the whole courſe of his life.

HERBERT (Mary), counteſs of Pembroke, was ſiſter of the famous Sir Philip Sidney, and wife of Henry earl of Pembroke. She was not only a lover of the muſes, but a great encourager of polite literature; a character not very common among ladies. Her brother dedicated his incomparable romance *Arcadia* to her, from which circumſtance it hath been called *The counteſs of Pembroke's Arcadia*. She tranſlated a dramatic piece from the French, intitled *Antonius*, a tragedy; though it is ſaid ſhe was aſſiſted by her lord's chaplain, Dr Babington, afterwards biſhop of Exeter. She alſo turned the pſalms of David into Engliſh metre; but it is doubtful whether theſe works were ever printed. She died in 1621; and an exalted character of her is to be found in Francis Oſborne's memoirs of king James I.

HERBERT (Edward), lord Herbert of Cherbury in Shropeſhire, an eminent Engliſh writer, was born in 1581, and educated at Oxford; after which he travelled, and at his return was made knight of the Bath. James I. ſent him embaſſador to Lewis XIII. in behalf of the Proteſtants who were beſieged in ſeveral cities of France; and continued in this ſtation till he was recalled, on account of a diſpute between him and the conſtable de Luines. In 1625 he was advanced to the dignity of a baron in the kingdom of Ireland, by the title of lord Herbert of Caſtle Iſland; and in 1631 to that of lord Herbert of Cherbury in Shropſhire. After the breaking out of the civil wars, he adhered to the parliament; and, in 1644, obtained a penſion, on account of his having been plundered by the king's forces. He wrote a hiſtory of the life and reign of Henry VIII. which was greatly admired; a treatiſe *de veritate*; and ſeveral other works. He died at London in 1648.

"Lord Herbert," ſays Mr Granger, "ſtands in the firſt rank of the public miniſters, hiſtorians, and philoſophers, of his age. It is hard to ſay whether his perſon, his underſtanding, or his courage, was the moſt extraordinary; as the fair, the learned, and the brave, held him in equal admiration. But the ſame man was wiſe and capricious; redreſſed wrongs, and quarrelled for punctilios; hated bigotry in religion, and was himſelf a bigot to philoſophy. He expoſed himſelf to ſuch dangers, as other men of courage would have carefully declined; and called in queſtion the fundamentals of a religion which none had the hardineſs to diſpute beſides himſelf."

Herbert (George), an Engliſh poet and divine, was brother to the preceding. He was born in 1593, and educated at Cambridge. In 1619 he was choſen public orator of that univerſity, and afterwards obtained a ſinecure from the king. In 1626 he was collated to the prebend of Layton Eccleſia, in the dioceſe of Lincoln; and in 1630 was inducted into the rectory of Bamerton, near Sarum. The great lord Bacon had ſuch an opinion of his judgment, that he would not ſuffer his works to be printed before they had paſſed his examination. He wrote a volume of devout poems called *The Temple*, and another intitled *The prieſt of the temple*. This pious divine died about the year 1635.

Herbert (Sir Thomas), an eminent gentleman of the Pembroke family, was born at York, where his father was an alderman. William earl of Pembroke ſent him to travel at his expence in 1626, and he ſpent four years in viſiting Aſia and Africa: his expectations of preferment ending with the death of the earl, he went abroad again, and travelled over ſeveral parts of Europe. In 1634, he publiſhed, in folio, A relation of ſome years travel into Africa and the Great Aſia, eſpecially the territories of the Perſian monarchy, and ſome parts of the oriental Indies, and iſles adjacent. On the breaking out of the civil war, he adhered to the parliament; and at Oldenby, on the removal of the king's ſervants, by deſire of the commiſſioners from the parliament, he and James Harrington were retained as grooms of his bed-chamber, and attended him even to the block. At the reſtoration he was created a baronet by Charles II. for his faithful ſervices to his father during his two laſt years. In 1678 he wrote *Threnodia Carolina*, containing an account of the two laſt years of the life of Charles I. and he aſſiſted Sir William Dugdale in compiling the third volume of his *Monaſticon Anglicanum*. He died at York in 1682, leaving ſeveral MSS to the public library at Oxford, and others to that of the cathedral at York.

HERBIVOROUS animals, thoſe which feed only on vegetables.

HERCULANEUM, a city of Naples, ſwallowed up by an earthquake in the reign of the emperor Titus, at the ſame time that there was an eruption of Mount Veſuvius: or rather it was overwhelmed with the aſhes, ſulphur, and other matter thrown out of that mountain, to the depth of eighty feet, and in ſome places of more

Herculaneum, Hercules.

than a hundred ; as appears from the whole earth thereabouts being made up of the matter which has been diſgorged from the mountain, and all the houſes which have appeared hitherto ſtand perfectly upright, which could not be the caſe if this diſaſter had happened from an earthquake. According to Strabo, one ſide of this ancient city was waſhed by the ſea, and lay expoſed to the ſouth-weſt wind, which rendered it a very ſalutary and agreeable place to dwell in. There have been ſeveral attempts to open a paſſage to it : and about a hundred years ſince, a private gentleman found means to get out as much treaſure, of one ſort or other, as he ſold for eighteen thouſand pounds ; but one of his companions betraying him to the government, his effects were ſeized, and he was forced to fly into Germany. In 1738, this place was again examined, by order of the government : and ſome years ago they ſunk a new paſſage into the higher part of the city, and when they were got to the level of the town, came to a broad and open ſquare, partly natural, and partly made by the workmen ; and round this they have broken in to ſeveral fine apartments, and in one place into a whole ſtreet. In this ſquare they found various antiquities, which ſhew the magnificence of the ancients. One room was lined with moſt beautiful purple and white marble, in regular pannels, each of which was edged with a black and gold-coloured marble, and ſurrounded with another of blue, green, white, and purple. The fineſt rooms were all covered with paintings, which are ſtill extremely beautiful. In the niches there were ſtatues, exquiſitely carved ; particularly a Juno of a blueiſh white marble, the folding of whoſe robes, at a ſmall diſtance, would be taken for real linen. The expreſſion of the face is much beyond any thing of the kind that has been lately ſeen. Among the paintings there is a Prometheus chained to a rock, and a large bird feeding upon his liver ; and the whole is executed with ſo much beauty and majeſty, that it exceeds all deſcription. The figure is eight feet in length, and the muſcles are expreſſed with ſurprizing art. The plumage of the bird ſeems to be looſe and trembling, as in expectation of a feaſt ; and the fierceneſs of its eye is very remarkable. This indeed is a horrible portrait ; but that of Semele melting into tranſport at the ſight of Jupiter, is all ſoftneſs. There are a multitude of other figures, many of which are not underſtood. However, there is a repreſentation of the public ſhow of beaſts, where ſome of the animals are painted in a ſurpriſing manner ; as for inſtance, a dying tyger, the nobleſt performance of the kind ever executed. There is likewiſe the death of Achilles, in which the paſſions are well expreſſed, and a concealed joy in the face of Polixena that nothing can come up to. There have been likewiſe found a great many of the utenſils and inſtruments formerly uſed among the Romans ; and many manuſcripts, which are greatly decayed, and much art and care has been uſed to render them legible.—Theſe manuſcripts were thought to be the moſt valuable of all the curioſities which had been diſcovered ; and it was hoped that by their means ſome defects in ancient hiſtory might have been ſupplied ; but nothing of that kind hath been yet accompliſhed.

HERCULES, in fabulous hiſtory, a moſt renowned Grecian hero, ſaid to have been born at Thebes about the year 1280 B. C. He is reported to have been the ſon of Jupiter by Alcmena (wife to Amphitryon king of Argos), whom Jupiter enjoyed in the ſhape of her huſband while he was abſent ; and in order to add the greater ſtrength to the child, made that amorous night as long as three. Amphitryon having ſoon after accidentally killed his uncle and father-in-law Electryon, was obliged to fly to Thebes, where Hercules was born. The jealouſy of Juno, on account of her huſband's amour with Alcmena, prompted her to deſtroy the infant. For this purpoſe ſhe ſent two ſerpents to kill him in the cradle, but young Hercules ſtrangled them both. As he grew up, he diſcovered ſuch extraordinary ſtrength and fierceneſs, that he was ſent to be brought up among ſome ſhepherds, where he killed a lion before he was eighteen years of age.

Hercules.

Euriſtheus, the ſon of Amphitryon, having ſucceeded his father, ſoon became jealous of Hercules ; and fearing leſt he might by him be deprived of his crown, left no means untried to get rid of him. Of this Hercules was not inſenſible, becauſe he was perpetually engaging him on ſome deſperate expedition ; and therefore went to conſult the oracle. But being anſwered that it was the pleaſure of the gods that he ſhould ſerve Euriſtheus 12 years, he fell into a deep melancholy, which at laſt ended in a furious madneſs ; duing which, among other deſperate actions, he put away his wife Megara, and murdered all the children he had by her. As an expiation of this crime, the king impoſed upon him twelve labours ſurpaſſing the power of all other mortals to accompliſh, which nevertheleſs our hero performed with great eaſe.

The firſt labour impoſed upon him was the killing of a lion in Nemea, a wood of Achaia ; whoſe hide was proof againſt any weapon, ſo that he was forced to ſeize him by the throat and ſtrangle him ; in memory of which he afterwards wore his ſkin about his ſhoulders.

In the ſecond, he killed the Hydra ; a monſter with two heads, one of which was no ſooner cut off, than two ſprung up in its room.

In the third, he brought the Erymanthian boar alive upon his ſhoulders ; at the ſight of which the king is ſaid to have been ſo frighted, that he ran and hid himſelf in a brazen hogſhead. It was likewiſe in this expedition that he overcame the famous Centaurs.

In his fourth, he caught a hart with golden horns, and of prodigious ſwiftneſs.

In his fifth labour, he was commanded to cleanſe Augeas's ſtable in one day, which he did by turning the river Alpheus into it. See AUGEAS.

In the ſixth he chaſed away the miſchievous birds of the lake Stymphalis, who are feigned to have lived upon human fleſh, and to have been at length deſtroyed by Hercules's arrows, or, according to others, to have been only ſcared away from thence.

His ſeventh was to fetch a famous bull from the iſle of Crete, with which Paſiphäe the wife of Minos is ſaid to have fallen in love. In this expedition, having helped Jupiter to overcome the Titanic giants, he reconciled Prometheus to him, and looſed him from mount Caucaſus.

The eighth was to fetch the mares of Diomedes out of Thrace, which were tied with iron-chains to brazen

zen mangers, and were fed with the fleſh of the ſtrangers that paſſed by that way. Hercules firſt threw their inhuman maſter to be devoured by them; and then brought the mares to Euryſtheus, who dedicated them to Juno. Their breed is ſaid to have continued till Alexander's time.

In the ninth he fetched away the girdle of the queen of the Amazons: and,

In the tenth, the oxen of Geryon out of Iberia, or Spain; in the furtheſt parts of which he erected his two pillars, as the utmoſt limits of the then known world. Theſe ten labours he atchieved, as the fable ſays, in about eight years. In this expedition he is likewiſe affirmed to have killed Antæus, a famous giant of a monſtrous ſize, who, when weary with wreſtling or labour, was immediately refreſhed by touching the earth. Pliny makes him the founder of Tangier. Hercules overcame him in wreſtling, and ſlew him; and after him the tyrant Buſiris in his way through Egypt. This bloody man uſed to ſacrifice all his gueſts and ſtrangers upon his altars; and deſigning to have done the ſame by Hercules, was ſlain by him, together with all his attendants.

His two laſt taſks were fetching Cerberus out of hell, and carrying away the Heſperian golden apples kept by a dragon; which laſt is interpreted to have been ſome fine herd of cattle kept by a ſtrong man, and brought out of Africa to the king.

Many other exploits are ſaid to have been performed by Hercules; the laſt of which was againſt Eurytus king Oechalia, who refuſed to give him Iöle his daughter, whom he had won by ſhooting againſt him and his ſons. Upon this he ſlew him and his ſons, and carried off his daughter with him. Coming ſoon after to the Cenæan promontory in Eubœa, to offer ſome ſacrifice there, he ſent his ſervant Lychas to Trachin, to his wife Dejanira, for the ſhirt and coat in which he uſed to perform that ceremony.

This princeſs had ſome time before been attempted by the centaur Neſſus, as he was ferrying her over the river Euenus; and Hercules beholding it from the ſhore, had given him a mortal wound with an arrow. The monſter finding himſelf dying, adviſed her to mix ſome oil with the blood which flowed from his wound, and to anoint her huſband's ſhirt with it, pretending that it would infallibly ſecure him from loving any other woman; and ſhe, too well appriſed of his inconſtancy, had actually prepared the poiſoned ointment accordingly.

Lychas coming to her for the garments, unfortunately acquainted her with his having brought away Iöle; upon which ſhe, in a fit of jealouſy, anointed his ſhirt with the fatal mixture. This had no ſooner touched his body, than he felt the poiſon diffuſe itſelf through all his veins; the violent pain of which cauſed him to diſband his army, and to return to Trachin. His torment ſtill increaſing, he ſent to conſult the oracle for a cure; and was anſwered that he ſhould cauſe himſelf to be conveyed to mount Oeta, and there rear up a great pile of wood, and leave the reſt to Jupiter.

By the time he had obeyed the oracle, his pains being become intolerable, he dreſſed himſelf in his martial habit, flung himſelf upon the pile, and deſired the by-ſtanders to ſet fire to it; others ſay that he left the charge of it to his ſon Philoctetes, who having performed his father's command, had his bow and arrows given him as a reward for his obedience. At the ſame time Jupiter, to be as good as his word, ſent a flaſh of lightning, which conſumed both the pile and the hero; inſomuch that Ioläus, coming to take up his bones, found nothing but aſhes; from which they concluded that he was paſſed from earth to heaven, and joined to the gods.

Hercules, in aſtronomy. See there, n° 206.

Hercules'*s Pillars*, in antiquity, a name given to mount Calpe in Spain, near Gibraltar; and mount Avila on the African ſide.

HERCYNIA silva, (anc. geog.) the largeſt of foreſts. Its breadth was a journey of nine days to the beſt traveller. Taking its riſe at the limits of the Helvetii, Nemetes, and Rauraci, it run along the Danube to the borders of the Daci and Anartes, a length of 60 days journey, according to Cæſar, who appears to have been well acquainted with its true breadth, ſeeing it occupied all Lower Germany. It may therefore be conſidered as covering the whole of Germany; and moſt of the other foreſts may be conſidered as parts of it, though diſtinguiſhed by particular names: conſequently the Hartz, in the duchy of Brunſwic, which gave name to the whole, may be conſidered as one of its parts. The name *Hartz* denotes "reſinous," or "pine-trees." By the Greeks it is called *Orcynius*, as a name common to all the foreſts in Germany; in the ſame manner as *Hercynius* was the name given by the Romans; and both from the German *Hartz*.

HERD, among hunters, an aſſemblage of black or fallow beaſts, in contradiſtinction to *flock*. See Flock.—In the hunting language there are various terms uſed for companies of the divers kinds of game. We ſay a *herd* of harts or bucks, a *bevy* of roes, a *rout* of wolves, a *richeſs* of martens, &c.

HEREDITAMENTS, whatever moveable things a perſon may have to himſelf and his heirs by way of inheritance; and which, if not otherwiſe bequeathed, deſcend to him who is next heir, and not to the executor as chattels do.

HEREDITARY, an appellation given to whatever belongs to a family by right of ſucceſſion from heir to heir.

Hereditary is alſo figuratively applied to good or ill qualities ſuppoſed to be tranſmitted from father to ſon: thus we ſay virtue and piety are hereditary qualities in ſuch a family; and that in Italy the hatred of families is hereditary. And indeed the gout, king's evil, madneſs, &c. may really be hereditary diſeaſes.

Hereditary *Right*. The grand fundamental maxim upon which the *jus coronæ*, or right of ſucceſſion to the throne of theſe kingdoms, depends, Sir William Blackſtone takes to be this: "That the crown is, by common law and conſtitutional cuſtom, hereditary; and this in a manner peculiar to itſelf: but that the right of inheritance may from time to time be changed or limited by act parliament; under which limitations the crown ſtill continues hereditary."

1. The crown is in general hereditary, or deſcendible to the next heir, on the death or demiſe of the laſt proprietor. All regal governments muſt be either he-

reditary or elective : and as there is no inſtance wherein the crown of England has ever been aſſerted to be elective, except by the regicides at the infamous and unparallelled trial of king Charles I. it muſt of conſequence be hereditary. Yet in thus aſſerting an hereditary right, a *jure divino* title to the throne is by no means intended. Such a title may be allowed to have ſubſiſted under the theocratic eſtabliſhments of the children of Iſrael in Paleſtine: but it never yet ſubſiſted in any other country; ſave only ſo far as kingdoms, like other human fabrics, are ſubject to the general and ordinary diſpenſations of Providence. Nor indeed have a *jure divino* and an hereditary right any neceſſary connexion with each other; as ſome have very weakly imagined. The titles of David and Jehu were equally *jure divino* as thoſe of either Solomon or Ahab; and yet David ſlew the ſons of his predeceſſor, and Jehu his predeceſſor himſelf. And when our kings have the ſame warrant as they had, whether it be to ſit upon the throne of their fathers, or to deſtroy the houſe of the preceding ſovereign, they will then, and not before, poſſeſs the crown of England by a right like theirs, immediately derived from heaven. The hereditary right, which the laws of England acknowledge, owes its origin to the founders of our conſtitution, and to them only. It has no relation to, nor depends upon, the civil laws of the Jews, the Greeks, the Romans, or any other nation upon earth; the municipal laws of one ſociety having no connexion with, or influence upon, the fundamental polity of another. The founders of our Engliſh monarchy might perhaps, if they had thought proper, have made it an elective monarchy; but they rather choſe, and upon good reaſon, to eſtabliſh originally a ſucceſſion by inheritance. This has been acquieſced in by general conſent, and ripened by degrees into common law; the very ſame title that every private man has to his own eſtate. Lands are not naturally deſcendible, any more than thrones: but the law has thought proper, for the benefit and peace of the public, to eſtabliſh hereditary ſucceſſion in the one as well as the other.

It muſt be owned, an elective monarchy ſeems to be the moſt obvious, and beſt ſuited of any to the rational principles of government, and the freedom of human nature: and accordingly we find from hiſtory, that, in the infancy and firſt rudiments of almoſt every ſtate, the leader, chief magiſtrate, or prince, hath uſually been elective. And, if the individuals who compoſe that ſtate could always continue true to firſt principles, uninfluenced by paſſion or prejudice, unaſſailed by corruption, and unawed by violence, elective ſucceſſion were as much to be deſired in a kingdom, as in other inferior communities. The beſt, the wiſeſt, and the braveſt man would then be ſure of receiving that crown, which his endowments have merited; and the ſenſe of an unbiaſſed majority would be dutifully acquieſced in by the few who were of different opinions. But hiſtory and obſervation will inform us, that elections of every kind (in the preſent ſtate of human nature) are too frequently brought about by influence, partiality, and artifice: and, even where the caſe is otherwiſe, theſe practices will be often ſuſpected, and as conſtantly charged upon the ſucceſsful, by a ſplenetic diſappointed minority. This is an evil to which all ſocieties are liable; as well thoſe of a private and domeſtic kind, as the great community of the public, which regulates and includes the reſt. But in the former there is this advantage, That ſuch ſuſpicions, if falſe, proceed no farther than jealouſies and murmurs, which time will effectually ſuppreſs; and, if true, the injuſtice may be remedied by legal means, by an appeal to thoſe tribunals to which every member of ſociety has (by becoming ſuch) virtually engaged to ſubmit. Whereas, in the great and independent ſociety, which every nation compoſes, there is no ſuperior to reſort to but the law of nature; no method to redreſs the infringements of that law, but the actual exertion of private force. As therefore between two nations, complaining of mutual injuries, the quarrel can only be decided by the law of arms; ſo in one and the ſame nation, when the fundamental principles of their common union are ſuppoſed to be invaded, and more eſpecially when the appointment of their chief magiſtrate is alleged to be unduly made, the only tribunal to which the complainants can appeal is that of the God of battles, the only proceſs by which the appeal can be carried on is that of a civil and inteſtine war. An hereditary ſucceſſion to the crown is therefore now eſtabliſhed, in this and moſt other countries, in order to prevent that periodical bloodſhed and miſery, which the hiſtory of ancient imperial Rome, and the more modern experience of Poland and Germany, may ſhew us are the conſequences of elective kingdoms.

2. But, ſecondly, as to the particular mode of inheritance, It in general correſponds with the feodal path of deſcents, chalked out by the common law in the ſucceſſion to landed eſtates; yet with one or two material exceptions. Like them, the crown will deſcend lineally to the iſſue of the reigning monarch; as it did from king John to Richard II. through a regular pedigree of ſix lineal generations: As in them the preference of males to females, and the right of primogeniture among the males, are ſtrictly adhered to. Thus Edward V. ſucceeded to the crown, in preference to Richard his younger brother, and Elizabeth his elder ſiſter. Like them, on failure of the male line, it deſcends to the iſſue female; according to the ancient Britiſh cuſtom remarked by Tacitus, *Solent fœminarum ductu bellare, et ſexum in imperiis non diſcernere.* Thus Mary I. ſucceeded to Edward VI.; and the line of Margaret queen of Scots, the daughter of Henry VII. ſucceeded, on failure of the line of Henry VIII., his ſon. But among the females, the crown deſcends by right of primogeniture to the eldeſt daughter only and her iſſue; and not, as in common inheritances, to all the daughters at once; the evident neceſſity of a ſole ſucceſſion to the throne having occaſioned the royal law of deſcents to depart from the common law in this reſpect: and therefore queen Mary, on the death of her brother, ſucceeded to the crown alone, and not in partnerſhip with her ſiſter Elizabeth. Again, the doctrine of repreſentation prevails in the deſcent of the crown, as it does in other inheritances; whereby the lineal deſcendants of any perſon deceaſed ſtand in the ſame place as their anceſtor, if living, would have done. Thus Richard II. ſucceeded his grandfather Edward III. in right of his father the black prince; to the excluſion of all his uncles, his grandfather's younger children. Laſtly,

on failure of lineal deſcendants, the crown goes to the next collateral relations of the late king; provided they are lineally deſcended from the blood-royal, that is, from that royal ſtock which originally acquired the crown. Thus Henry I. ſucceeded to William II. John to Richard I. and James I. to Elizabeth; being all derived from the Conqueror, who was then the only regal ſtock. But herein there is no objection (as in the caſe of common deſcents) to the ſucceſſion of a brother, an uncle, or other collateral relation, of the *half*-blood; that is, where the relationſhip proceeds not from the ſame *couple* of anceſtors, (which conſtitutes a kinſman of the *whole* blood), but from a *ſingle* anceſtor only; as when two perſons are derived from the ſame father, and not from the ſame mother, or *vice verſa*: provided only, that the one anceſtor, from whom both are deſcended, be that from whoſe veins the blood-royal is communicated to each. Thus Mary I. inherited to Edward VI. and Elizabeth inherited to Mary; all born of the ſame father, king Henry VIII. but all by different mothers. See the articles CONSANGUINITY, DESCENT, and SUCCESSION.

3. The doctrine of *hereditary* right does by no means imply an *indefeaſible* right to the throne. No man will aſſert this, who has conſidered our laws, conſtitution, and hiſtory, without prejudice, and with any degree of attention. It is unqueſtionably in the breaſt of the ſupreme legiſlative authority of this kingdom, the king and both houſes of parliament, to defeat this hereditary right; and, by particular entails, limitations, and proviſions, to exclude the immediate heir, and veſt the inheritance in any one elſe. This is ſtrictly conſonant to our laws and conſtitution; as may be gathered from the expreſſion ſo frequently uſed in our ſtatute-book, of "the king's majeſty, his heirs, and ſucceſſors." In which we may obſerve, that as the word *heirs* neceſſarily implies an inheritance or hereditary right generally ſubſiſting in the royal perſon; ſo the word *ſucceſſors*, diſtinctly taken, muſt imply that this inheritance may ſometimes be broken through; or, that there may be a ſucceſſor, without being the heir of the king. And this is ſo extremely reaſonable, that without ſuch a power, lodged ſomewhere, our polity would be very defective. For, let us barely ſuppoſe ſo melancholy a caſe, as that the heir-apparent ſhould be a lunatic, an idiot, or otherwiſe incapable of reigning; how miſerable would the condition of the nation be, if he were alſo incapable of being ſet aſide! —It is therefore neceſſary that this power ſhould be lodged ſomewhere; and yet the inheritance and regal dignity would be very precarious indeed, if this power were *expreſsly* and *avowedly* lodged in the hands of the ſubject only, to be exerted whenever prejudice, caprice, or diſcontent, ſhould happen to take the lead. Conſequently it can nowhere be ſo properly lodged, as in the two houſes of parliament, by and with the conſent of the reigning king; who, it is not to be ſuppoſed, will agree to any thing improperly prejudicial to the rights of his own deſcendants. And therefore in the king, lords, and commons, in parliament aſſembled, our laws have expreſsly lodged it.

4. But, fourthly, However the crown may be limited or transferred, it ſtill retains its deſcendible quality, and becomes hereditary in the wearer of it. And hence in our law the king is ſaid never to die in his political capacity; though, in common with other men, he is ſubject to mortality in his natural: becauſe immediately upon the natural death of Henry, William, or Edward, the king ſurvives in his ſucceſſor. For the right of the crown veſts, *eo inſtanti*, upon his heir; either the *hæres natus*, if the courſe of deſcent remains unimpeached, or the *hæres factus*, if the inheritance be under any particular ſettlement. So that there can be no *interregnum*; but, as Sir Matthew Hale obſerves, the right of ſovereignty is fully inveſted in the ſucceſſor by the very deſcent of the crown. And therefore, however acquired, it becomes in him abſolutely hereditary, unleſs by the rules of the limitation it is otherwiſe ordered and determined: In the ſame manner as landed eſtates, to continue our former compariſon, are by the law hereditary, or deſcendible to the heirs of the owner; but ſtill there exiſts a power, by which the property of thoſe lands may be tranſferred to another perſon. If this transfer be made ſimply and abſolutely, the lands will be hereditary in the new owner, and deſcend to his heir at law: but if the transfer be clogged with any limitations, conditions, or entails, the lands muſt deſcend in that channel, ſo limited and preſcribed, and no other. See SUCCESSION.

HEREDITAS JACENS, in Scots law. An eſtate is ſaid to be *in hereditate jacente*, after the proprietor's death till the heir's entry.

HEREFORD, which in Saxon ſignifies *the ford of the army*, the capital of Herefordſhire in England, ſituated in W. Lon. 2. 35. N. Lat. 52. 6. It is ſuppoſed to have riſen out of the ruins of Kencheſter, in its neighbourhood, which Cambden believes to have been the *Ariconium* of Antoninus. It is very pleaſantly ſituated among meadows and corn-fields, and is almoſt encompaſſed with rivers. It ſeems to have owed its riſe, or at leaſt its increaſe, to the building and dedicating a church there to Ethelbert king of the Eaſt-Angles, who was murdered in the neighbourhood and afterwards taken into the catalogue of martyrs; ſoon after it became a biſhop's ſee, and in conſequence of that a conſiderable place. In 1055 it was ſacked, the cathedral deſtroyed, and its biſhop Leofgar carried away captive by Gryffin prince of South-Wales, and Algar, an Engliſhman, who had rebelled againſt Edward the Confeſſor. Harold fortified it with a broad and high rampart; and it appears by Doomſday-book, that there were no more than 300 men within and without the wall. A very large and ſtrong caſtle was built by the Normans along the Wye, and the city walled round. The preſent ſtately cathedral was founded in the reign of Henry I. by biſhop Reinelm, but enlarged and beautified by his ſucceſſors. It ſuffered much in the barons wars; and was often taken and retaken in the war between king Charles I. and the parliament. This city is pretty large, and had once ſix churches; but two were deſtroyed in the civil wars. It is not very populous nor well built, many of the houſes being old. Its manufactures are gloves and other leathern goods; and its corporation conſiſts of a mayor, ſix aldermen, a high-ſteward, deputy ſteward, and town-clerk, who have a ſword-bearer, and four ſerjeants at mace. Each of the companies enjoys diſtinct laws and privileges by their charter, and each has its hall. The city gave long the title of *earl* to the noble family of the Bohuns; then of *duke* to Henry of Lancaſter, afterwards Henry IV. king of England; after him, of *earl* to Stafford, earl of Buckingham; then of *viſcount* to D'Evereux, earl of Eſſex, which a collateral branch of this family ſtill enjoys, and is thereby the premier viſcount of England.

Herefordshire, a county of England, nearly of a circular form, bounded on the eaſt by Worceſter and Glouceſter, on the ſouth by Monmouthſhire, on the weſt by Radnorſhire and Brecknockſhire, and on the north by Shropſhire. Its length from north to ſouth is 35 miles, its breadth from eaſt to weſt 30, and its circumference 108. It contains 660,000 acres, 11 hundreds, one city, eight market-towns, 176 pariſhes, and 95,000 inhabitants. The members it ſends to parliament are eight, namely, two for the county, two for Hereford city, two for Lempſter, and two for Weobly.

The air of this county is allowed to be as pleaſant, ſweet, and wholeſome, as that of any other in England, there being nothing either in the ſoil or ſituation to render it otherwiſe. The ſoil throughout is excellent, and inferior to none, either for grain, fruit, or paſture, ſupplying the inhabitants plentifully with all the neceſſaries of life: but that by which it is diſtinguiſhed from moſt others, is its fruit, eſpecially apples, of which it produces ſuch quantities, that the cyder made of them is not only ſufficient for their own conſumption, though it is their ordinary drink, but alſo in a great meaſure for that of London and other parts. That in particular which is made from the apple called *redſtreak*, is much admired, and has a body almoſt equal to that of white-wine. The county is well ſupplied with wood and water; for, beſides leſſer ſtreams, there are the rivers Frome, Loden, Lug, Wye, Wadel, Arrow, Dare, and Monow; the laſt of which is large, and all of them are well ſtored with fiſh, particularly the Wye, which breeds ſalmon. It lies in the dioceſe of Hereford, and Oxford circuit.

HERENHAUSEN, a palace of Germany near Hanover, belonging to the king of Great Britain. Here are lodgings for all the court; and a garden of vaſt extent, in which are fine waterworks, a labyrinth, and many other curioſities worthy the obſervation of a traveller.

HERENTHALS, a town of Brabant in the Auſtrian Netherlands, in the quarter of Antwerp; ſeated on the river Nethe, in E. Long. 4. 51. N. Lat. 51. 9.

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ment.

HERESY, in law, an offence againſt Chriſtianity, conſiſting in a denial of ſome of its eſſential doctrines, publicly and obſtinately avowed; being defined, "*ſententia rerum divinarum humano ſenſu excogitata, palam docta et pertinaciter defenſa*." And here it muſt alſo be acknowledged that particular modes of belief or unbelief, not tending to overturn Chriſtianity itſelf, or to ſap the foundations of morality, are by no means the object of coercion by the civil magiſtrate. What doctrines ſhall therefore be adjudged hereſy, was left by our old conſtitution to the determination of the eccleſiaſtical judge; who had herein a moſt arbitrary latitude allowed him. For the general definition of an heretic given by Lyndewode, extends to the ſmalleſt deviations from the doctrines of holy church: "*hæreticus eſt qui dubitat de fide catholica, et qui negligit ſervare ea, quæ Romana eccleſia ſtatuit, ſeu ſervare decreverat.*" Or, as the ſtatute 2 Hen. IV. c. 15. expreſſes it in Engliſh, "teachers of erroneous opinions, contrary to the faith and bleſſed determinations of the holy church." Very contrary this to the uſage of the firſt general councils, which defined all heretical doctrines with the utmoſt preciſion and exactneſs. And what ought to have alleviated the puniſhment, the uncertainty of the crime, ſeems to have enhanced it in thoſe days of blind zeal and pious cruelty. It is true, that the ſanctimonious hypocriſy of the canoniſts went at firſt no farther than enjoining penance, excommunication, and eccleſiaſtical deprivation, for hereſy; tho' afterwards they proceeded boldly to impriſonment by the ordinary, and confiſcation of goods *in pios uſus*. But in the mean time they had prevailed upon the weakneſs of bigotted princes to make the civil power ſubſervient to their purpoſes, by making hereſy not only a temporal, but even a capital, offence: the Romiſh eccleſiaſtics determining, without appeal, whatever they pleaſed to be hereſy, and ſhifting off to the ſecular arm the odium and drudgery of executions; with which they themſelves were too tender and delicate to intermeddle. Nay, they pretended to intercede and pray, on behalf of the convicted heretic, *ut citra mortis periculum ſententia circa eum moderetur*: well knowing that at the ſame time they were delivering the unhappy victim to certain death. Hence the capital puniſhments inflicted on the ancient Donatiſts and Manichæans by the emperors Theodoſius and Juſtinian: hence alſo the conſtitution of the emperor Frederic mentioned by Lyndewode, adjudging all perſons without diſtinction to be burnt with fire who were convicted of hereſy by the eccleſiaſtical judge. The ſame emperor, in another conſtitution, ordained, that if any temporal lord, when admoniſhed by the church, ſhould neglect to clear his territories of heretics within a year, it ſhould be lawful for good catholics to ſeiſe and occupy the lands, and utterly to exterminate the heretical poſſeſſors. And upon this foundation was built that arbitrary power, ſo long claimed and ſo fatally exerted by the Pope, of diſpoſing even of the kingdoms of refractory princes to more dutiful ſons of the church. The immediate event of this conſtitution was ſomething ſingular, and may ſerve to illuſtrate at once the gratitude of the holy ſee, and the juſt puniſhment of the royal bigot; for, upon the authority of this very conſtitution, the pope afterwards expelled this very emperor Frederic from his kingdom of Sicily, and gave it to Charles of Anjou.

Chriſtianity being thus deformed by the dæmon of perſecution upon the continent, we cannot expect that our own iſland ſhould be entirely free from the ſame ſcourge. And therefore we find among our ancient precedents a writ *de hæretico comburendo*, which is thought by ſome to be as ancient as the common law itſelf. However, it appears from thence, that the conviction of hereſy by the common law was not in any petty eccleſiaſtical court, but before the archbiſhop himſelf in a provincial ſynod; and that the delinquent was delivered over to the king to do as he ſhould pleaſe with him: ſo that the crown had a controul over the ſpiritual power, and might pardon the convict by iſſuing no proceſs againſt him; the writ *de hæretico comburendo* being not a writ of courſe, but iſſuing only by the ſpecial direction of the king in council.

But in the reign of Henry IV. when the eyes of the Chriſtian world began to open, and the ſeeds of the Proteſtant religion (though under the opprobious name of *lollardy*) took root in this kingdom; the clergy, taking advantage from the king's dubious title to demand an increaſe of their own power, obtained an act of parliament, which ſharpened the edge of perſecution to its utmoſt keenneſs. For, by that ſtatute, the dioceſan alone, without the intervention of a ſynod, might convict of heretical tenets; and unleſs the convict abjured his opinions, or if after abjuration he relapſed, the ſheriff was bound *ex officio*, if required by the biſhop, to commit the unhappy victim to the flames, without waiting for the conſent of the crown. By the ſtatute 2 Hen. V. c. 7. lollardy was alſo made a temporal offence, and indictable in the king's courts; which did not thereby gain an excluſive, but only a concurrent juriſdiction with the biſhop's conſiſtory.

Afterwards, when the final reformation of religion began to advance, the power of the eccleſiaſtics was ſomewhat moderated: for though what hereſy *is*, was not then preciſely defined, yet we are told in ſome points what it *is not:* the ſtatute 25 Hen. VIII. c. 14. declaring, that offences againſt the ſee of Rome are not hereſy; and the ordinary being thereby reſtrained from proceeding in any caſe upon mere ſuſpicion; that is, unleſs the party be accuſed by two credible witneſſes, or an indictment of hereſy be firſt previouſly found in the king's courts of common law. And yet the ſpirit of perſecution was not then abated, but only diverted into a lay channel. For in ſix years afterwards, by ſtatute 31 Hen. VIII. c. 14. the bloody law of the ſix articles was made, which eſtabliſhed the ſix moſt conteſted points of popery, tranſubſtantiation, communion in one kind, the celibacy of the clergy, monaſtic vows, the ſacrifice of the maſs, and auricular confeſſion; which points were "determined and reſolved by the moſt godly ſtudy, pain, and travail of his majeſty: for which his moſt humble and obedient ſubjects, the lords *ſpiritual* and temporal and the commons, in parliament aſſembled, did not only render and give unto his highneſs their moſt high and hearty thanks;" but did alſo enact and declare all oppugners of the firſt to be heretics, and to be burnt with fire; and of the five laſt to be felons, and to ſuffer death. The ſame ſtatute eſtabliſhed a new and mixed juriſdiction of clergy and laity for the trial and conviction of heretics; the reigning prince being then equally intent on deſtroying the ſupremacy of the biſhops of Rome, and eſtabliſhing all other their corruptions of the Chriſtian religion.

Without perplexing this detail with the various repeals and revivals of theſe ſanguinary laws in the two ſucceeding reigns, let us proceed to the reign of queen Elizabeth; when the reformation was finally eſtabliſhed with temper and decency, unſullied with party-rancour, or perſonal caprice and reſentment. By ſtatute 1 Eliz. c. 1. all former ſtatutes relating to hereſy are repealed, which leaves the juriſdiction of hereſy as it ſtood at common law; *viz.* as to the infliction of common cenſures, in the eccleſiaſtical courts; and, in caſe of burning the heretic, in the provincial ſynod only. Sir Matthew Hale is indeed of a different opinion, and holds that ſuch power reſided in the dioceſan alſo; tho' he agrees, that in either caſe the writ *de hæretico comburendo* was not demandable of common right, but grantable or otherwiſe merely at the king's diſcretion. But the principal point now gained was, that by this ſtatute a boundary is for the firſt time ſet to what ſhall be accounted hereſy; nothing for the future being to be ſo determined, but only ſuch tenets, which have been heretofore ſo declared, 1. By the words of the canonical ſcriptures; 2. By the firſt four general councils, or ſuch others as have only uſed the words of the holy Scriptures; or, 3. Which ſhall hereafter be ſo declared by the parliament, with the aſſent of the clergy in convocation. Thus was hereſy reduced to a greater certainty than before; though it might not have been the worſe to have defined it in terms ſtill more preciſe and particular: as a man continued ſtill liable to be burnt, for what perhaps he did not underſtand to be hereſy, till the eccleſiaſtical judge ſo interpreted the words of the canonical ſcriptures.

For the writ *de hæretico comburendo* remained ſtill in force; and we have inſtances of its being put in execution upon two Anabaptiſts in the ſeventeenth of Elizabeth, and two Arians in the ninth of James I. But it was totally aboliſhed, and hereſy again ſubjected only to eccleſiaſtical correction, *pro ſalute animæ*, by virtue of the ſtatute 29 Car. II. c. 9.: for, in one and the ſame reign, our lands were delivered from the ſlavery of military tenures; our bodies from arbitrary impriſonment by the *habeas corpus* act; and our minds from the tyranny of ſuperſtitious bigotry, by demoliſhing this laſt badge of perſecution in the Engliſh law.

Every thing is now as it ſhould be, with reſpect to the ſpiritual cognizance, and ſpiritual puniſhment, of hereſy: unleſs perhaps that the crime ought to be more ſtrictly defined, and no proſecution permitted, even in the eccleſiaſtical courts, till the tenets in queſtion are by proper authority previouſly declared to be heretical. Under theſe reſtrictions, it ſeems neceſſary for the ſupport of the national religion, that the officers of the church ſhould have power to cenſure heretics; yet not to harraſs them with temporal penalties, much leſs to exterminate or deſtroy them. The legiſlature hath indeed thought it proper, that the civil magiſtrate ſhould again interpoſe, with regard to one ſpecies of hereſy, very prevalent in modern times; for by ſtatute 9 & 10 W. III. c. 32. if any perſon educated in the Chriſtian religion, or profeſſing the ſame, ſhall by writing, printing, teaching, or adviſed ſpeaking, deny any one of the perſons in the holy Trinity to be God, or maintain that there are more Gods than one, he ſhall undergo the ſame penalties and incapacities which were juſt now mentioned to be inflicted on apoſtacy by the ſame ſtatute.

HERETABLE RIGHTS, in Scots law, all rights affecting lands, houſes, &c. or any immoveable ſubject.

HERETAGE, in Scots law, lands, houſes, or any immoveable ſubject, in contradiſtinction to moveables or moveable ſubjects. It alſo ſometimes ſignifies ſuch immoveable property as a perſon ſucceeds to as heir to another, in contradiſtinction to that which he himſelf purchaſes or acquires in any other manner, called *conqueſt*.

HERETIC, a general name for all ſuch perſons under any religion, but eſpecially the Chriſtian, as profeſs or teach religious opinions contrary to the eſtabliſhed faith, or to what is made the ſtandard of orthodoxy. See Heresy.

HERFORDEN, or Herwarden, a free and imperial town of Germany, in the circle of Weſtphalia, and capital of the county of Ravenſberg. Here is a famous nunnery belonging to the Proteſtants of the confeſſion of Augſburg, whoſe abbeſs is a princeſs of the empire, and has a voice and place in the diet. It is ſeated on the river Aa. E. Long. 8. 47. N. Lat. 52. 12.

HERGUNDT, a town of Upper Hungary, remarkable for its rich mines of vitriol. Thoſe who work in the mines have built a ſubterraneous town, which has a great number of inhabitants. E. Long. 18. 15. N. Lat. 48. 30.

HERISSON, in fortification, a beam armed with a great number of iron ſpikes with their points outwards, and ſupported by a pivot on which it turns. Theſe ſerve as a barrier to block up any paſſage, and are frequently placed before the gates, and more eſpecially the wicket-doors, of a town or fortreſs, to ſecure thoſe paſſages which muſt of neceſſity be often opened and ſhut.

HERMÆA, in antiquity, ancient Greek feſtivals in honour of the god Hermes or Mercury. One of theſe was celebrated by the Pheneatæ in Arcadia; a ſecond by the Cyllenians in Elis; and a third by the Tanagræans, where Mercury was repreſented with a ram upon his ſhoulder, becauſe he was ſaid to have walked thro' the city in that poſture in time of a plague, and to have cured the ſick; in memory of which, it was cuſtomary at this feſtival for one of the moſt beautiful youths in the city to walk round the walls with a ram upon his ſhoulder.—A fourth feſtival of the ſame name was obſerved in Crete, when it was uſual for the ſervants to ſit down at the table while their maſters waited; a cuſtom which was alſo obſerved at the Roman Saturnalia.

HERMAN (Paul), a famous botaniſt in the 17th century, was born at Hall in Saxony. He practiſed phyſic in the Iſle of Ceylon, and was afterwards made profeſſor of botany at Leyden, where he died in 1695. He wrote a catalogue of the plants in the public garden at Leyden, and a work intitled *Floræ Lugduno-Batavæ flores*.

HERMANN (James), a learned mathematician of the academy at Berlin, and a member of the academy of ſciences at Paris, was born at Baſil in 1678. He was a great traveller, and for ſix years was profeſſor of mathematics at Padua. He afterwards went to Muſcovy, being invited thither by the Czar in 1724. At his return to his native country, he was made profeſſor of morality and natural law at Baſil; and died there in 1733. He wrote ſeveral mathematical works.

HERMANNIA, in botany; a genus of the pentandria order, belonging to the monodelphia claſs of plants.

Species. 1. The lavendulifolia, hath a ſhrubby ſtalk and ſlender branches, very buſhy, about a foot and an half high, ſmall, ſpear-ſhaped, obtuſe and hairy leaves, with cluſters of ſmall yellow flowers along the ſides of the branches, continuing from June to Autumn. 2. The althæifolia hath a ſhrubby ſtalk, and ſoft woolly branches, growing two feet high, with numerous yellow flowers in looſe ſpikes growing at the end of the branches, and making their appearance in July. 3. The groſſularifolia hath a ſhrubby ſtalk and ſpreading branches, growing three or four feet high, with bright yellow flowers coming out in great numbers at the ends of all the ſhoots and branches in April or May. 4. The alnifolia hath a ſhrubby ſtalk and branches growing irregularly four or five feet high, with pale yellow flowers in ſhort ſpikes from the ſides and ends of the branches, appearing in April or May. 3. The hyſſopifolia hath a ſhrubby upright ſtalk, branching out laterally ſix or ſeven feet high, with pale yellow flowers in cluſters from the ſides of the branches, appearing in May and June.

Culture. All theſe plants are natives of Africa, and therefore muſt be kept in a green-houſe during the winter in this country. They are propagated by cuttings of their young ſhoots, which may be planted in pots of rich earth any time from April to July.

HERMANSTADT, a handſome, populous, and ſtrong town of Hungary, capital of Tranſilvania, with a biſhop's ſee. It is the reſidence of the governor of the province; and is ſeated on the river Ceben, in E. Long. 23. 40. N. Lat. 46. 25.

HERMANT (Godfrey), a learned doctor of the Sorbonne, born at Beauvais in 1917. He wrote many excellent works; the principal of which are, 1. The lives of St Athanaſius, St Baſil, St Gregory Nazianzen, St Chryſoſtom, and St Ambroſe. 2. Four pieces in defence of the rights of the univerſity of Paris againſt the Jeſuits. 3. A French tranſlation of St Chryſoſtom's treatiſe of Providence, and St Baſil's Aſcetics. 4. Extracts from the councils; publiſhed after his death, under the title of *Clavis diſciplinæ eccleſiaſticæ*. He died ſuddenly at Paris in 1690.

HERMAPHRODITE, is generally underſtood to ſignify a human creature poſſeſſed of both ſexes, or who has the parts of generation both of male and female. The term however is applied alſo to other animals, and even to plants.—The word is formed of the Greek Ἑρμαφροδιτος, a compound of Ἑρμης, *Mercury*, and Αφροδιτη, *Venus*; *q. d.* a mixture of Mercury and Venus, *i. e.* of male and female. For it is to be obſerved, *Hermaphroditus* was originally a proper name, applied by the heathen mythologiſts to a fabulous deity, whom ſome repreſent as a ſon of *Hermes*, Mercury, and *Aphrodite*, Venus; and who, being deſperately in love with the nymph Salmaſis, obtained of the gods to have his body and hers united into one. Others ſay, that the god Hermaphroditus was conceived as a compoſition of Mercury and Venus, to exhibit the union between eloquence, or rather commerce, whereof Mercury was god, with pleaſure, whereof Venus was the proper deity. Laſtly, others think this junction intended to ſhew that Venus, (pleaſure,) was of both ſexes; as, in effect, the poet Calvus call Venus a god.

> *Pollentemque Deum Venerem.*

As alſo Virgil, *Æneid.* lib. ii.

> *Diſcedo, ac ducente Deo flammam inter et hoſtes*
> *Expedior*——————

M. Spon obſerves, Heſychius calls Venus *Aphroditos*: and Theophraſtus affirms, that Aphroditos, or Venus, is *Hermaphroditus*; and that in the iſland of Cyprus ſhe has a ſtatue, which repreſents her with a beard like a man.—The Greeks alſo call *hermaphrodites* ανδρογυνοι, *androgyni*, *q. d.* men-women. See the article Androgynes.

Hermaphrodite.

The beſt treatiſe that hath appeared on this ſubject is that of Mr Hunter, in the 69th volume of the Philoſophical Tranſactions. He divides hermaphrodites into *natural*, and *unnatural* or monſtrous. The firſt belongs to the more ſimple orders of animals, of which there are a much greater number than of the more perfect. The unnatural takes place in every tribe of animals having diſtinct ſexes, but is more common in ſome than in others. The human ſpecies, our author imagines, has the feweſt; never having ſeen them in that ſpecies, nor in dogs; but in the horſe, ſheep, and black cattle, they are very frequent.

From Mr Hunter's account, however, it doth not appear that ſuch a creature as a perfect hermaphrodite has ever exiſted. All the hermaphrodites which he had the opportunity of ſeeing had the appearance of females, and were generally ſaved as ſuch. In the horſe they are very frequent; and in the moſt perfect of this kind he ever ſaw, the teſticles had come down out of the abdomen into the place where the udder ſhould have been, and appeared like an udder, not ſo pendulous as the ſcrotum in the male of ſuch animals. There were alſo two nipples, of which horſes have no perfect form; being blended in them with the ſheath or prepuce, of which there was none here. The external female parts were exactly ſimilar to thoſe of a perfect female; but inſtead of a common-ſized clitoris, there was one about five or ſix inches long; which, when erect, ſtood almoſt directly backwards.

A foal aſs very ſimilar to the above was killed, and the following appearances were obſerved on diſſection. The teſticles were not come down as in the former, poſſibly becauſe the creature was too young. It had alſo two nipples; but there was no penis paſſing round the pubes to the belly, as in the perfect male aſs. The external female parts were ſimilar to thoſe of the ſhe-aſs. Within the entrance of the vagina was placed the clitoris; but much longer than that of a true female, being about five inches long. The vagina was open a little further than the opening of the urethra into it, and then became obliterated; from thence, up to the fundus of the uterus, there was no canal. At the fundus of the common uterus it was hollow, or had a cavity in it, and then divided into two, viz. a right and a left, called the *horns* of the uterus, which were alſo pervious. Beyond the termination of the two horns were placed the ovaria, as in the true female; but the Fallopian tubes could not be found.—From the broad ligaments, to the edges of which the horns of the uterus and ovaria were attached, there paſſed towards each groin a part ſimilar to the round ligaments in the female, which were continued into the rings of the abdominal muſcles; but with this difference, that there were continued with them a proceſs or theca of the peritonæum, ſimilar to the tunica vaginalis communis in the male aſs; and in theſe thecæ were found the teſticles, but no vaſa deferentia could be obſerved paſſing from them.

In moſt ſpecies of animals, the production of hermaphrodites appears to be the effect of chance; but in the black cattle it ſeems to be an eſtabliſhed principle of their propagation. It is a well-known fact, and, as far as hath yet been diſcovered, appears to be univerſal, that when a cow brings forth two calves, one of them a bull, and the other a cow to appearance, the cow is unfit for propagation, but the bull-calf becomes a very proper bull. They are known not to breed; they do not even ſhew the leaſt inclination for the bull, nor does the bull ever take the leaſt notice of them. Among the country people in England, this kind of calf is called a *free martin;* and this ſingularity is juſt as well known among the farmers as either cow or bull. When they are preſerved, it is for the purpoſes of an ox or ſpayed heifer; viz. to yoke with the oxen, or fatten for the table. They are much larger than either the bull or the cow, and the horns grow longer and bigger, being very ſimilar to thoſe of an ox. The bellow of a free-martin is alſo ſimilar to that of an ox, and the meat is ſimilar to that of the ox or ſpayed heifer, viz. much finer in the fibre than either the bull or cow; and they are more ſuſceptible of growing fat with good food. By ſome they are ſuppoſed to exceed the ox and heifer in delicacy of taſte, and bear a higher price at market; this, however, does not always hold, and Mr Hunter gives an inſtance of the contrary. The Romans, who called the bull *taurus*, ſpoke alſo of *tauræ* in the feminine gender different from cows. Stephens obſerves, that it was thought they meant by this word *barren cows*, who obtained the name becauſe they did not conceive any more than bulls. He alſo quotes a paſſage from Columella, *lib.* vi. *cap.* 22. "And, like the *tauræ*, which occupy the place of fertile cows, ſhould be rejected or ſent away." He likewiſe quotes Varro, *De re ruſtica*, lib. ii. cap. 5. "The cow which is barren is called *taura*." From which we may reaſonably conjecture, that the Romans had not the idea of the circumſtances of their production.

Of theſe creatures Mr Hunter diſſected three, and the following appearances were obſerved in the moſt perfect of them.—The external parts were rather ſmaller than in the cow. The vagina paſſed on as in the cow to the opening of the urethra, and then it began to contract into a ſmall canal, which paſſed on to the diviſion of the uterus into the two horns; each horn paſſing along the edge of the broad ligament laterally towards the ovaria. At the termination of theſe horns were placed both the ovaria and teſticles, both of which were nearly about the ſize of a ſmall nutmeg. No Fallopian tubes could be found. To the teſticles were vaſa deferentia, but imperfect. The left one did not come near the teſticle; the right only came cloſe to it, but did not terminate in the body called *epididymis*. They were both pervious, and opened into the vagina near the opening of the urethra.—On the poſterior ſurface of the bladder, or between the uterus and bladder, were the two bags called the *veſiculæ ſeminales* in the male, but much ſmaller than what they are in the bull: the ducts opened along with the vaſa deferentia.

Concerning hermaphrodites of the human ſpecies, much has been wrote, and many laws enacted about them in different nations; but the exiſtence of them is ſtill diſputed. Dr Parſons has given us a treatiſe on the ſubject, in which he endeavours to explode the notion as a vulgar error. According to him, all the hermaphrodites that have appeared, were only women whoſe clitoris from ſome cauſe or other was overgrown;

and, in particular, that this was the caſe with an Angola woman ſhewn at London as an hermaphrodite ſome time ago.

Among the reptile tribe, indeed, ſuch as worms, ſnails, leeches, &c. hermaphrodites are very frequent.

Hermaphrodite *Flowers*, in botany. Theſe are ſo called by the ſexualiſts on account of their containing both the antheræ and ſtigma, the pretended organs of generation, within the ſame calix and petals. Of this kind are the flowers of all the claſſes in Linnæus's ſexual method, except the claſſes *monœcia* and *diœcia;* in the former of which, male and female flowers are produced on the ſame root; in the latter, in diſtinct plants from the ſame ſeed.—In the claſs *polygamia*, there are always hermaphrodite flowers mixed with male or female, or both, either on the ſame or diſtinct roots. In the plantain-tree the flowers are all hermaphrodite; in ſome, however, the antheræ or male organ, in others the ſtigma or female organ, proves abortive. The flowers in the former caſe are ſtyled *female hermaphrodites;* in the latter, *male hermaphrodites*.—Hermaphrodites are thus as frequent in the vegetable kingdom as they are rare and ſcarce in the animal one.

HERMAS, an eccleſiaſtical author of the firſt century; and, according to Origen, Euſebius, and Jerome, the ſame whom St Paul ſalutes in the end of his epiſtle to the Romans. He wrote a book in Greek ſome time before Domitian's perſecution, which happened in the year 95. This work is entitled *The Paſtor*, from his repreſenting an angel ſpeaking to him in it under the form of a ſhepherd. The Greek text is loſt, but a very ancient Latin verſion of it is ſtill extant. Some of the fathers have conſidered this book as canonical. The beſt edition of it is that of 1698, where it is to be found among the other apoſtolical fathers, illuſtrated with the notes and corrections of Cotelerius and Le Clerc. With them it was tranſlated into Engliſh by Archbiſhop Wake, the beſt edition of which is that of 1710.

HERMES, Thoth, or *Mercury*, one of the ſecondary gods of Egypt, who received divine honours on account of his uſeful and extraordinary talents.

ology, 21.

There is no perſonage in all antiquity more renowned than the Egyptian Hermes, who was ſurnamed *Triſmegiſtus*, or *Thrice-illuſtrious*. He was the ſoul of Oſiris's counſel and government; and is called by Sir Iſaac Newton, his *ſecretary*. "Oſiris," ſays he, "uſing the advice of his ſecretary Thoth, diſtributes Egypt into 36 nomes; and in every nome erects a temple, and appoints the ſeveral gods, feſtivals, and religions of the ſeveral nomes. The temples were the ſepulchres of his great men, where they were to be buried and worſhipped after death, each in his own temple, with ceremonies and feſtivals appointed by him; while he and his queen, by the names of *Oſiris* and *Iſis*, were to be worſhipped in all Egypt: theſe were the temples ſeen and deſcribed by Lucian, who was himſelf an Egyptian, 1100 years after, and to be of one and the ſame age: this was the original of the ſeveral nomes of Egypt, and of the ſeveral gods and ſeveral religions of thoſe nomes." And Diodorus Siculus tells us, that Mercury was honoured by Oſiris, and afterwards worſhipped by the Egyptians, as a perſon endowed with extraordinary talents for every thing that was conducive to the good of ſociety. He was the firſt who out of the coarſe and rude dialects of his time formed a regular language, and gave appellatives to the moſt uſeful things: he likewiſe invented the firſt characters or letters, and even regulated the harmony of words and phraſes: he inſtituted ſeveral rites and ceremonies relative to the worſhip of the gods, and communicated to mankind the firſt principles of aſtronomy. He afterwards ſuggeſted to them as amuſements, wreſtling and dancing; and invented the lyre, to which he gave three ſtrings in alluſion to the ſeaſons of the year: for theſe three ſtrings producing three different ſounds, the grave, the mean, and the acute, the grave anſwered to winter, the mean to ſpring, and the acute to ſummer.

Among the various opinions of the ſeveral ancient writers who have mentioned this circumſtance, and confined the invention to the Egyptian Mercury, that of Apollodorus is the moſt intelligible and probable. "The Nile, (ſays this writer), after having overflowed the whole country of Egygt, when it returned within its natural bounds, left on the ſhore a great number of dead animals of various kinds; and among the reſt a tortoiſe, the fleſh of which being dried and waſted by the ſun, nothing was left within the ſhell but nerves and cartilages; and theſe being braced and contracted by deſiccation, were rendered ſonorous. Mercury, in walking along the banks of the Nile, happening to ſtrike his foot againſt the ſhell of this tortoiſe, was ſo pleaſed with the ſound it produced, that it ſuggeſted to him the firſt idea of a lyre, which he afterwards conſtructed in the form of a tortoiſe, and ſtrung it with the dried ſinews of dead animals." See Lyre.

It is generally imagined that there were two Thoths or Mercuries in Egypt, who lived at very remote periods, but both perſons of great abilities. The Egyptians themſelves diſtinguiſh two Thoths or Hermeſes; and yet the hiſtories of the firſt and ſecond are as much confounded together, as thoſe of Oſiris and Seſoſtris. *Div. Leg.* book iv. ſect 5.

The Greek Chriſtians had ſo high an opinion of the antiquity of the firſt Egyptian Hermes, who lived at Sais, that they ſuppoſed him and the antedeluvian patriarch Enoch to have been the ſame perſon, and give to both the ſame inventions. We are told likewiſe, that Manetho extrrcted his hiſtory and dynaſties of the Egyptians from certain pillars in Egypt, on which inſcriptions had been made by Thoth, or the firſt Mercury, in the ſacred letters, before the flood! Vid. Dodwell *Diſſert. de Sachon. Fabric. Bib. Gr. Stillingfleet. Orig. Sacr. et alios.*

No leſs than 42 different works are attributed to the Egyptian Hermes by ancient writers; of theſe the learned and exact Fabricius has collected all the titles. It was uſual for the Egyptians, who had the higheſt veneration for this perſonage, after his apotheoſis, to have his works, which they regarded as their bible, carried about in proceſſions with great pomp and ceremony; and the firſt that appeared in theſe ſolemnities was the chanter, who had two of them in his hands, while others bore ſymbols of the muſical art. It was the buſineſs of the chanters to be particularly verſed in the two firſt books of Mercury; one of which contained the hymns to the gods; and the other, maxims of government: 36 of theſe books comprehended a complete ſyſtem of Egyptian philoſophy; the reſt were chiefly upon the ſubjects of medicine and anatomy.

Theſe books upon theology and medicine are aſcribed by Marſham to the ſecond Mercury, the ſon of Vulcan, who, according to Euſebius, lived a little after Moſes; and this author, upon the authority of Manetho, cited by Syncellus, regarded the ſecond Mercury as the Hermes ſurnamed *Triſmegiſtus*. Enough has been ſaid, however, to prove, that the Egyptian Mercuries, both as to the time when they flouriſhed, and their attributes, were widely different from the Grecian Mercury, the ſon of Jupiter and Maia. See MERCURY.

HERMETICAL PHILOSOPHY, that which undertakes to ſolve the various phenomena of nature, from the chemical principles ſalt, ſulphur, and mercury.

HERMETICAL *Seal*, among chemiſts, a method of ſtopping glaſs-veſſels uſed in chemical operations, ſo cloſely, that the moſt ſubtil ſpirit cannot eſcape thro' them.

It is commonly done by heating the neck of the veſſel in a flame till ready to melt, and then twiſting it cloſely together with a pair of pincers. Or veſſels may be hermetically ſealed by ſtopping them with a glaſs plug, or by putting one ovum philoſophorum over another.

HERMIONE (anc. geog.), a conſiderable city of Argolis. It was in ruins, except a few temples, in the time of Pauſanias; who ſays that the new city was at the diſtance of four ſtadia from the promontory on which the temple of Neptune ſtood. It gave name to the Sinus Hermionicus, a part of the Sinus Argolicus.

HERMIT, or EREMIT, *Eremita*, a devout perſon retired into ſolitude, to be more at leiſure for prayer and contemplation, and to diſencumber himſelf of the affairs of this world.—The word is formed from the Greek ερημος, *deſart*, or *wilderneſs*; and, according to the etymology, ſhould rather be wrote *Eremit*.

Paul ſurnamed the *hermit* is uſually reckoned the firſt hermit; though St Jerome at the beginning of the life of that ſaint ſays, it is not known who was the firſt.—Some go back to John the Baptiſt, others to Elias: others make St Anthony the founder of the eremitical life; but others think that he only rekindled and heightened the fervour thereof, and hold that the diſciples of that ſaint owned St Paul of Thebes for the firſt that practiſed it. The perſecutions of Decius and Valerian are ſuppoſed to have been the occaſion.—A hermit is not reputed a religious, unleſs he have made the vows.

HERMIT (Gaytier Peter the), a French officer of Amiens in Picardy, who quitted the military profeſſion, and commenced hermit and pilgrim. Unfortunately, he travelled to the Holy Land about the year 1093; and making a melancholy recital of the deplorable ſituation of a few Chriſtians in that country to Pope Urban II. and at the ſame time enthuſiaſtically lamenting that Infidels ſhould be in poſſeſſion of the famous city where the Author of Chriſtianity firſt promulgated his ſacred doctrines, Urban gave him a fatal commiſſion to excite all Chriſtian princes to a general war againſt the Turks and Saracens the poſſeſſors of the Holy Land. See CRUSADES.

HERMOGENES, the firſt and moſt celebrated architect of antiquity, was, according to Vitruvius, born at Alanbada, a city in Caria. He built a temple of Diana at Magneſia; another of Bacchus at Tros; and was the inventor of ſeveral parts of architecture. He compoſed a book on the ſubject, which is loſt.

HERMOGENES *Tarſenſis*, a rhetorician and orator, and who was in every reſpect a prodigy. At 17 years of age he publiſhed his ſyſtem of rhetoric, and at 20 his philoſophic ideas: but at 25 he forgot every thing he had known. It is ſaid, that, his body being opened after his death, his heart was found of an extraordinary ſize, and all over hairy. He died about 168 B. C.

HERMON, or AERMON (anc. geog.); a mountain of the Amorites, called *Sanior* by the Phœnicians, and *Sanir* or *Senir* by the Amorites on the eaſt of Jordan. It is alſo called *Sion*, (Moſes); but muſt not be confounded with the Sion of Jeruſalem. By the Sidonians it was called *Scirion*; in the vulgate, it is called *Sarion*. Joſhua informs us, that it was the dominion of Og king of Baſhan; which muſt be underſtood of its ſouth ſide. It is never particularly mentioned by profane writers; being compriſed under the appellation *Libanus*, or *Antilibanus*, with which mountain it is joined to the eaſt. It is alſo called *Hermonim* plurally, Pſalm xlii. 6. becauſe it was extenſive, and contained ſeveral mountains.

HERMUS, (anc. geog.), a river of Ionia; which riſing near Dorylæum, a town of Phrygia, in a mountain ſacred to Dindymene or Cybele, touched Myſia, and ran through the Regio Combuſta, then through the plains of Smyrna down to the ſea, carrying along with it the Pactolus, Hyllus, and other leſs noble rivers. Its waters were ſaid to roll down gold, by Virgil and other poets.

HERNANDRIA, JACK-IN-A-BOX TREE; a genus of the triandria order, belonging to the monœcia claſs of plants.

Species. 1. The ſonora, or common jack-in-a-box, is a native of the Weſt Indies. It grows 20 or 30 feet high; and is garniſhed with broad peltated leaves, and monœcious flowers, ſucceeded by a large ſwollen hollow fruit formed of the calix; having a hole or open at the end, and a hard nut within. The wind blowing into the cavity of this fruit makes a very whiſtling and rattling noiſe, whence comes the name. 2. The ovigera grows many feet high, garniſhed with large oval leaves not peltated; and monœcious flowers, ſucceeded by a ſwollen fruit open at the end, and a nut within.

Culture. Both theſe plants being tender exotics, muſt be planted in pots of rich earth, and always kept in a hot-houſe; in which, notwithſtanding all the care that can be taken, they ſeldom flower, and never grow beyond the height of common ſhrubs, tho' in the places where they are natives they arrive at the height of trees. They are propagated by ſeeds procured from the Weſt Indies.

HERNIA, in medicine. See (the *Index* ſubjoined to) MEDICINE, and SURGERY.

HERNIARIA, RUPTURE-WORT; a genus of the digynia order, belonging to the pentandria claſs of plants.

Species. There are four ſpecies, of which the only remarkable one is the glabra, or ſmooth rupture-wort, a native of many parts of England. It is a low trailing plant, with leaves like the ſmaller chickweed; the flowers come out in cluſters from the ſide of the ſtalks at the joints, and are of a yellowiſh green colour.

Uſes, &c. This plant is a little ſaltiſh and aſtringent. The juice takes away ſpecks in the eye. Cows, ſheep, and horſes, eat the plant; goats and ſwine refuſe it.

HERO, in Pagan mythology, a great and illuſtrious perſon, of a mortal nature, though ſuppoſed by the populace to partake of immortality, and after his death to be placed among the number of the gods. The word is formed of the Latin *heros*, and that of the Greek ἥρως, *ſemi-deus*, "demi-god."

Hero, in fabulous hiſtory, a famous prieſteſs of Venus, lived at Abydos, in a tower ſituated on the banks of the Helleſpont. She being beloved by Leander, who lived at Seſtos on the other ſide of the ſtreight, he every night ſwam over to viſit her, being directed by a light fixed on the tower. But the light being put out in a ſtormy night, the youth miſſed his way, and was drowned; on which Hero threw herſelf into the ſea, and periſhed.

Hero, the name of two celebrated Greek mathematicians; the one called the *old*, and the other the *young*, *Hero*. The younger was a diſciple of Cteſibius. They are known by two works tranſlated into Latin by Barochius: *Spiralium liber*, by Hero ſenior; and *Tractat. artis et machin. militar.* by Hero junior. They flouriſhed about 130 and 100 B. C.

HEROD, falſly ſtyled the *Great*, king and execrable tyrant of Judæa; who, on the ſtrength of a miſinterpreted prophecy, cauſed all the male children of Bethlehem and its neighbourhood, to be maſſacred by his ſoldiers at the time of the birth of Chriſt, in the vain hope of deſtroying the Saviour of mankind. He died, eaten with worms, two or three years after the birth of our Saviour, at the age of 71, after a reign of 40 years. He had ordered that all the perſons of quality, whom he kept in priſon, ſhould be maſſacred the moment the breath was out of his body, in order that every conſiderable family in the kingdom might ſhed tears at his death; but that inhuman order was not executed.

HERODIAN, an eminent Greek hiſtorian, who ſpent the greateſt part of his life at Rome, flouriſhed in the third century, in the reigns of Severus, Caracalla, Heliogabalus, Alexander, and Maximin. His hiſtory begins from the death of Marcus Aurelius the philoſopher; and ends with the death of Balbinus and Maximin, and the beginning of the reign of Gordian. It is wrote in very elegant Greek; and there is an excellent tranſlation of it into Latin, by Angelus Politianus. Herodian has been publiſhed by Henry Stephens in 4to, in 1581; by Boecler, at Straſburg, in 1662, 8vo; and by Hudſon, at Oxford, in 1699, 8vo.

HERODIANS, a ſect among the Jews at the time of our Saviour; mentioned Math. xxii. 16. Mark iii. 6. The critics and commentators are very much divided with regard to the Herodians. St Jerom, in his Dialogue againſt the Luciferians, takes the name to have been given to ſuch as owned Herod for the Meſſiah; and Tertullian and Epiphanius are of the ſame opinion. But the ſame Jerom, in his Comment on St Matthew, treats this opinion as ridiculous; and maintains, that the Phariſees gave this appellation by way of ridicule to Herod's ſoldiers who paid tribute to the Romans; agreeable to which the Syrian interpreters render the word by *the domeſtics of Herod*, i. e. "his courtiers." M. Simon, in his notes on the 22d chapter of Matthew, advances a more probable opinion. The name *Herodian* he imagines to have been given to ſuch as adhered to Herod's party and intereſt; and were for preſerving the government in his family, about which were great diviſions among the Jews.—F. Hardouin will have the Herodians and Sadducees to have been the ſame.

HERODOTUS, an ancient Greek hiſtorian of Halicarnaſſus in Caria, ſon of Lyxus and Dryo, was born in the firſt year of the 74th Olympiad, that is, about 484 B. C. The city of Halicarnaſſus being at that time under the tyranny of Lygdamis grandſon of Artemiſia queen of Caria, Herodotus quitted his country and retired to Samos; from whence he travelled over Egypt, Greece, Italy, &c. and in his travels acquired the knowledge of the hiſtory and origin of many nations. He then began to digeſt the materials he had collected into order, and compoſed that hiſtory which has preſerved his name among men ever ſince. He wrote it in the iſle of Samos, according to the general opinion.—Lucian informs us, that when Herodotus left Caria to go into Greece, he began to conſider with himſelf,

> What he ſhould do to be for ever known
> And make the age to come his own,

in the moſt expeditious way, and with as little trouble as poſſible. His hiſtory, he preſumed, would eaſily procure him fame, and raiſe his name among the Grecians in whoſe favour it was written: but then he foreſaw that it would be very tedious to go through the ſeveral cities of Greece, and recite it to each reſpective city; to the Athenians, Corinthians, Argives, Lacedemonians, &c. He thought it moſt proper therefore to take the opportunity of their aſſembling all together; and accordingly recited his work at the Olympic games, which rendered him more famous than even thoſe who had obtained the prizes. None were ignorant of his name, nor was there a ſingle perſon in Greece who had not ſeen him at the Olympic games, or heard thoſe ſpeak of him who had ſeen him there.

His work is divided into nine books; which, according to the computation of Dionyſius Halicarnaſſenſis, contain the moſt remarkable occurrences within a period of 240 years; from the reign of Cyrus the firſt king of Perſia, to that of Xerxes when the hiſtorian was living. Theſe nine books are called after the names of the nine muſes, each book being diſtinguiſhed by the name of a muſe; and this has given birth to two diſquiſitions among the learned: 1. Whether they were ſo called by Herodotus himſelf; and, 2. For what reaſon they were ſo called. As to the firſt, it is generally agreed that Herodotus did not impoſe theſe names himſelf; but it is not agreed why they were impoſed by others. Lucian tells us, that theſe names were given them by the Grecians at the Olympic games, when they were firſt recited, as the beſt compliment that could be paid the man who had taken pains to do them ſo much honour. Others have thought that the names of the *muſes* have been fixed upon them by way of reproach; and were deſigned to intimate, that Herodotus, inſtead of true hiſtory, had written a great deal of fable. But, be this as it will, it is certain, that, with regard to the truth of his hiſtory, he is accuſed by ſeveral authors; and, on the other hand, he has not wanted perſons to defend him. Aldus Manutius, Joachim Camerarius, and Henry Stephens, have written apologies for him; and, among other things, have very juſtly obſerved, that he ſeldom relates any thing of doubtful credit without producing the authority on which his narration is founded; and, if he has no certain authority to fix it upon, uſes always the terms *ut ferunt, ut ego audivi*, &c.

There is aſcribed alſo to Herodotus, but falſely, a Life of Homer, which is uſually printed at the end of his work.—He wrote in the Ionic dialect, and his ſtyle and manner have ever been admired by all people of taſte. There have been ſeveral editions of the works of this hiſtorian; two by Henry Stephens, one in 1570, and the other in 1592; one by Gale at London in 1679; and one by Gronovius at Leyden in 1715, which is the laſt and beſt, though not the beſt printed.

HEROIC POEM, that which deſcribes ſome extraordinary enterpriſe; being the ſame with EPIC poem.

HEROIC *Verſe*, that wherein heroic poems are uſually compoſed, or it is that proper for ſuch poems. In the Greek and Latin, hexameter verſes are uſually denominated heroic verſes, as being thoſe only uſed by mer, Virgil, &c. See POETRY, n° 116—124.

HERON, in ornithology. See ARDEA.

This bird is a very great devourer of fiſh, and will do more miſchief to a pond than even an otter. Some ſay that an heron will deſtroy more fiſh in a week than an otter will in three months; but that ſeems carrying the matter too far. People who have kept herons, have had the curioſity to number out the fiſh they fed them with into a tub of water; and counting them again afterwards, it has been found, that a heron will eat 50 moderate ſized dace and roaches in a day. It has been found, that in carp-ponds viſited by this bird, one heron will eat up 1000 ſtore carp in a year, and will hunt them ſo cloſe that very few can eſcape. The readieſt method of deſtroying this miſchievous bird is by fiſhing for him in the manner of pike, with a baited hook. When the haunt of the heron is found out, three or four ſmall roach or dace are to be procured, and each of them is to be baited on a wire with a ſtrong hook at the end; entering the wire juſt under the gills, and letting it run juſt under the ſkin to the tail: the fiſh will live in this condition five or ſix days, which is a very eſſential thing; for if it is dead, the heron will not touch it. A ſtrong line, about two yards long, is then to be prepared of ſilk and wire twiſted together; tie this to the wire that holds the hook; and to the other end there is to be tied a ſtone of about a pound weight. Let three or four of theſe baits be ſunk in different ſhallow parts of the pond, and in a night or two the heron will not fail of being taken by one or other of them.—When hawking was in uſe, the heron afforded a great deal of ſport to people who loved that diverſion. There is but very little art in this flight of the hawk; but as both birds are large and courageous, the fight is finer than in the flight of ſmaller birds that make no reſiſtance.

HERPES, in medicine, a bilious puſtule, which breaking out in different manners upon the ſkin, accordingly receives different denominations. See (the *Index* ſubjoined to) MEDICINE.

HERRERA TORDESILLAS (Anthony), a Spaniſh hiſtorian, was ſecretary to Veſpaſian Gonzaga viceroy of Naples, and afterwards hiſtoriographer of the Indies, under king Philip II. who allowed him a conſiderable penſion. He wrote a general hiſtory of the Indies, in Spaniſh, from 1492 to 1554; and of the world (not ſo much eſteemed), from 1554 to 1598. He died in 1625, aged about 66.

HERRERA (Ferdinand de), an eminent Spaniſh poet, of the 16th century, was born at Seville, and principally ſucceeded in the lyric kind. Beſides his poems, he wrote notes on Garcilaſſo de la Vega, and an account of the war of Cyprus and the battle of Lepanto, &c.

HERRING, in ichthyology. See CLUPEA.

HERRING (Thomas), archbiſhop of Canterbury, was the ſon of the rev. Mr John Herring, rector of Walſoken in Norfolk, where he was born in 1693. He was educated at Jeſus-college, Cambridge; was afterwards choſen fellow of Corpus Chriſti college, and continued a tutor there upwards of ſeven years. Having entered into prieſt's orders in 1719, he was ſucceſſively miniſter of Great Shelford, Stow cum Qui, and Trinity, in Cambridge; chaplain to Dr Fleetwood, biſhop of Ely; rector of Rettingdon in Eſſex, and of Barly in Hertfordſhire; preacher to the Society of Lincoln's Inn, chaplain in ordinary to his late majeſty, rector of Blechingly in Surry, and dean of Rocheſter. In 1737 he was conſecrated biſhop of Bangor, and in 1743 tranſlated to the archiepiſcopal ſee of York. When the late rebellion broke out in Scotland, and the king's troops were defeated by the Highlanders at Preſtonpans, he diſtinguiſhed himſelf by removing the general panic, and awakening the nation from its lethargy. He convened the nobility, gentry, and clergy of his dioceſe; and addreſſed them in a noble ſpeech, which had ſuch an effect upon his auditory, that a ſubſcription enſued, to the amount of forty thouſand pounds; and the example was followed by the nation in general. On the death of Dr Potter in 1747, he was tranſlated to the ſee of Canterbury; but in 1753, was ſeized with a violent fever, which brought him to the brink of the grave; and after languiſhing about four years, he died on the 13th of March 1757. He expended upwards of ſix thouſand pounds in repairing and adorning the palaces of Croydon and Lambeth. This worthy prelate, in a moſt eminent degree, poſſeſſed the virtues of public life; his mind was filled with unaffected piety and benevolence, he was an excellent preacher, and a true friend to religious and civil liberty. After his death was publiſhed a volume of his ſermons on public occaſions.

HERSE, in fortification, a lattice, or portcullis, in form of an harrow, beſet with iron-ſpikes. The word *herſe* is French, and literally ſignifies "harrow;"

being formed of the Latin *herpex* (or *irpex*), which denotes the ſame.

It is uſually hung by a rope faſtened to a moulinet; to be cut, in caſe of ſurprize, or when the firſt gate is broken with a petard, that the herſe may fall, and ſtop up the paſſage of the gate or other entrance of a fortreſs.

The herſe is otherwiſe called a *ſarraſin*, or *cataract*; and when it conſiſts of ſtraight ſtakes, without any croſs-pieces, it is caled *orgues*.

Herse, is alſo a harrow, which the beſieged, for want of chevaux de friſe, lay in the way, or in breaches, with the points up, to incommode the march as well of the horſe as of the infantry.

HERSILLON, in the military art, a ſort of plank, or beam, ten or twelve feet long, whoſe two ſides are drove full of ſpikes or nails, to incommode the march of the infantry or cavalry. The word is a diminutive of *herſe*; the herſillon doing the office of a little herſe. See Herse.

HERTZBERG, a conſiderable town of Germany, in the electorate of Saxony, and on the confines of Luſatia. E. Lon. 13. 37. N. Lat. 51. 42.

HERVEY (James), a late divine of examplary piety, was born in 1714, and ſucceeded his father in the livings of Weſton Favell and Collingtree in Northamptonſhire. Theſe being within five miles of each other, he attended alternately with his curate; till being confined by his ill health, he reſided conſtantly at Weſton; where he diligently purſued the labours of the miniſtry and his ſtudy, under the diſadvantage of a weak conſtitution. He was remarkably charitable; and deſired to die juſt even with the world, and to be, as he termed it, his own executor. This excellent divine died on Chriſtmas-day 1758, leaving the little he poſſeſſed to buy warm cloathing for the poor in that ſevere ſeaſon.—No work is more generally or deſervedly known than his *Meditations and Contemplations*: containing, Meditations among the tombs, reflections on a flower-garden, a deſcant on creation, contemplations on the night and ſtarry heavens, and a winter-piece. The ſublime ſentiments in theſe pieces have the peculiar advantage of being conveyed in a flowing elegant language, and they have accordingly gone through many editions. He publiſhed beſides, *Remarks on lord Bolingbroke's letters on hiſtory*; *Theron and Aſpaſio, or a ſeries of dialogues and letters on the moſt important ſubjects*; ſome ſermons, and other tracts.

Hervey *Iſland*, one of the ſouth-ſea iſlands, diſcovered by captain Cook September 23d 1773, who gave it that name in honour of the earl of Briſtol. It is a low iſland, ſituated in W. Lon. 158. 54. S. Lat. 19. 8.

HESBON, Esebon, or *Heſebon*, (anc. geog.), the royal city of the Amorites, in the tribe of Reuben, according to Moſes: Though in Joſhua xxi. 39. where it is reckoned among the Levitical cities, it is put in the tribe of Gad; which argues its ſituation to be on the confines of both. It is thus determined by Jerome, who ſays, that in his time it was called *Eſbus*. A conſiderable city, in the mountains of Arabia, which lie over againſt Jericho, diſtant 20 miles from the Jordan; not indeed in the ſame latitude with Jericho, but ſomewhat more to the north, becauſe ſituated on the borders of the Gadites; and called a city of Arabia, becauſe the Arabs were at that time poſſeſſed of the Lower Petræa.

HESIOD, a very ancient Greek poet; but whether cotemporary with Homer, or a little older or younger than him, is not yet agreed among the learned; nor is there light enough in antiquity to ſettle the matter exactly. His father, as he tells us in his *Opera et dies*, was an inhabitant of Cuma, one of the Eolian iſles, now called *Taio Nova*; and removed from thence to Aſcra, a little village of Bæotia, at the foot of mount Helicon, where Heſiod was probably born, and called, as he often is, *Aſcræus*, from it. Of what quality his father was, is nowhere ſaid; but that he was driven by his misfortunes from Cumæ to Aſcra, Heſiod himſelf informs us. His father ſeems to have proſpered better at Aſcra than he did in his own country; yet Heſiod could arrive at no higher fortune than keeping ſheep on the top of mount Helicon. Here the muſes met with him, and entered him into their ſervice:

> Erewhile as they the ſhepherd-ſwain behold,
> Feeding beneath the ſacred mount his fold,
> With love of charming ſong his breaſt they fir'd,
> There me the heav'nly muſes firſt inſpir'd;
> There, when the maids of Jove the ſilence broke.
> To Heſiod thus, the ſhepherd-ſwain, they ſpoke, &c.

To this account, which is to be found in the beginning of his *Generatio Deorum*, Ovid alludes in theſe two lines:

> *Nec mihi ſunt viſæ Clio, Cliuſque ſorores.*
> *Servanti pecudes vallibus Aſcra tuis.*
>
> Nor Clio nor her ſiſters have I ſeen,
> As Heſiod ſaw them in th' Aſcræan green.

On the death of the father, an eſtate was left, which ought to have been equally divided between the two brothers Heſiod and Perſes; but Perſes defrauded him in the diviſion, by corrupting the judges. Heſiod was ſo far from reſenting this injuſtice, that he expreſſes a concern for thoſe miſtaken mortals who place their happineſs in riches only, even at the expence of their virtue. He lets us know, that he was not only above want, but capable of aſſiſting his brother in time of need; which he often did, though he had been ſo ill uſed by him. The laſt circumſtance he mentions relating to himſelf is his conqueſt in a poetical contention. Archidamus, king of Eubœa, had inſtituted funeral games in honour of his own memory, which his ſons afterwards took care to have performed. Here Heſiod was a competitor for the prize in poetry; and won a tripod, which he conſecrated to the muſes.

Heſiod having entered himſelf in the ſervice of the muſes, left off the paſtoral life, and applied himſelf to the ſtudy of arts and learning. When he was grown old, for it is agreed by all that he lived to a very great age, he removed to Locris, a town about the ſame diſtance from mount Parnaſſus as Aſcra was from Helicon. His death was tragical. The man with whom he lived at Locris, a Mileſian born, raviſhed a maid in the ſame houſe; and though Heſiod was entirely ignorant of the fact, yet being maliciouſly accuſed to her brothers as an accomplice, he was injuriouſly ſlain with the raviſher, and thrown into the ſea.

The *Theogony*, and *Works and Days*, are the only undoubted pieces of this poet now extant: though it is ſuppoſed that theſe poems have not deſcended perfect and finiſhed to the preſent time. A good edition of Heſiod's works was publiſhed by Mr Le Clerc at Amſterdam in 1701.

HESPER, an apellation given to the planet Venus when ſhe ſets after the ſun. See HESPERUS.

HESPERIA, an ancient name of Italy; ſo called by the Greeks from its weſtern ſituation. *Heſperia* was alſo an appellation of Spain; but with the epithet *ultima* (Horace), to diſtinguiſhed it from Italy, which is called *Heſperia magna* (Virgil), from its extent of empire.

HESPERI CORNU, called the *Great Bay* by the author of Hanno's Periplus: but moſt interpreters, following Mela, underſtand a promontory; ſome Cape Verd, others *Palmas Cape:* Voſſius takes it to be the former, ſince Hanno did not proceed ſo far as the latter cape.

HESPERIDEÆ (from the *Heſperides*, whoſe orchards are ſaid to have produced golden apples), *golden* or *precious fruit:* The name of the 19th order in Linnæus's fragments of a natural method. See BOTANY, p. 1308.

HESPERIDES, in the ancient mythology, were the daughters of Heſper, or Heſperus, brother of Atlas. The Heſperides were three in number, Ægle, Arethuſa, and Heſperthuſa.—Heſiod, in his Theogony, makes them the daughters of Nox, night; and ſeats them in the ſame place with the Gorgons, viz. at the extremities of the weſt, near mount Atlas: it is on that account he makes them the daughters of Night, by reaſon the ſun ſets there.

The Heſperides are repreſented by the ancients, as having the keeping of certain golden apples, on t'other ſide the ocean. The poets give them a dragon to watch the garden where the fruit grows: this dragon Hercules ſlew, and carried off the apples.

Pliny and Solinus will have the dragon to be no other than an arm of the ſea, wherewith the garden was incompaſſed, and which defended the entrance thereof. And Varro ſuppoſes that the golden apples were nothing but ſheep. Others, with more probability, ſay they were oranges.

HESPERIDUM INSULÆ, (anc. geog.), iſlands near the Heſperi Cornu; but the accounts of them are ſo much involved in fable, that nothing certain can be affirmed of them.

HESPERIS, ROCKET, *Dame's violet*, or *queen's gilliflower;* a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants.

Species 1. The matronalis, or common ſweet ſcented garden-rocket hath fibrous roots, crowned with a tuft of long, ſpear-ſhaped, rough leaves; upright, ſingle, hairy ſtalks two feet high; garniſhed with oval, lanceolate, ſlightly indented, cloſe-fitting leaves; and the ſtalk and branches terminated by large and long ſpikes of ſweet-ſcented flowers of different colours and properties in the varieties, of which there are a great number. All the varieties of this ſpecies are ſo remarkable for imparting a fragrant odour, that the ladies were fond of having them in their apartments. Hence they derived the name of *dame's violet;* and, bearing ſome reſemblance to a ſtock-gilliflower, were ſometimes alſo called *queen's gilliflower;* but are now moſt commonly called *rocket.* 2. The inodora, or ſcentleſs rocket, hath a fibrous root; upright, round, firm ſtalks, two feet high, garniſhed with ſpear-ſhaped, acute-pointed, ſharply indented, cloſe-fitting leaves; and all the branches terminated by large ſpikes of ſcentleſs flowers, with obtuſe petals, of different colours and properties in the varieties. This ſpecies makes a fine appearance, but hath no ſcent. 3. The triſtis, or dull-flowered night-ſmelling rocket, hath fibrous roots; upright, branching, ſpreading, briſtly ſtalks, two feet high; ſpear-ſhaped pointed leaves; and ſpikes of pale purple flowers, of great fragrance in the evening.

Culture. All the ſpecies are hardy, eſpecially the firſt and ſecond, which proſper in any of the open borders, and any common garden-ſoil; but the third, being rather impatient of a ſevere froſt, and of much moiſture in winter, ſhould have a dry warm ſituation, and a few may be placed in pots to be ſheltered in caſe of inclement weather. They may be propagated either by ſeeds, by offſets, or by cuttings of the ſtalks.

HESPERUS, in fabulous hiſtory, ſon of Cephalus by Aurora, as fair as Venus, was changed into a ſtar, called *Lucifer* in the morning, and *Heſperus* in the evening. See HESPER.

HESSE, a country of Germany, in the circle of the Upper Rhine; bounded on the ſouth by the biſhopric of Fulda; on the eaſt, by the principality of Hersfeld, Thuringia, and Eichsfeld, as alſo by that of Calenburg; on the north, by the biſhopric of Paderborn, and Waldeck, the duchy of Weſtphalia, and the county of Witgenſtein; and on the weſt, by Naſſau-Dillenburg, the county of Solins, and Upper-Iſenburg. In the above limits, the county of Katzenellnbogen and ſome other territories are not included. The whole country, in its utmoſt length, is near 100 miles, and in ſome places near as much in breadth. The air is cold, but wholeſome; and the ſoil fruitful in corn, wine, wood, and paſture. The country abounds alſo in cattle, fiſh, and game; ſalt-ſprings, baths, and mineral waters. The hills, which are many, yield ſilver, copper, lead, iron, alum, vitriol, pit-coal, ſulphur, boles, a porcelain earth, marble, and alabaſter. In the Eder, gold is ſometimes found; and at Frankenberg a gold mine was formerly wrought. Beſides many leſſer ſtreams, Heſſe is watered by the following rivers, viz. the Lahn, the Fulda, the Eder or Schwalm, the Werra or Weſer, and Diemel. The Rhine alſo and the Mayne paſs through the country of Katzenellnbogen. This country, like moſt others in Germany, has its ſtates, conſiſting of the *prelates*, as they are called, the nobility, and the towns. The diets are divided into general and particular, and the latter into the greater and ſmaller committees. The houſe of Heſſe is divided into two principal branches, viz. Caſſel and Darmſtadt, of which Philipſdale, Rhinfels, and Homburg, are collateral branches; the two firſt of Heſſe-Caſſel, and the laſt of Heſſe-Darmſtadt. Their rights and privileges are very conſiderable. In particular, they have ſeveral votes at the diets of the empire; and cauſes, not exceeding 1000 florins, are determined by the courts of the country, without appeal. The princes of Heſſe-Caſſel are not of age till they are 25, but thoſe of Heſſe-Darmſtadt are ſo at 18. The right of primogeniture hath been eſtabliſhed in both houſes. The revenues of Darmſtadt are ſaid to amount to near 100,000l. a year, and thoſe of Heſſe-Caſſel to near 200,000l. The ſmall county of Schaumberg alone yields a revenue of 10,000l. and that of Katzenellnbogen, with the foreſts of Richardſwalde, it is ſaid, was farmed near 200 years ago at 12,000l. The prince of Heſſe-Caſſel has 40 or 50,000 men in his dominions fit to bear arms; and the troops that he hires out have often brought him in large ſums, eſpecially from Great Britain. The branches of Caſſel, Homburg, and Philipſdale, are Calviniſts; that of Darmſtadt, Lutherans; and that of Rhinfeldts, Roman-catholics. The preſent prince of Heſſe-Caſſel, indeed, in the year 1749, embraced the Roman-catholic religion; but in 1754 drew up, and confirmed by oath, an inſtrument, of which all the Proteſtant princes are guarantees, declaring, that the eſtabliſhed religion of his dominions ſhould continue in every reſpect as before, and that his children ſhould be brought up and inſtructed therein. Here, as in the other Proteſtant Lutheran countries of Germany, are conſiſtories, ſuperintendants, and inſpectors of the church. In the whole landgraviate are three univerſities, beſides Latin ſchools and gymnaſia, for the education of youth. The manufactures of Heſſe are linen cloth, hats, ſtockings, gloves, paper, goldſmiths wares, and at Caſſel a beautiful porcelain is made. They have alſo the fineſt wool in Germany; but are reproached with want of induſtry, in exporting inſtead of manufacturing it themſelves.—This is ſuppoſed to have been the country of the ancient Catti, mentioned by Tacitus, &c. who, in after-ages, were called *Chatti*, *Chaſſi*, *Haſſi*, and *Heſſi*. The two chief branches of Caſſel and Darmſtadt have many rights and privileges in common, which we have not room to ſpecify. Both of them have a ſeat and vote in the college of princes at the diet of the empire, and thoſe of this circle. Each of theſe princes, beſides their guards and militia, maintains a conſiderable body both of horſe and foot.

HESYCHIUS, the moſt celebrated of all the ancient Greek grammarians whoſe works are now extant, was a Chriſtian; and, according to ſome, the ſame with Heſychius patriarch of Jeruſalem, who died in 609. He wrote a Greek lexicon; which, in the opinion of Caſaubon, is the moſt learned and uſeful work of that kind produced by the ancients. Schrevelius publiſhed a good edition of it in 1668, in 4to. with notes; but the beſt is that of John Alberti, printed at Leyden in 1746, in two vols folio.

HETEROCLITE, among grammarians, one of the three variations in irregular nouns, and defined by Mr Ruddiman, a noun that varies in its declenſion; as *hoc vas, vaſis; hæc vaſa, vaſorum.*

HETERODOX, in polemical theology, any thing contrary to the faith and doctrines of a church.

HETEROGENEITY, in phyſiology, that quality or property of bodies which denominates a thing heterogeneous.

HETEROGENEOUS, or **Heterogeneal**, ſomething that conſiſts of parts of diſſimilar kinds, in oppoſition to *homogeneous*.

Heterogeneous *Light*, is, by Sir Iſaac Newton, ſaid to be that which conſiſts of rays of different degrees of refrangibility: thus the common light of the ſun or clouds is heterogeneous, being a mixture of all ſorts of rays.

Heterogeneous *Nouns*, one of the three variations in irregular nouns; or ſuch as are of one gender in the ſingular number, and of another in the plural.—Heterogeneous, under which are comprehended mixed nouns, are ſix-fold. 1. Thoſe which are of the maſculine gender in the ſingular number, and neuter in the plural; as *hic tartarus, hæc tartara.* 2. Thoſe which are maſculine in the ſingular number, but maſculine and neuter in the plural; as *hic locus, hi loci, & hæc loca.* 3. Such as are feminine in the ſingular number, but neuter in the plural; as *hæc carbaſus, & hæc carbaſa.* 4. Such nouns as are neuter in the ſingular number, but maſculine in the plural; as *hoc cœlum, hi cœli.* 5. Such as are neuter in the ſingular, but neuter and maſculine in the plural; as *hoc raſtrum, hi raſtri, & hæc raſtra;* and, 6. Such as are neuter in the ſingular, but feminine in the plural number; as *hoc epulum, hæ epulæ.*

HETEROSCII, in geography, a term of relation, denoting ſuch inhabitants of the earth as have their ſhadows falling but one way, as thoſe who live between the tropics and polar circles; whoſe ſhadows at noon in north latitude are always to the northward, and in ſouth latitude to the ſouthward.

HEVELIUS, or **Hevelke**, (John), an eminent aſtronomer, was born at Dantzic in 1611. He ſtudied in Germany, England, and France, and every where obtained the eſteem of the learned. He was the firſt that diſcovered a kind of libration in the moon, and made ſeveral important obſervations on the other planets. He alſo diſcovered ſeveral fixed ſtars, which he named the *firmament of Sobieſki*, in honour of John III. king of Poland. His wife was alſo well ſkilled in aſtronomy, and made a part of the obſervations publiſhed by her huſband. In 1673, he publiſhed, A deſcription of the inſtruments with which he made his obſervations, under the title of *Machina Cœleſtis:* and in 1679, he publiſhed the ſecond part of this work; but in September the ſame year, while he was at a ſeat in the country, he had the misfortune to have his houſe at Dantzic burnt down. By this calamity he is ſaid to have ſuſtained a loſs of ſeveral thouſand pounds; having not only his obſervatory and all his valuable inſtruments and apparatus deſtroyed; but alſo a great number of copies of his *Machina Cœleſtis;* which accident has made this ſecond part very ſcarce, and conſequently very dear. In the year 1690 were publiſhed, "Firmamentum Sobieſcianum," and "Prodomus aſtronomicæ & novæ tabulæ ſolares, una cum catalogo fixarum," in which he lays down the neceſſary preliminaries for taking an exact catalogue of the ſtars. But both theſe works are poſthumous; for Hevelius died in 1687, on his birth-day, aged 76. He was a man greatly eſteemed by his countrymen, not only on account of his great reputation and ſkill in aſtronomy, but as a very excellent and worthy magiſtrate. He was made a burgomaſter of Dantzic; which office he is ſaid to have executed with the utmoſt integrity and applauſe. He was alſo very highly eſteemed by foreigners; and not only by thoſe ſkilled in aſtronomy and the ſciences, but by foreign princes and potentates: as appears abundantly from a collection of their letters which were printed at Dantzic in the year 1683.

HEURNIUS, or Van Heurn, (John), a learned phyſician, was born at Utrecht, in 1543; and ſtudied at Louvain, Paris, Padua, and Pavia. At his return to his native country he became magiſtrate of Amſterdam; after which he was profeſſor of phyſic at Leyden, and rector of the univerſity of that city, where he died in 1601. He wrote, among other works, ſeveral treatiſes on the diſeaſes of different parts of the body, and ſeveral commentaries on the works of Hippocrates.—*Otho Heurnius*, his ſon, was alſo profeſſor of phyſic at Leyden, and wrote ſome books.

HEUSDEN, a ſtrong town of the United Provinces in Holland, ſeated on the river Maeſe among marſhes, with a handſome caſtle, in E. Long. 5. 3. N. Lat. 51. 47.

HEWSON (William), a very ingenious anatomiſt, was born in 1739. He became aſſiſtant to Dr Hunter, and was afterwards in partnerſhip with him; but, on their diſagreement, read anatomical lectures at his own houſe (in which he was ſeconded by Mr Falconer). He wrote *Inquiries into the properties of the blood, and the lymphatic ſyſtem*, 2 vols; and diſputed with Dr Monro the diſcovery of the lymphatic ſyſtem of veſſels in oviparous animals. He died in 1774.

HEXACHORD, in ancient muſic, a concord called by the moderns a *ſixth*.

HEXAGON, in geometry, a figure of ſix ſides and angles; and if theſe ſides and angles are equal, it is called a *regular hexagon*.

HEXAHEDRON, in geometry, one of the five platonic bodies, or regular ſolids, being the ſame with a cube.

HEXAMETER, in ancient poetry, a kind of verſe conſiſting of ſix feet; the firſt four of which may be indifferently either ſpondees or dactyls; the fifth is generally a dactyl, and the ſixth always a ſpondee. Such is the following verſe of Horace:

1 2 3 4 5 6
Aut pro|deſſe vo|lunt, aut| dele|ctare po|etæ.

HEXANDRIA, in botany, (from ἑξ, "ſix;" and ανηρ, "a man;") the name of the ſixth claſs in Linnæus's ſexual method, conſiſting of plants with hermaphrodite flowers, which are furniſhed with ſix ſtamina or male organs, that are of an equal length. See Botany, p. 1292.

HEXASTYLE, in architecture, a building with ſix columns in front.

HEXHAM, a town of Northumberland. It is commonly reckoned to be the *Alexodunum* of the Romans, where the firſt cohort of the Spaniards were in garriſon. It was made a biſhop's ſee by Etheldreda, wife of king of Egfred, in the year 675. Its firſt biſhop, St Wilfred, built here a moſt magnificent cathedral and monaſtery, and it was poſſeſſed by ſeven biſhops ſucceſſively; but being very much infeſted by the Danes, the ſee was removed to York. The town is at preſent well built, and its market is pretty good for corn. There was a remarkable and bloody battle fought near this town, between the houſes of Lancaſter and York, wherein the former were defeated, chiefly by the extraordinary bravery and conduct of John Nevil, lord Montacute, who was for that reaſon created earl of Northumberland. W. Long. 1. 37. N. Lat. 55. 5.

HEYDON, a little, pleaſant, well-built town of Yorkſhire, in that part called *Holderneſſe*, ſeated on a river that falls into the Humber. It has now but one church, tho' there are the remains of two more; and had formerly a conſiderable trade, which is now loſt, on account of its being ſo near Hull. The houſes being rebuilt, adds to the beauty of the place. It is a corporation; and is governed by a mayor, a recorder, nine aldermen, and two bailiffs, who have the power of chooſing ſheriffs, and are juſtices of the peace. It ſends two members to parliament. W. Long. 0. 55. N. Lat. 53. 46.

Heydon (John), who ſometimes aſſumed the name of *Eugenius Theodidactus*, was a great pretender to ſkill in the Roſicrucian philoſophy and the celeſtial ſigns, in the reign of king Charles I.; and wrote a conſiderable number of chemical and aſtrological works, with very ſingular titles. This ridiculous author was much reſorted to by the duke of Buckingham, who was infatuated with judicial aſtrology. He employed him to calculate the king's and his own nativity, and was aſſured that his ſtars had promiſed him great things. The duke alſo employed Heydon in ſome treaſonable and ſeditious practices, for which he was ſent to the tower. He loſt much of his former reputation by telling Richard Cromwell and Thurloe, who went to him diſguiſed like cavaliers, That Oliver would infallibly be hanged by a certain time; which he out-lived ſeveral years.

HEYLIN (Dr Peter), an eminent Engliſh writer, was born at Burford, in Oxfordſhire, in 1600. He ſtudied at Hart-hall, Oxford; where he took his degrees in arts and divinity, and became an able geographer and hiſtorian. He was appointed one of the chaplains in ordinary to king Charles I. was preſented to the rectory of Hemingford in Huntingtonſhire, made a prebendary of Weſtminſter, and obtained ſeveral other livings: but of theſe he was deprived by the parliament, who alſo ſequeſtered his eſtate; by which means he and his family were reduced to great neceſſity. However, upon the reſtoration, he was reſtored to his ſpiritualities; but never roſe higher than to be ſubdean of Weſtminſter. He died in 1662; and was interred in St Peter's church in Weſtminſter, where he had a neat monument erected to his memory. His writings are very numerous: the principal of which are, 1. *Microcoſmus*, or a deſcription of the great world. 2. *Coſmographia*. 3. The hiſtory of St George. 4. *Eccleſia vindicata*, or the church of England juſtified. 5. Hiſtorical and miſcellaneous tracts, &c.

HEYWOOD (John), one of our moſt ancient dramatic poets, was born at North-Mims, near St Alban's in Hertfordſhire, and educated at Oxford. From thence he retired to the place of his nativity; where he had the good fortune to become acquainted with Sir Thomas More, who, it ſeems, had a ſeat in that neighbourhood. This patron of genius introduced our comic poet to the princeſs Mary, and afterwards to her father Henry, who, we are told, was much delighted with his wit, and ſkill in muſic, and by whom he was frequently rewarded. When his former patroneſs, queen Mary, came to the crown, Heywood became a favourite at court, and continued often to entertain her majeſty, *exerciſing his fancy before her, even to the time that ſhe lay languiſhing on her death-bed.*

bed. On the acceſſion of Elizabeth, being a zealous Papiſt, he thought fit to decamp, with other favourites of her deceaſed majeſty. He ſettled at Mechlin in Flanders, where he died in the year 1565.—John Heywood was a man of no great learning, nor were his poetical talents by any means extraordinary; but he poſſeſſed talents of more importance in the times in which he lived, namely, the talents of a jeſter. He wrote ſeveral plays; 500 epigrams; *A dialogue in verſe concerning Engliſh proverbs*; and, *The ſpider and fly, a parable*, a thick 4to. Before the title of this laſt work is a whole-length wooden print of the author; who is alſo repreſented at the head of every chapter in the book, of which there are 77.—He left two ſons, who both became Jeſuits and eminent men: viz. Ellis Heywood, who continued ſome time at Florence under the patronage of cardinal Pole, and became ſo good a maſter of the Italian tongue, as to write a treatiſe in that language, entitled *Il Moro*; he died at Louvain about the year 1572. His other ſon was Jaſper Heywood, who was obliged to reſign a fellowſhip at Oxford on account of his immoralities: he tranſlated three tragedies of Seneca, and wrote various poems and deviſes; ſome of which were printed in a volume, intitled, *The paradiſe of dainty deviſes*, 4to. 1573. He died at Naples in 1597

Heywood (Eliza), one of the moſt voluminous novel writers this iſland ever produced; of whom we know no more than that her father was a tradeſman, and that ſhe was born about the year 1696. In the early part of her life, her pen, whether to gratify her own diſpotion or the prevailing taſte, dealt chiefly in licentious tales, and memoirs of perſonal ſcandal: the celebrated Atalantis of Mrs Manley ſerved her for a model; and *The court of Carimania*, *The new Utopia*, with ſome other pieces of a like nature, were the copies her genius produced. She alſo attempted dramatic writing and performance, but did not ſucceed in either. Whatever it was that provoked the reſentment of Pope, he gave full ſcope to it by diſtinguiſhing her as one of the prizes to be gained in the games introduced in honour of Dullneſs, in his Dunciad. Nevertheleſs, it ſeems undeniable, that there is much ſpirit, and much ingenuity, in her manner of treating ſubjects, which the friends of virtue may perhaps wiſh ſhe had never meddled with at all. But, whatever offence ſhe may have given to delicacy or morality in her early works, ſhe appears to have been ſoon convinced of, and endeavoured to atone for in the latter part of her life; as no author then appeared a greater advocate for virtue. Among her riper productions may be ſpecified, *The female Spectator*, 4 vols; *The hiſtory of Miſs Betſy Thoughtleſs*, 4 vols; *Jemmy and Jenny Jeſſamy*, 3 vols; *The inviſible ſpy*, 4 vols; with a pamphlet, intitled, *A preſent for a ſervant-maid*. She died in 1759.

HIATUS, properly ſignifies an opening, chaſm, or gap; but it is particularly applied to thoſe verſes where one word ends with a vowel, and the following word begins with one, and thereby occaſions the mouth to be more open, and the ſound to be very harſh.

The term *hiatus* is alſo uſed in ſpeaking of manuſcripts, to denote their defects, of the parts that have been loſt or effaced.

HIBISCUS, Syrian mallow; a genus of the polyandria order, belonging to the monodelphia claſs of plants.

Species. Of this genus there are 25 ſpecies; the moſt remarkable are, 1. The Syriacus, commonly called *althæa frutex*, is a native of Syria. It riſes with ſhrubby ſtalks to the height of eight or ten feet, ſending out many woody branches covered with a ſmooth grey bark, garniſhed with oval ſpear-ſhaped leaves, whoſe upper parts are frequently divided into three lobes. The flowers come out from the wings of the ſtalk at every joint of the ſame year's ſhoot. They are large, and ſhaped like thoſe of the mallow, having five large roundiſh petals which join at their baſe, ſpreading open at the top, in ſhape of an open bell. Theſe appear in Auguſt; and if the ſeaſon is not too warm, there will be a ſucceſſion of flowers till September. The flowers are ſucceeded by ſhort capſules, with five cells, filled with kidney-ſhaped ſeeds; but unleſs the ſeaſon proves warm, they will not ripen in this country. Of this ſpecies there are four or five varieties, differing in the colour of their flowers: the moſt common hath pale purple flowers with dark bottoms; another hath bright purple flowers with black bottoms; a third hath white flowers with purple bottoms; and a fourth, variegated flowers with dark bottoms. There are alſo two with variegated leaves, which are by ſome much eſteemed. All theſe varieties are very ornamental in a garden. 2. The Chinenſis is a native of the Eaſt Indies, whence it has got the name of *China roſe*; but the ſeeds having been carried by the French to their Weſt India ſettlements, it hath thence obtained the name of *Martinico roſe*. Of this there are the double and ſingle flowering kinds; the ſeeds of the firſt frequently produce plants that have only ſingle flowers, but the latter ſeldom vary to the double kind. The plant has a ſoft ſpungy ſtem, which by age becomes ligneous and pithy. It riſes to the height of 12 or 14 feet, ſending out branches towards the top, which are hairy, garniſhed with heart-ſhaped leaves, cut into five acute angles on their borders, and ſlightly ſawed on their edges; of a lucid green on their upper ſide, but pale below. The flowers are produced from the wings of the leaves; the ſingle are compoſed of five petals which ſpread open, and are at firſt white, but afterwards change to a bluſh roſe colour, and as they decay turn purple. In the Weſt Indies, all theſe alterations happen on the ſame day, and the flowers themſelves are of no longer duration; but in Britain the changes are not ſo ſudden. The flowers are ſurrounded by ſhort, thick, blunt, capſules, which are very hairy; having five cells, which contain many ſmall kidney-ſhaped ſeeds, having a fine plume of fibrous down adhering to them. 3. The almoſchus, or muſk, is a native of the Weſt Indies, where the French cultivate great quantities of it. The plant riſes with an herbaceous ſtalk three or four feet high, ſending out two or three ſide-branches, garniſhed with large leaves cut into ſix or ſeven acute angles, ſawed on their edges, having long footſtalks, and placed alternately. The ſtalks and leaves of this ſort are very hairy. The flowers come out from the wings of the leaves upon pretty long footſtalks which ſtand erect. They are large, of a ſulphur colour, with purple bottoms; and are ſucceeded by pyramidal five-cornered capſules, which open in five cells, filled with large kidney-ſhaped ſeeds of a very muſky odour. 4. The tiliaceus, or maho-tree, is a native of both the Indies. It riſes with a woody, pithy ſtem, to the height of ten feet, dividing into ſeveral branches towards the top, which are covered with a woolly down, garniſhed with heart-ſhaped leaves ending in acute points. They are of a lucid green on their upper ſide, and hoary on the under ſide, full of large veins, and are placed alternately. The flowers are produced in looſe ſpikes at the end of the branches, and are of a whitiſh-yellow colour. They are ſucceeded by ſhort acuminated capſules, opening in five cells, filled with kidney-ſhaped ſeeds. 5. The javanica grows naturally on the coaſt of Malabar. It riſes with a woody ſtalk 12 or 14 feet high, dividing into many ſmall branches towards the top, garniſhed with oval ſawed leaves ending in acute points, of a lucid green above, but pale on their under ſide, placed without order. The flowers come out from the ſides of the branches at the wings of the leaves on pretty long footſtalks. They are compoſed of many oblong roundiſh petals of a red colour, which expand like the roſe; the flowers being as large when fully blown as the common red roſe, and as double. 6. The goſſypifolius, with a cotton leaf, is a native of the Weſt Indies, and riſes with an herbaceous ſtem three feet high, ſending out ſeveral lateral branches, which are garniſhed with ſmooth leaves divided into five lobes. The flowers come out at the ſide of the branches. They are of a dirty white, with dark purple bottoms, and are ſucceeded by obtuſe ſeed-veſſels divided into five cells, which are filled with kidney-ſhaped ſeeds. 7. The trionum, Venice mallow, or flower of an hour, is a native of ſome parts of Italy, and has long been cultivated in the gardens of this country. It riſes with a branching ſtalk a foot and an half high, having many ſhort ſpines, which are ſoft, and do not appear unleſs cloſely viewed: the leaves are divided into three lobes, which are deeply jagged almoſt to the midrib. The flowers come out at the joints of the ſtalks, upon pretty long footſtalks. They have a double empalement; the outer being compoſed of ten long narrow leaves, which join at their baſe: the inner is of one thin leaf ſwollen like a bladder, cut into five acute ſegments at the top, having many longitudinal purple ribs, and is hairy. Both theſe are permanent, and incloſe the capſule after the flower is paſt. The flower is compoſed of five obtuſe petals, which ſpread open at the top; the lower part forming an open bell-ſhaped flower. Theſe have dark purple bottoms, but are of a pale ſulphur-colour above. In hot weather the flowers continue but a few hours open; however, there is a ſucceſſion of flowers that open daily for a conſiderable time. 8. The ficifolia, or ketmia of the Braſils, with a fig-leaf, is common in the Weſt Indies. It riſes with a ſoft herbaceous ſtalk from three to five feet high, dividing upward into many branches garniſhed with hand-ſhaped leaves, divided into five lobes. The flowers are produced from the wings of the ſtalks; they are of a pale ſulphur colour with dark purple bottoms, but are of a very ſhort duration; opening in the morning with the riſing ſun, and fading long before noon in hot weather. They are ſucceeded by capſules of very different forms, in the different varieties. In ſome, the capſules are not thicker than a man's finger, and five or ſix inches long; in others, they are very thick, and not more than two or three inches long; in ſome plants they grow erect, in others they are inclined, &c.

Culture. The firſt ſort may be propagated either by ſeeds or cuttings. The ſeeds may be ſown in pots filled with light earth about the latter end of March, and the young plants tranſplanted about the ſame time next year. They will ſucceed in the full ground; but muſt be covered in winter whilſt young, otherwiſe they are apt to be deſtroyed. The ſecond ſort is propagated by ſeeds, which muſt be ſown in a hot-bed. The young plants are to be tranſplanted into ſmall ſeparate pots, and treated like other tender vegetables, only allowing them a good ſhare of air. The third ſort is annual in this country, though biennial in thoſe places where it is native. It is propagated by ſeeds, and muſt be treated in the manner directed for Amaranth. The fourth, fifth, ſixth, and eighth ſorts require the ſame treatment with the third. The ſeventh is propagated by ſeeds, which ſhould be ſown where the plants are deſigned to remain, for they do not bear tranſplanting well. They require no other culture than to be kept free from weeds, and thinned where they are too cloſe; and if the ſeeds are permitted to ſcatter, the plants will come up fully as well as if they had been ſown.

Uſes. The third ſort is cultivated in the Weſt Indies by the French, for the ſake of its ſeeds. Theſe are annually ſent to France in great quantities, and form a conſiderable branch of trade, but the purpoſes which they anſwer are not certainly known. The flowers of the fifth kind are uſed by the Indian women of Malabar for colouring their hair and eyebrows of a black that will not waſh off. The Europeans there uſe it for blacking their ſhoes, and thence have named it the *ſhoe-flower*. The green pods of the ſixth ſort have the taſte of ſorrel, and are uſed by the Weſt Indians for giving an acid taſte to their viands. The eighth ſort is alſo cultivated by the Weſt Indians for the ſake of its pods. Theſe they gather green to put into their ſoups; and having a ſoft viſcous juice, they add a thickneſs to the ſoup which renders it very palatable.

HICETAS of Syracuſe, an ancient philoſopher and aſtronomer, who taught that the ſun and ſtars were motionleſs, and that the earth moved round them. This is mentioned by Cicero, and probably gave the firſt hint of the true ſyſtem to Copernicus. He flouriſhed 344 B. C.

HICKES (George), an Engliſh divine of extraordinary parts and learning, born in 1642. In 1681 he was made king's chaplain, and two years after dean of Worceſter. The death of Charles II. ſtopped his farther preferment; for, though his church principles were very high, he manifeſted too much zeal againſt Popery to be any favourite with James II. On the revolution, he with many others was deprived for refuſing to take the oaths to king William and queen Mary; and ſoon after, archbiſhop Sancroft and his colleagues conſidering how to maintain epiſcopal ſucceſſion among thoſe who adhered to them, Dr Hickes carried over a liſt of the deprived clergy to king James; and with his ſanction a private conſecration was performed, at which it is ſaid lord Clarendon was preſent. Among others, Dr Hickes was conſecrated ſuffragan biſhop of Thetford, and died in 1715.—He wrote, 1. *Inſtitutiones Grammaticæ Anglo-Saxonicæ, et Mœſo-Gothicæ.*

thicæ. 2. *Antiqua literatura ſeptentrionalis.* 3. Two treatiſes, one of the Chriſtian prieſthood, the other of the dignity of the epiſcopal order. 4. Jovian, or an anſwer to Julian the apoſtate. 5. Sermons; with many temporary controverſial pieces on politics and religion.

HICKUP, or Hiccough, a ſpaſmodic affection of the ſtomach, œſophagus, and muſcles ſubſervient to deglutition, ariſing ſometimes from ſome particular injury done to the ſtomach, œſophagus, diaphragm, &c. and ſometimes from a general affection of the nervous ſyſtem. See (the *Index* ſubjoined to) Medicine.

HIDAGE (*Hidagium*), was an extraordinary tax payable to the kings of England for every hyde of land. This taxation was levied not only in money, but in proviſion, armour, &c.; and when the Danes landed in Sandwich in 994, king Ethelred taxed all his lands by hides; ſo that every 310 hides found one ſhip furniſhed, and every eight hides furniſhed one jack and one ſaddle, to arm for the defence of the kingdom, &c.—Sometimes the word *hidage* was uſed for the being quit of that tax: which was alſo called *hidegild;* and interpreted, from the Saxon, a "price, or ranſom paid to ſave one's ſkin or hide from beating."

HIDE, the ſkin of beaſts; but the word is particularly applied to thoſe of large cattle, as bullocks, cows, horſes, &c.

Hides are either raw or green, juſt as taken off the carcaſe, ſalted, or ſeaſoned with ſalt, alum, and ſaltpetre, to prevent their ſpoiling; or curried and tanned. See Tanning.

Hide *of Land*, was ſuch a quantity of land as might be ploughed with one plough within the compaſs of a year, or as much as would maintain a family; ſome call it 60, ſome 80, and others 100 acres.

Hide-*Bound*. See Farriery, §. xix.

HIERACIUM, hawkweed; a genus of the order of polygamia æqualis, belonging to the ſyngeneſia claſs of plants.

Species. 1. The aurantiacum, commonly called *grim the collier*, hath many oblong oval entire leaves, crowning the root; an upright, ſingle, hairy, and almoſt leafleſs ſtalk, a foot high, terminated by reddiſh orange-coloured flowers in a corymbus. Theſe flowers have dark oval aſh-coloured calyces; whence the name of *grim the collier*. 2. The piloſella or mouſe-ear, hath bloſſoms red on the outſide, and pale yellow within; the cups ſet thick with black hairs. The flowers open at eight in the morning, and cloſe about two in the afternoon. 3. The umbellatum grows to the height of three feet, with an erect and firm ſtalk, terminated with an umbel of yellow flowers.

Culture. The firſt is the only ſpecies cultivated in gardens. It is propagated by ſeeds, or parting the roots. The ſeed may be ſown in autumn or ſpring. In June, when the plants are grown two or three inches high, they may be picked out and planted in beds, where they muſt remain till the next autumn, and then tranſplanted where they are to remain.

Properties. The ſecond ſpecies is common in dry paſtures in England; it has a milky juice, but is leſs bitter and aſtringent than is uſual with plants of that claſs. It is reckoned hurtful to ſheep. An inſect of the cochineal genus, (*Coccus Polonicus*) is often found at the roots, (*Act. Upſal.* 1752.) Goats eat it; ſheep are not fond of it; horſes and ſwine refuſe it.—The third ſpecies is a native of Scotland, and grows in rough ſtony places, but is not very common. The flowers are ſometimes uſed for dying yarn of a fine yellow colour.

HIERACITES, in church-hiſtory, Chriſtian heretics in the third century: ſo called from their leader Hierax, a philoſopher of Egypt; who taught that Melchiſedek was the Holy Ghoſt, denied the reſurrection, and condemned marriage.

HIERANOSIS, or Morbus Sacer. See (the *Index* ſubjoined to) Medicine.

HIERA picra. See Pharmacy, n° 826.

HIERARCHY, among divines, denotes the ſubordination of angels.

Some of the rabbins reckon four, others ten, orders or ranks of angels; and give them different names according to their different degrees of power and knowledge.

Hierarchy, likewiſe denotes the ſubordination of the clergy, eccleſiaſtical polity, or the conſtitution and government of the Chriſtian church conſidered as a ſociety.

HIERES, the name of ſome ſmall iſlands lying near the coaſt of Provence in France, oppoſite to the towns of Hieres and Toulon, where the Engliſh fleet lay many months in 1744, and blocked up the French and Spaniſh fleets in the harbour of Toulon.

Hieres, a town of Provence in France, ſeated on the Mediterranean ſea. It is a pretty little town, and was formerly a colony of the Marſilians; and pilgrims uſed to embark here for the holy land. But its harbour being now choaked up, it is conſiderable only for its ſalt-works. E. Long. 6. 13. N. Lat. 43. 7.

HIERO I. and II. kings of Syracuſe. See Syracuse.

HIEROCLES, a cruel perſecutor of the Chriſtians, and a violent promoter of the perſecution under Diocleſian, flouriſhed in 302. He wrote ſome books againſt the Chriſtian religion; in which he pretends ſome inconſiſtencies in the Holy Scriptures, and compares the miracles of Apollonius Tyanæus to thoſe of our Saviour. He was refuted by Lactantius and Euſebius. The remains of his works were collected into one volume octavo, by biſhop Pearſon; and publiſhed in 1654, with a learned diſſertation prefixed to the work.

Hierocles, a Platonic philoſopher of the fifth century, taught at Alexandria, and was admired for his eloquence. He wrote ſeven books upon Providence and Fate; and dedicated them to the philoſoſopher Olympiodorus, who by his embaſſies did the Romans great ſervices under the emperors Honorius and Theodoſius the younger. But theſe books are loſt, and we only know them by the extracts in Photius. He wrote alſo a Commentary upon the golden verſes of Pythagoras; which is ſtill extant, and has been ſeveral times publiſhed with thoſe verſes.

HIEROGLYPHICS, in antiquity, myſtical characters, or ſymbols, in uſe among the Egyptians, and that as well in their writings as inſcriptions; being the figures of various animals, the parts of human bodies, and menchanical inſtruments.

The word is compoſed of the Greek ιερος, *ſacer*, "holy," and γλυφειν, *ſculpere*, "to engrave;" it being the cuſtom to have the walls, doors, &c. of their temples, obeliſks, &c. engraven with ſuch figures.

After Hermes, and the Egyptian prieſts who ſucceeded, had, by long ſtudy and ſpeculation, formed a ſyſtem of theology, and natural philoſophy, in which God, the ſupreme cauſe of all, was the univerſal ſoul diffuſed through the whole creation, they endeavoured to expreſs the divine attributes and operations of the Deity, in the works of nature, by the properties and powers of living animals, and other natural productions, as the proper ſymbols of ſuch amazing cauſes.

In order to chooſe the moſt proper ſymbols, and, at the ſame time, the moſt expreſſive of the divine attributes, and of the effects of Divine Providence in every part of the univerſe, they ſtudied with great application and care, not only the peculiar properties of thoſe animals, birds, and fiſhes, herbs and plants, which Egypt produced, but alſo the geometrical properties of lines and figures; and by a regular connection of theſe in various orders, attitudes, and compoſitions, they formed the whole ſyſtem of their theology and philoſophy, which was hidden under hieroglyphic figures and characters, known only to themſelves, and to thoſe who were initiated into their myſteries.

In this ſyſtem their principal hero-gods, Oſiris and Iſis, theologically repreſented the Supreme Being, and univerſal nature; and phyſically ſignified the two great celeſtial luminaries, the ſun and moon, by whoſe influence all nature was actuated. In like manner, the inferior heroes repreſented the ſubordinate gods, who were the miniſters of the ſupreme ſpirit; and phyſically they denoted the inferior mundane elements and powers. Their ſymbols repreſented, and comprehended under them, the natural productions of the Deity; and the various beneficial effects of Divine Providence, in the works of creation: and alſo the order and harmony, the powers and mutual influence of the ſeveral parts of the univerſal ſyſtem.

This is the ſum and ſubſtance of the Egyptian learning, ſo famed in ancient times throughout the world. And in this general ſyſtem, the particular hiſtory of their hero-gods was contained, and applied to phyſical cauſes, and theological ſcience. The hieroglyphic ſyſtem was compoſed with great art and ſagacity; and was ſo univerſally eſteemed and admired, that the moſt learned philoſophers of other nations came into Egypt on purpoſe to be inſtructed in it, and to learn the philoſophy and theology conveyed by theſe appoſite ſymbols.

In this hieroglyphic ſyſtem the hero-gods not only repreſented, and were ſymbols of, the ſupreme God, and ſubordinate deities; but they had each their animal ſymbol, to repreſent their peculiar powers, energy, and adminiſtration: and their figures were compounded of one part or other of their ſymbols, to expreſs more ſenſibly the natural effects of divine energy attributed to them.

Thus Oſiris, when he repreſented the power and all-ſeeing providence of the Supreme Being, had a human body with a hawk's head, and a ſceptre in his hand, and decorated with the other regalia or enſigns of royalty. Under the ſame form alſo he repreſented the ſun, the great celeſtial luminary; and, as it were, the ſoul of the world: his ſymbol now was a bull, and the ſcarabæus or beetle, which expreſſed the ſun's motion, by rolling balls of dung, containing its ſeed, backwards, or from eaſt to weſt, his face being towards the eaſt. The ſymbolic bull was likewiſe of a particular form and make, to denote the various influences of the ſun.

Oſiris was alſo delineated ſometimes with a bull's, and ſometimes with a lion's head, to repreſent the heat, vigour, and influence of the ſun, eſpecially in the inundation of the Nile, when the ſun was in the celeſtial ſign Leo; and likewiſe to expreſs the ſolar influence in all the productions of nature. And it is alſo obſervable, that the bull and lion were parts of the Jewiſh cherub's ſymbol; and as the one was the head of the wild, and the other of the tame beaſts, they repreſented, in conjunction, the animal-creation; while the other two parts, namely, the eagle and human figure, repreſented the aërial, rational creation.

Iſis was formed with many beaſts, to repreſent the earth, the univerſal mother; and with a cornucopia in her hand, denoting the nutritive and productive powers of nature: her ſymbol was a cow, part black and part white, to repreſent the enlightened and dark parts of the moon.

Pan had the horns and feet, and ſometimes alſo the head, of a goat, which was his ſymbol, to ſhew the generative power of nature, over which he preſided. At the ſame time, he ſymbolically repreſented univerſal nature, the cauſe of all things.

Hermes had a dog's head, which was his ſymbol, to denote his ſagacity in the invention of arts and ſciences; eſpecially in his watchful diligence in the culture of religious rites and ſacred knowledge: at the ſame time he ſymbolically repreſented the Divine Providence, and was worſhipped as the chief counſellor of Saturn and Oſiris; he who communicated the will of the gods to men, and by whom their ſouls were conducted into the other world. He was likewiſe repreſented by the ibis, and with the head of this bird, which was at the ſame time his ſymbol, to ſignify his conveying literature to the Egyptians, which they believed was done under the form of this bird, and confined to their nation only, as the ibis was known to live no where but in Egypt.

Ammon repreſented the deity called *Amun*, and his ſymbol was a ram. He was alſo delineated with a ram's head and horns, to denote the creative power of God, and his beneficial and diffuſive influence through the works of nature, making every thing fruitful, to produce and multiply its kind; and cheriſhing and preſerving them by the warmth of the ſun, and an internal vital heat and vigour.

The univerſal ſoul itſelf was beautifully repreſented by a winged globe, with a ſerpent emerging from it. The globe denoted the infinite divine eſſence, whoſe centre, to uſe the expreſſion in the Hermetic writings, was every where, and circumference no where. The wings of the hawk repreſented the divine all-comprehenſive intellect: and the ſerpent denoted the vivifying power of God, by which life and exiſtence are given to all things.

Typhon repreſented the moſt powerful dæmon, or evil genius; who was continually at war with Oſiris and Iſis, the moſt benevolent geniuſes of Egypt. His ſymbol was an hippopotamus, or river-horſe, a very treacherous and cruel animal.

Orus was a principal deity of the Egyptians; and, according to his heiroglyphic forms and habits, ſignified ſometimes the ſun, and ſometimes the harmony of the whole mundane ſyſtem. At the ſame time, being the offspring of Oſiris and Iſis, he was always repreſented young. He alſo repreſented the order and fitneſs of the ſeveral parts of the external ſenſible world, formed by the wiſdom of Divine Providence, expreſſed by Iſis; and by the intellect, power, and goodneſs of the ſupreme God, repreſented by Oſiris. Hence, and alſo becauſe Oſiris and Iſis repreſented phyſically the ſun and moon, who, by their diffuſive light, heat, and influence, preſerve the viſible ſyſtem, Orus was called their offspring.

To expreſs the hieroglyphic mean of Orus, as repreſenting the world, he was repreſented with a ſtaff, upon the top of which was the head of the upupa, to ſignify, by the variegated feathers of that bird, the beautiful variety of the creation. In one of his hands he held a lituus, to denote the harmony of the ſyſtem; and a gnomon in the other, to ſhew the perfect proportions of its parts. Behind him was a triangle inſcribed in a circle, to ſignify that the world was made by the unerring wiſdom of God. He had alſo ſometimes a cornucopia in his hand, to denote the fertility and productions of the earth.

Harpocrates was deſcribed holding one of his fingers on his lips, to denote the myſterious and ineffable nature of God; and that the knowledge of him was to be ſearched after, with profound and ſilent meditation, and, at the ſame time, that they are not to be uttered or divulged.

Upon the whole, almoſt all the Egyptian deities and ſymbols centered in two, namely, Oſiris and Iſis; who repreſented, under various hieroglyphic forms, both the celeſtial and terreſtrial ſyſtem, together with all the divine attributes, operations, and energy, which created, animated, and preſerved them.

The Egyptians likewiſe concealed their moral philoſophy under hieroglyphic ſymbols; but theſe were not the ſubjects of the hieroglyphics delineated on obeliſks. And as hieroglyphic and ſymbolical figures were very ancient in Egypt, and firſt invented, at leaſt formed into a ſyſtem, there; ſo they were thence carried into other countries, and imitated in all religious myſteries as well as in political and moral ſcience.

The preceding ſymbolical figures making the ſubſtance of hieroglyphics, and all belonging to Oſiris, his family, and contemporaries, they were probably formed into a ſyſtem ſoon after the death of thoſe hero-gods, by ſome who had been inſtructed, in the art of hieroglyphics, by Hermes the inventor of them. The firſt he formed himſelf; and the others were probably added by his learned ſucceſſors, who had been inſtructed by him in all his myſterious learning.

This hieroglyphic ſyſtem was, in its beginning, more ſimple, and leſs compounded, than afterwards; for it had been improving for ſeveral ages before it appeared on the obeliſks of the temples. And hence we may infer the time of the firſt Egyptian hieroglyphic ſymbols; for, in all probability, they were not older than the time of the famous Hermes, who flouriſhed in the reign, and ſome time after the death, of Oſiris.

The hieroglyphic ſymbols were, in early times, carried into Greece; and gave the firſt occaſion to the fables of the poets, with regard to the metamorphoſes of the gods, which they improved from inventions of their own; and from the knowledge of them, the Greeks aſcribed peculiar arts and inventions to their gods, whoſe names they firſt received from Egypt.

But beſides the hieroglyphics in common uſe among the people, the Egyptian prieſts had certain myſtical characters, in which they wrapped up and concealed their doctrines from the vulgar. It is ſaid that theſe ſomething reſembled the Chineſe characters, and that they were alſo the invention of Hermes. Sir John Marſham conjectures, that the uſe of theſe hieroglyphical figures of animals introduced the ſtrange worſhip paid them by that nation: for as theſe figures were made choice of according to the reſpective qualities of each animal, to expreſs the qualities and dignity of the perſons repreſented by them, who were generally their gods, princes, and great men, and being placed in their temples as the images of their deities, hence they came to pay a ſuperſtitious veneration to the animals themſelves.

HIEROGRAMMATISTS, i. e. *holy regiſters*, were an order of prieſts among the ancient Egyptians, who preſided over learning and religion. They had the care of the hieroglyphics, and were the expoſitors of religious doctrines and opinions. They were looked upon as a kind of prophets; and it is pretended that one of them predicted to an Egyptian king, that an Iſraelite (meaning Moſes), eminent for his qualifications and atchievements, would leſſen and depreſs the Egyptian monarchy.

HIEROMANCY, in antiquity, that part of divination which predicted future events from obſerving the various things offered in ſacrifice. See DIVINATION and SACRIFICE.

HIEROMNEMON, the name of an officer in the Greek church, whoſe principal function it was to ſtand behind the patriarch at the ſacraments and other ceremonies of the church, and to ſhew him the prayers, pſalms, &c. in the order in which they were to be rehearſed.

HIERONYMUS. See JEROME.

HIEROPHANTES, in Grecian antiquity, the name by which the Athenians called thoſe prieſts and prieſteſſes who were appointed by the ſtate to have the ſuperviſal of things ſacred, and to take care of the ſacrifices.

HIEROPHYLAX, an officer in the Greek church, who was guardian or keeper of the holy utenſils, veſtments, &c. anſwering to our *ſacriſta* or veſtry-keeper.

HIGH, a term of relation, importing one thing's being ſuperior or above another: thus we ſay, a *high* mountain, the *high* court of parliament, *high* relievo, &c.

HIGH, in muſic, is ſometimes uſed in the ſame ſenſe with *loud*, and ſometimes in the ſame ſenſe with *acute*.

HIGH *Dutch*, is the German tongue in its greateſt purity, &c. as ſpoken in Miſnia, &c.

HIGH *Operation*, in chirurgery, is a method of extracting the ſtone; thus called, becauſe the ſtone is taken out at the upper part of the bladder. See SURGERY.

High *Way*, a free paſſage for the king's ſubjects; on which account it is called *the king's high-way*, though the freehold of the ſoil belong to the owner of the land. Thoſe ways that lead from one town to another, and ſuch as are drift or cart ways, and are for all travellers in great roads, or that communicate with them, are high-ways only; and as to their reparation, are under the care of ſurveyors.

HIGHAM ferrers, an ancient borough of Northamptonſhire in England, which has its name from the family of the Ferrers, to whom it formerly belonged, and who had a caſtle in its neighbourhood. It ſends one member to parliament. E. Lon. 1. 40. N. Lat. 52. 20.

HIGHGATE, a village five miles north of London. It has its name from its high ſituation, and from a gate ſet up there about 400 years ago, to receive toll for the biſhop of London, when the old miry road from Gray's-inn lane to Barnet was turned through the biſhop's park. There was a hermitage where the chapel now ſtands; and one of the hermits cauſed a cauſeway to be made between Highgate and Iſlington, with gravel dug out of the top of the hill, where there is now a pond. Near the chapel, in 1562, lord chief baron Cholmondely built and endowed a free ſchool, which was enlarged, in 1570, by Edwin Sandys, biſhop of London.—This village is a noted and airy retirement for the gentry and wealthy citizens; and is a place of good accommodation, beſides its affording a delightful and pleaſant proſpect over the city and adjacent country.

HIGHLANDERS, the inhabitants of the mountainous parts of Scotland, to the north and north-weſt, including thoſe of the Hebrides or Weſtern Iſles.—They are a branch of the ancient Celtæ; and undoubtedly the deſcendants of the firſt inhabitants of Britain, as appears from the many monuments of their language ſtill retained in the moſt ancient names of places in all parts of the iſland. The Highlanders, or, as they are often termed by ancient authors, the *Caledonians*, were always a brave, warlike, and hardy race of people; and, in the remoteſt times, ſeem to have poſſeſſed a degree of refinement in ſentiment and manners, then unknown to the other nations that ſurrounded them. This appears not only from their own traditions and poems, but alſo from the teſtimony of many ancient authors. This civilization was probably owing in a great meaſure to the order of the Bards, or Druids, and ſome other inſtitutions peculiar to this people.

The ancient Highlanders lived in the hunting ſtate till ſome time after the æra of Fingal, who was one of their kings, towards the cloſe of the third century. For ſome ages after that, they turned their chief attention to the paſtoral life, which afforded a leſs precarious ſubſiſtence. Till of late, agriculture in moſt parts of the Highlands, made but little progreſs.

The Highlanders always enjoyed a king and government of their own, till Kenneth M'Alpin, (anno 845,) after having ſubdued the Pictiſh kingdom, transferred thither the ſeat of royalty. This event proved very unfavourable to the virtues of the Highlanders, which, from this period, began to decline. The country, no longer awed by the preſence of the ſovereign, fell into anarchy and confuſion. The chieftains began to extend their authority, to form factions, and to foment diviſions and feuds between contending clans. The laws were either too feeble to bind them, or too remote to take notice of them. Hence ſprung all thoſe evils which long diſgraced the country, and diſturbed the peace of its inhabitants. Robbery or plunder, providing it was committed on any one of an adverſe clan or tribe, was countenanced and authoriſed; and their repriſals on one another were perpetual. Thus quarrels were handed down from one generation to another, and the whole clan were bound in honour to eſpouſe the cauſe of every individual that belonged to it. By this means the genius of the people was greatly altered; and the Highlanders of a few ages back were almoſt as remarkable for their irregular and diſorderly way of life, as their predeceſſors were for their civilization and virtue. It is from not attending to this diſtinction between the ancient Highlanders and their poſterity in later times, that many have doubted the exiſtence of thoſe exalted virtues aſcribed by their poets to the more ancient inhabitants of the country. But now that the power of the chieſtains is again aboliſhed, law eſtabliſhed, and property ſecured, the genius of the people (where it is not hindered by ſome other extraneous cauſe) begins again to ſhew itſelf in its genuine colours; and many of their ancient virtues begin to ſhine with conſpicuous luſtre. Juſtice, generoſity, honeſty, friendſhip, peace and love, are perhaps nowhere more cultivated than among this people. But one of the ſtrongeſt features which marked the character of the Highlanders in every age, was their hoſpitality and benevolence to ſtrangers. At night the traveller was always ſure to find a hearty welcome in whatever houſe he ſhould go to; and the hoſt thought himſelf happier in giving the entertainment, than the gueſt in receiving it. Even with regard to their enemies, the laws of hoſpitality were obſerved with the moſt ſacred regard. They who fought againſt each other in the day, could in the night feaſt, and even ſleep together, in the ſame houſe. From the ſame principle, they were, in moſt other caſes, ſo faithful to their truſt, that they rarely betrayed any confidence repoſed in them. A promiſe they thought as binding as an oath, and held it equally inviolable and ſacred.

The Caledonians in all ages have been much addicted to poetry and muſic. The poems of Oſſian, ſo univerſally repeated, and ſo highly eſteemed by every Highlander, are a ſtrong proof of the early proficiency of this people in the poetical art. Even to this day, notwithſtanding the many diſadvantages they labour under, the moſt illiterate of either ſex diſcover frequently a genius for poetry, which often breaks forth in the moſt natural and ſimple ſtrains, when love, grief, joy, or any other ſubject of ſong, demands it. Wherever their circumſtances are ſo eaſy as to allow them any reſpite from toil, or any cheerfulneſs of ſpirits, a good portion of their time, eſpecially of the winter-nights, is ſtill devoted to the ſong and tale. This laſt ſpecies of compoſition is chiefly of the novel-kind, and is handed down by tradition like their poems. It was the work of the bards; and proved, while they exiſted, no contemptible entertainment. But ſince the extinction of that order, both the Galic poems and tales are, in a great meaſure, either loſt or adulterated. —The genius and character of the Galic poetry is well known. It is tender, ſimple, beautiful, and ſublime.

Among the ancient Highlanders, the harp was the chief inſtrument of muſic. It ſuited the mildneſs of their manners, and was well adapted to the peace and quiet which they enjoyed under their own kings. In a later period, however, when the conſtant quarrels of their chiefs, and the endleſs feuds of contending clans, turned all their thoughts to war, it was forced to give place to the bag-pipe, an inſtrument altogether of the martial kind, and therefore well ſuited to the ſtate of the country at that time. But ever ſince the cauſe which had brought this inſtrument in vogue has ceaſed to operate, the attention to it has been on the decline; ſo that the harp, with very little encouragement, might again reſume the ſeat from which it was once expelled. —The moſt, and eſpecially the oldeſt of the Highland muſic, having been compoſed to the harp, is of a ſoft, tender, and elegiac caſt, as beſt ſuited the genius of that inſtrument. Theſe pieces are generally expreſſive of the paſſions of love and grief. Other pieces, which were compoſed in their ſtate of war, and adapted to a different inſtrument, are altogether bold and martial. And many are of a ſprightly and cheerful caſt, the offspring of mirth, and the ſport of fancy in the ſeaſon of feſtivity. Many of theſe laſt are of the chorus kind; and are ſung in almoſt all the exerciſes in which a number of people are engaged, ſuch as rowing, reaping, fulling, &c. The time of theſe pieces is adapted to the exerciſes to which they are reſpectively ſung. They greatly forward the work, and alleviate the labour. The particular muſick which is generally uſed by the Highlanders in their dances is well known by the name of *Strathſpey reels*.

The language of the Highlanders is ſtill the Galic; which, with many of their cuſtoms and manners, has been ſecured to them by their mountains and faſtneſſes, amidſt the many revolutions which the reſt of the iſland has undergone in ſo long a courſe of ages. The Galic ſeems to be the oldeſt and pureſt dialect which remains of the Celtic, as appears from its approaching the neareſt to the names of places, &c. which that language left in moſt countries where it prevailed, and from its moſt obvious affinity to thoſe tongues, ancient or modern, which have been in any meaſure derived from the old Celtic. The Galic has all the marks of an original and primitive language. Moſt of the words are expreſſive of ſome property or quality of the objects which they denote. This, together with the variety of its ſounds (many of which, eſpecially of thoſe that expreſs the ſoft and mournful paſſions, are peculiar to itſelf), renders it highly adapted for poetry. It is generally allowed to have been the language of court, in Scotland, till the reign of Malcom Canmore. The Galic epithet of *Can-more*, or "large head," by which this king is diſtinguiſhed, ſeems to intimate ſo much. In ſome particular parliaments at leaſt, it was ſpoken much later, as in that held by Robert the Bruce at Ardchattan. That it has been formerly a good deal cultivated, appears from the ſtyle and complexion of its poems and tales, and from ſeveral ancient MSS. that have come down to the preſent times. To ſtrangers the Galic has a forbidding aſpect, on account of the number of its quieſcent conſonants (which are retained to mark the derivation of words and their variation in caſe and tenſe), but its ſound is abundantly muſical and harmonious; and its genius ſtrong and maſculine. Its alphabet conſiſts of 18 letters, of which one is an aſpirate, 12 are conſonants, and five are vowels.

The Highlanders are beginning of late to apply to learning, agriculture, and eſpecially to commerce, for which their country, every where indented with arms of the ſea, is peculiarly favourable. Cattle is the chief ſtaple of the country; but it produces more grain than would ſupply its inhabitants, if ſo much of it were not conſumed in whiſky. The natives are beginning to avail themſelves of their mines, woods, wool, and fiſheries; and by a vigorous application, with the due encouragement of government, may become a proſperous and uſeful people.

The Highlanders are of a quick and penetrating genius, ſtrongly tinctured with a curioſity or thirſt of knowledge, which diſpoſes them to learn any thing very readily. They are active and induſtrious, where oppreſſion does not diſcourage them by ſecluding even the hope of thriving. They are remarkably bold and adventurous, which qualifies them for being excellent ſeamen and ſoldiers. They are generally of a middle ſize, rather above it than otherwiſe; their eyes are briſk and lively, their features diſtinctly marked, and their perſons tight and well made. Their countenance is open and ingenuous, and their temper frank and communicative.

HIGHNESS, a quality, or title of honour given to princes.—The kings of England and Spain had formerly no other title but that of *highneſs*; the firſt till the time of James I. and the ſecond till that of Charles V. The petty princes of Italy began firſt to be complimented with the title of *highneſs* in the year 1630.—The duke of Orleans aſſumed the title of *royal highneſs* in the year 1631, to diſtinguiſh himſelf from the other princes of France.

The duke of Savoy, late king of Sardinia, bore the title of *royal highneſs*, on account of his pretenſions to the kingdom of Cyprus.—It is ſaid that duke only took the title of *royal highneſs*, to put himſelf above the duke of Florence, who was called *great duke*; but the great duke afterwards aſſumed the title of *royal highneſs*, to put himſelf on a level with the duke of Savoy.

The prince of Conde firſt took the title of *moſt ſerene highneſs*, leaving that of ſimple *highneſs* to the natural princes.

HILARIA, an ancient Roman feſtival, obſerved on the eighth of the kalends of April, or the 25th day of March, in honour of the goddeſs Cybele. It was ſo called from the various expreſſions of joy and mirth on this occaſion.

HILARIUS, an ancient father of the Chriſtian church, who flouriſhed in the 4th century. He was born, as St Jerome informs us, at Poictiers, of a good family; who gave him a liberal education in the Pagan religion, and which he did not forſake till he was arrived at maturity. He was advanced to the biſhopric of Poictiers in the year 355, according to Baronius; and became a moſt zealous champion for the orthodox faith, particularly againſt the Arians, who were

were at that time gaining ground in France. He aſſembled ſeveral councils there, in which the determinations of the ſynods of Rimini and Seleucia were condemned. He wrote a treatiſe concerning ſynods; and a famous work in 12 books on the Trinity, which is much admired by the orthodox believers. He died in the latter end of the year 367. His works have been many times publiſhed; but the laſt and beſt edition of them was given by the Benedictines at Paris in 1693.

HILARODI, in the ancient muſic and poetry, a ſort of poets among the Greeks, who went about ſinging little gay poems or ſongs, ſomewhat graver than the Ionic pieces, accompanied with ſome inſtrument. From the ſtreets they were at length introduced into tragedy, as the magodi were into comedy. They appeared dreſſed in white, and were crowned with gold. At firſt they wore ſhoes; but afterwards they aſſumed the crepida, being only a ſole tied over with a ſtrap.

HILARY-TERM. See TERM.

HILDESHEIM, a ſmall diſtrict of Germany, in the circle of Lower Saxony. It lies between the duchies of Lunenburg and Brunſwick; and may be about 25 miles from eaſt to weſt, and 36 from north to ſouth. It is watered by the rivers Leine and Innerſty. The ſoil is fertile; and its principal places are Peine, Sarſted, Bruggen, and Alveld. Hildeſheim, from whence it takes its name, is governed as an imperial city. Its biſhop is now elector of Cologne.

HILDESHEIM, a ſtrong city of Germany, in Lower Saxony, with a Roman-catholic biſhop's ſee, whoſe biſhop is ſovereign. It is a free imperial city, tho' in ſome things dependent on the biſhop. It is a large town, well built and fortified. It is divided into the Old Town and the New, which have each their ſeparate council. It is ſeated on the river Irneſt, in E. Long. 10. 0. N. Lat. 52. 17.

HILL, a term denoting any conſiderable eminence on the earth's ſurface. It is ſometimes ſynonimous with the word *mountain;* though generally it denotes only the leſſer eminences, the word *mountain* being particularly applied to the very largeſt. See MOUNTAIN.

HILL (Aaron), a poet of conſiderable eminence, the ſon of a gentleman of Malmeſbury-abbey in Wiltſhire, was born in 1685. His father's imprudence having cut off his paternal inheritance, he left Weſtminſter ſchool at 14 years of age; and embarked for Conſtantinople, to viſit lord Paget the Engliſh ambaſſador there, who was his diſtant relation. Lord Paget received him with ſurprize and pleaſure, provided him a tutor, and ſent him to travel: by which opportunity he ſaw Egypt, Paleſtine, and a great part of the eaſt; and returning home with his noble patron, viſited moſt of the courts of Europe. About the year 1709, he publiſhed his firſt poem intitled *Camillus,* in honour of the earl of Peterborough who had been general in Spain; and being the ſame year made maſter of Drury-lane theatre, he wrote his firſt tragedy, *Elfrid, or the fair Inconſtant.* In 1710, he became maſter of the opera-houſe in the Hay-market; when he wrote an opera called *Rinaldo,* which met with great ſucceſs, being the firſt that Mr Handel ſet to muſic after he came to England. Unfortunately for Mr Hill, he was a projector as well as poet, and in 1715 obtained a patent for extracting oil from beech-nuts; which undertaking, whether good or bad, miſcarried after engaging three years of his attention. He was alſo concerned in the firſt attempt to ſettle the colony of Georgia; from which he never reaped any advantage: and in 1728 he made a journey into the Highlands of Scotland, on a ſcheme of applying the woods there to ſhip-building; in which alſo he loſt his labour.

Mr Hill ſeems to have lived in perfect harmony with all the writers of his time, except Mr Pope, with whom he had a ſhort paper-war, occaſioned by that gentleman's introducing him in the Dunciad, as one of the competitors for the prize offered by the goddeſs of Dullneſs, in the following lines.

> " Then *Hill* eſſay'd; ſcarce vaniſh'd out of ſight,
> " He buoys up an inſtant, and returns to light;
> " He bears no token of the ſabler ſtreams,
> " And mounts far off among the Swans of Thames."

This, though far the gentleſt piece of ſatire in the whole poem, and conveying at the ſame time an oblique compliment, rouſed Mr Hill to take ſome notice of it; which he did by a poem written during his perigrination in the north, intitled, "The progreſs of wit, a caveat for the uſe of an eminent writer;" which he begins with the following eight lines, in which Mr Pope's too well known diſpoſition is elegantly, yet very ſeverely, characterized:

> " Tuneful *Alexis* on the Thames' fair ſide,
> " The Ladies play-thing and the Muſes pride;
> " With merit popular, with wit polite,
> " Eaſy tho' vain, and elegant tho' light;
> " Deſiring and *deſerving* others praiſe,
> " Poorly *accepts* a Fame he ne'er *repays:*
> " Unborn to cheriſh, *ſneakingly approves;*
> " And wants the ſoul to *ſpread* the worth *he loves.*"

The *ſneakingly approves,* in the laſt couplet, Mr Pope was much affected by; and indeed, thro' their whole controverſy afterwards, in which it was generally thought that Mr Hill had much the advantage, Mr Pope ſeems rather to expreſs his repentance by denying the offence, than to vindicate himſelf ſuppoſing it to have been given.

Beſides the above poems, Mr Hill, among many others, wrote one, called *The northern ſtar,* upon the actions of Czar Peter the Great; for which he was ſeveral years afterwards complimented with a gold medal from the empreſs Catharine, according to the Czar's deſire before his death. He likewiſe altered ſome of Shakeſpeare's plays, and tranſlated ſome of Voltaire's. His laſt production was *Merope;* which was brought upon the ſtage in Drury-lane by Mr Garrick. He died on the eighth of February 1749, as it is ſaid, in the very minute of the earthquake; and after his deceaſe four volumes of his works in proſe and verſe were publiſhed in octavo, and his dramatic works in two volumes.

HILL (Sir John), a voluminous writer, was originally bred an apothecary; but his marrying early, and without a fortune, made him very ſoon look round for other reſources than his profeſſion. Having, therefore, in his apprenticeſhip, attended the botanical lectures of the company, and being poſſeſſed of quick natural parts, he ſoon made himſelf acquainted with the theoretical as well as practical parts of botany;

from whence being recommended to the late duke of Richmond and lord Petre, he was by them employed in the inſpection and arrangement of their botanic gardens. Aſſiſted by the liberality of theſe noblemen, he executed a ſcheme of travelling over the kingdom, to collect the moſt rare and uncommon plants; which he afterward publiſhed by ſubſcription: but after great reſearches and uncommon induſtry, this undertaking turned out by no means adequate to his expectation. The ſtage next preſented itſelf, as a ſoil in which genius might ſtand a chance of flouriſhing: but after two or three unſucceſsful attempts, it was found he had no pretenſions either to the ſock or buſkin; which once more reduced him to his botanical purſuits, and his buſineſs as an apothecary. At length, about the year 1746, he tranſlated from the Greek a ſmall tract, written by Theophraſtus, *On gems*, which he publiſhed by ſubſcription; and which, being well executed, procured him friends, reputation, and money. Encouraged by this, he engaged in works of greater extent and importance. The firſt he undertook was *A general natural hiſtory*, in 3 vols folio. He next engaged, in conjunction with George Lewis Scott, eſq; in furniſhing a *Supplement to Chambers's Dictionary*. He at the ſame time ſtarted the Britiſh Magazine; and while he was engaged in a great number of theſe and other works, ſome of which ſeemed to claim the continued attention of a whole life, he carried on a daily eſſay, under the title of *Inſpector*. Amidſt this hurry of buſineſs, Mr Hill was ſo laborious and ready in all his undertakings, and was withal ſo exact an oeconomiſt of his time, that he ſcarcely ever miſſed a public amuſement for many years: where, while he relaxed from the ſeverer purſuits of ſtudy, he gleaned up articles of information for his periodical works. It would not be eaſy to trace Mr Hill, now Dr Hill, (for he procured a diploma from the college of St Andrews,) through all his various purſuits in life. A quarrel he had with the Royal Society, for being refuſed as a member, which provoked him to ridicule that learned body, in *A review of the works of the Royal Society of London*, 4to, 1751; together with his over-writing himſelf upon all ſubjects without reſerve; made him ſink in the eſtimation of the public nearly in the ſame pace as he had aſcended. He found as uſual, however, reſources in his own invention. He applied himſelf to the preparation of certain ſimple medicines: ſuch as the eſſence of water-dock, tincture of valerian, balſam of honey, &c. The well-known ſimplicity of theſe medicines, made the public judge favourably of their effects, inſomuch that they had a rapid ſale, and once more enabled the doctor to figure in that ſtyle of life ever ſo congenial to his inclination. Soon after the publication of the firſt of theſe medicines, he obtained the patronage of the earl of Bute, through whoſe intereſt he acquired the management of the royal gardens at Kew, with an handſome ſalary: and to wind up the whole of an extraordinary life, having, a little before his death, ſeized an opportunity to introduce himſelf to the knowledge of the king of Sweden, that monarch inveſted him with one of the orders of his court, which title he had not the happineſs of enjoying above two years. He died toward the cloſe of the year 1775.

HILLEL, ſenior, of Babylon, preſident of the ſanhedrim of Jeruſalem. He formed a celebrated ſchool there, in which he maintained the oral traditions of the Jews againſt Shamai, his colleague, whoſe diſciples adhered only to the written law; and this controverſy gave riſe to the ſects of Phariſees and Scribes. He was likewiſe one of the compilers of the Talmud. He alſo laboured much at giving a correct edition of the ſacred text; and there is attributed to him an ancient manuſcript bible, which bears his name. He flouriſhed about 30 years B. C. and died in a very advanced age.

HILLEL, the naſi, or prince, another learned Jew, the grandſon of Judas Hakkadoſh, or the Saint, the author of the Miſhna, lived in the fourth century. He compoſed a cycle; and was one of the principal doctors of the Gamara. The greateſt number of the Jewiſh writers attribute to him the correct edition of the Hebrew text which bears the name of *Hillel*, which we have already mentioned in the preceding article. There have been ſeveral other Jewiſh writers of the ſame name.

HILUM, among botaniſts, denotes the eye of a bean.

HIN, a Hebrew meaſure of capacity for things liquid, containing the ſixth part of an ephah, or one gallon two pints Engliſh meaſure.

HIND, a female ſtag in the third year of its age. See CERVUS.

HINDON, a ſmall town of Wiltſhire in England, which ſends two members to parliament. It is ſituated in E. Long. 2. 14. N. Lat. 51. 12.

HINE, or HIND, a huſbandman's ſervant. Thus the perſon who overſees the reſt, is called the maſter's hine.

HIPPARCHUS, a great aſtronomer, born at Nice in Bithynia, flouriſhed between the 154th and 163d Olympiads. His commentary upon Aratus's phenomena is ſtill extant. Rohault was very much miſtaken when he aſſerted, that this aſtronomer was not acquainted with the particular motion of the fixed ſtars from weſt to eaſt, by which their longitude changes. By foretelling eclipſes, he taught mankind not to be frightened at them, and that even the gods were bound by laws. Pliny, who tells this, admires him for making a review of all the ſtars; by which his deſcendants would be enabled to diſcover whether they are born and die, whether they change their place, and whether they increaſe and decreaſe.

HIPPOBOSCA, or HORSE-FLY, in zoology, a genus of inſects, belonging to the order of diptera. The beak conſiſts of two valves, is cylindrical, obtuſe, and hanging; and the feet have ſeveral claws. There are four ſpecies, diſtinguiſhed by their wings, &c. The equina is very troubleſome to horſes.

HIPPOCAMPUS, in ichthyology. See SYNGNATHUS.

HIPPOCENTAUR, in antiquity, a fabulous animal, half man and half horſe.

What gave riſe to the fable of Hippocentaurs was this. The Theſſalians are ſaid to have been the firſt inventors of the art of breaking horſes; and being firſt ſeen on horſeback, they ſeemed to make but one body with the horſes; whence the fable took its riſe.

HIPPOCRATES, the greateſt phyſician of antiquity, was born in the iſland of Cos in the 80th Olympiad, and flouriſhed at the time of the Peloponneſian war. He was the firſt that we know of who laid down precepts concerning phyſic; and, if we may believe the author of his life, who goes under the name of *Soranus*, drew his original from Hercules and Æſculapius. He was firſt a pupil of his own father Heraclides, then of Herodicus, then of Gorgias of Leontinum the orator, and, according to ſome, of Democritus of Abdera. After being inſtructed in phyſic, and in the liberal arts, and loſing his parents, he left his own country, and practiſed phyſic all over Greece; where he was ſo much admired for his ſkill, that he was publicly ſent for with Euryphon, a man ſuperior to him in years, to Perdiccas king of Macedonia, who was then thought to be conſumptive. But Hippocrates, as ſoon as he arrived, pronounced the diſeaſe to be entirely mental, as in truth it was. For upon the death of his father Alexander, Perdiccas fell in love with Philas, his father's miſtreſs: and this Hippocrates diſcerning by the great change her preſence always wrought upon him, a cure was ſoon effected.

Being intreated by the people of Abdera to come and cure Democritus of a ſuppoſed madneſs, he went; but, upon his arrival, inſtead of finding Democritus mad, he found all his fellow-citizens ſo, and Democritus the only wiſe man among them. He heard many lectures, and learned much philoſophy from him; which has made Cornelius Celſus and ſome others imagine, that Hippocrates was the diſciple of Democritus, though it is probable they never ſaw each other till this interview which was occaſioned by the Abderites. Hippocrates had alſo public invitations to other countries. Thus, when a plague invaded the Illyrians and Pæonians, the kings of thoſe countries begged him to come to their relief: he did not go; but learning from the meſſengers the courſe of the winds there, he concluded that the diſtemper would come to Athens; and, foretelling what would happen, applied himſelf to take care of the city and the ſtudents. He was indeed ſuch a lover of Greece, that when his fame had reached as far as Perſia, and upon that account Artaxerxes had intreated him by his governor of the Helleſpont, with a promiſe of great rewards, to come to him, he refuſed to go. He alſo delivered his own country from a war with the Athenians, that was juſt ready to break out, by prevailing with the Theſſalians to come to their aſſiſtance, for which he received very great honours from the Coans. The Athenians alſo conferred great honours upon him: they admitted him next to Hercules in the Eleuſinian ceremonies; gave him the freedom of the city; and voted a public maintenance for him and his family in the prytanæum or council-houſe at Athens, where none were maintained at the public charge but ſuch as had done ſignal ſervice to the ſtate. He died among the Lariſſæans, ſome ſay in his 90th year, ſome in his 85th, others in his 104th, and ſome in his 109th. The beſt edition of his works is, that of Foeſius, in Greek and Latin. Hippocrates wrote in the Ionian dialect. His aphoriſms, prognoſtics, and all that he has written on the ſymptoms of diſeaſes, juſtly paſs for maſter-pieces. See *Hiſtory* of MEDICINE.

HIPPOCREPIS, COMMON HORSE-SHOE VETCH; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are three ſpecies, two natives of the warm parts of Europe, and one of Britain. They are all low herbaceous trailing plants, with yellow flowers. They are propagated by ſeeds; but having, no great beauty are ſeldom kept in gardens.

HIPPODROME, in antiquity, the courſe where horſe-races were performed.

HIPPOGLOSSUS, in ichthyology; a ſpecies of PLEURONECTES.

HIPPOMANE, the MANCHINEEL-TREE; a genus of the adelphia order, belonging to the monœcia claſs of plants.

Species. 1. The mancinella, with oval ſawed leaves, is a native of all the Weſt India iſlands. It hath a ſmooth browniſh bark; the trunk divides upward into many branches, garniſhed with oblong leaves about three inches long. The flowers come out in ſhort ſpikes at the end of the branches, but make no great appearance, and are ſucceeded by fruit of the ſame ſhape and ſize with a golden pippin. The tree grows to the ſize of a large oak. 2. The biglandulosa, with oblong bay leaves, is a native of South America; and grows to as large a ſize as the firſt, from which it differs moſtly in the ſhape of its leaves. 3. The ſpinoſa, with holly leaves, is a native of Campeachy, and ſeldom riſes above 20 feet high; the leaves greatly reſemble thoſe of the common holly, and are ſet with ſharp prickles at the end of each indenture. They are of a lucid green, and continue all the year.

Culture. Theſe plants being natives of very warm climates, cannot be preſerved in this country without a ſtove; nor can they by any means be made to riſe above five or ſix feet high even with that aſſiſtance. They are propagated by ſeeds; but muſt have very little moiſture, or they will certainly be killed by it.

Properties. Theſe trees have a very poiſonous quality, abounding with an acrid milky juice of a highly cauſtic nature. Strangers are often tempted to eat the fruit of the firſt ſpecies; the conſequences of which are, an inflammation of the mouth and throat, pains in the ſtomach, &c. which are very dangerous unleſs remedies are ſpeedily applied. The wood is much eſteemed for making cabinets, book-caſes, &c. being very durable, taking a fine poliſh, and not being liable to become worm-eaten: but as the trees abound with a milky cauſtic juice already mentioned, fires are made round their trunks, to burn out this juice; otherwiſe thoſe who fell the trees would be in danger of loſing their ſight by the juice flying in their eyes. This juice raiſes bliſters on the ſkin wherever it falls, turns linen black, and makes it fall out in holes. It is alſo dangerous to work the wood after it is ſawn out; for if any of the ſaw-duſt happens to get into the eyes of the workmen, it cauſes inflammations and the loſs of ſight for ſome time; to prevent which, they generally cover their faces with fine lawn during the time of working the wood.

HIPPOMANES, a ſort of poiſon famous among the ancients as an ingredient in amorous philters or love-charms. The word is Greek, ιϖϖομανης, compoſed of ιϖϖος, "a horſe," and μανια, "fury, or madneſs."

Authors are not agreed about the nature of the Hippomanes. Pliny deſcribes it as a blackiſh caruncle found on the head of a new-born colt; which the dam bites off and eats as ſoon as ſhe is delivered. He adds, that if ſhe is prevented herein by any one's cutting it off before, ſhe will not take to nor bring up the young. Virgil, and after him Servius and Columella, deſcribe it as a poiſonous matter trickling from the pudendum of a mare when proud, or longing for the horſe. At the end of Mr Bayle's Dictionary is a very learned diſſertation on the *hippomanes*, and all its virtues both real and pretended.

HIPPOPHAE, sea-buckthorn; a genus of the tetrandria order, belonging to the diœcia claſs of plants.

Species. 1. The rhamnoides hath a ſhrubby ſtem, branching irregularly eight or ten feet high, having a dark brown bark. It is armed with a few thorns; hath ſpear-ſhaped, narrow, ſeſſile leaves, of a dark green above, and hoary underneath. 2. The canadenſis hath a ſhrubby brown ſtem, branching eight or ten feet high, with oval leaves, and male and female flowers on different plants.

Culture, &c. Both theſe ſpecies are very hardy, and may be propagated in abundance by ſuckers from the roots, by layers, and by cuttings of their young ſhoots. They are retained in gardens, on account of their two-coloured leaves in ſummer; and in winter, on account of the appearance of the young ſhoots, which are covered with turgid, irregular, ſcaly buds. Goats, ſheep, and horſes, eat the firſt ſpecies; cows refuſe it.

HIPPOPOTAMUS, the river-horse; a genus of quadrupeds, belonging to the order of belluæ; the characters of which are theſe: it has ſix fore-teeth in the upper jaw, diſpoſed in pairs at a diſtance from each other; and four prominent fore-teeth in the under jaw, the intermediate ones being longeſt: the dog-teeth are ſolitary and obliquely truncated; and the feet are hoofed on the edges.

There is but one ſpecies of hippopotamus, viz. the amphibius, or river-horſe. The hiſtory of this quadruped, though next to the elephant in magnitude, is far from being ſufficiently delineated. The beſt deſcription hitherto given of him is that of Frederic Zerenghi, an Italian ſurgeon, publiſhed in the year 1603. Zerenghi killed two of them (a male and a female) on the banks of the Nile, preſerved their ſkins, and brought them to Rome. Every ſkin took 400 pounds of ſalt in curing. He ſays, the ſkin of the hippopotamus is about an inch thick, extremely hard, impenetrable by a common muſket-ball; and there are only a few ſhort white hairs ſcattered very thin over it. The teeth are not protruded out of the mouth, as is commonly believed; for, when the mouth is ſhut, although the teeth be extremely large, they are entirely covered by the lips. The dimenſions of the female, of which Zerenghi gives a figure, are as follow: from the point of the muzzle to the origin of the tail, between 11 and 12 feet; the circumference of the body, about 10 feet; the height of the body, $4\frac{1}{2}$ feet; the circumference of the leg, near the ſhoulder, 2 feet 9 inches, lower down 1 foot $9\frac{1}{2}$ inches; the height of the legs about $1\frac{1}{2}$ foot; the length of the feet from the extremity of the claws, $4\frac{1}{2}$ inches: the claws are nearly of an equal length and breadth, and are ſomewhat more than two inches; each toe is furniſhed with a claw, and each foot has four toes. The tail is about one foot long, more than a foot in circumference near the origin, and about 3 inches near the point. The tail is not round, but flattiſh. The head, from the extremity of the lips to the neck, is about 2 feet 4 inches, and the circumference 5 feet 8 inches. The ears are about 3 inches long, and nearly as broad; they are a little pointed, and covered in the interior ſide with ſhort white hair. The mouth, when open, is about $1\frac{1}{2}$ foot wide, and furniſhed with 44 teeth of different figures. Their teeth are of ſuch a hard ſubſtance, that they give fire with ſteel. Theſe dimenſions are taken from a female hippopotamus; but the male is generally about one third larger.

With ſuch powerful arms, and ſuch a prodigious ſtrength of body, the hippopotamus might render himſelf formidable to every other animal. But he is naturally of a mild diſpoſition; and beſides, his body is ſo heavy, and his motions ſo ſlow, that he cannot overtake any other quadruped. He ſwims ſwifter than he runs, and preys upon fiſhes. He dives in the water, and can ſtay very long under. He has no membrane betwixt his toes, as the caſtor or the otter; and he only ſwims eaſily in conſequence of the great bulk of his belly, which makes him nearly of an equal ſpecific gravity with the water. Moreover, he often keeps himſelf at the bottom, and walks upon the channel with the ſame freedom as upon dry land. Beſides preying upon fiſhes, crocodiles, &c. he frequently goes out of the water, and feeds upon ſugar-canes, ruſhes, millet, rice, roots, &c. Theſe he devours in large quantities, and often does great damage in the cultivated field. But as he is more timid on land than in the water, he is eaſily driven away. His legs are ſo ſhort, that he cannot eſcape by flight when at a diſtance from the river. He generally flies when approached by people in boats; but, if they wound him, he returns with fury, attacks the boats with his teeth, and frequently overſets them.

This animal ſeems to be confined principally to the rivers of Africa. The male and female generally go together, and the female is ſaid to produce but one at a time.

Concerning this creature Mr Haſſelquiſt relates the following particulars, which he ſays he had from a credible perſon who lived 12 years in Egypt.

" 1. The hide of a full-grown hippopotamus is a load for a camel.

" 2. The river-horſe is an inveterate enemy to the crocodile, and kills it whenever he meets it. This, with ſome other reaſons, contributes much to the extirpation of the crocodile; which, otherwiſe, conſidering the many eggs they would lay, would utterly deſtroy Egypt.

3. " The river-horſe never appears below the cataracts in Egypt; wherefore the inhabitants of Upper Egypt only can give an account of it; and as very few Europeans, none at leaſt who underſtood natural hiſtory, have travelled into thoſe parts of Egypt, we know little of the hiſtory of this animal; ſuch as have travelled in India, have had better opportunities of informing themſelves in this matter. The Egyptians very ſeldom bring the hide of it to Cairo; and it is impoſſible to bring thither the living animal. A hide has been ſent to France, which, I am informed, is preſerved in the royal menagerie.

Hippopotamus ‖ Hirch-horn

4. “ The river-horſe does much damage to the Egyptians in thoſe places he frequents. He goes on ſhore, and in a ſhort ſpace of time deſtroys an entire field of corn or clover, not leaving the leaſt verdure as he paſſes : for he is voracious, and requires much to fill his great belly. They have a curious manner of freeing themſelves, in ſome meaſure, from this deſtructive animal. They remark the places he frequents moſt, and there lay a large quantity of peaſe : when the beaſt comes on ſhore, hungry and voracious, he falls to eating what is neareſt him; and filling his belly with the peaſe, they occaſion an inſupportable thirſt: he then returns immediately into the river, and drinks upon theſe dry peas large draughts of water, which ſuddenly cauſes his death ; for the peaſe ſoon begin to ſwell with the water, and not long after the Egyptians find him dead on the ſhore, blown up, as if killed with the ſtrongeſt poiſon.

5. “ The oftener the river-horſe goes on ſhore, the better hopes have the Egyptians of a ſufficient ſwelling or increaſe of the Nile.

6. “ The Egyptians ſay, they can almoſt diſtinguiſh the food of this animal in his excrement.”

Mr Pennant in his Synopſis, p. 80. treats the enmity of the hippopotamus and crocodile as a vulgar error ; an eye-witneſs, he tells us, declaring he had ſeen them ſwimming together without any diſagreement. “ They are (ſays he) capable of being tamed. Belon ſays, he has ſeen one ſo gentle as to be let looſe out of a ſtable, and fed by its keeper, without attempting to injure any one. They are generally taken in pitfalls, and the poor people eat the fleſh. In ſome parts, the natives place boards full of ſharp irons in the corn-grounds ; which theſe beaſts ſtrike into their feet, and ſo become an eaſy prey. Sometimes they are ſtruck in the water with harpoons faſtened to cords, and 10 or 12 canoes are employed in the chace. The teeth are moſt remarkably hard, even harder than ivory, and much leſs ſubject to turn yellow. Des Marchais ſays, that the dentiſts prefer them for the making of falſe teeth. The ſkin when dried is uſed to make bucklers, and is of impenetrable hardneſs. It is the *behemoth* of Job, and was known to the Romans. An ancient writer aſſerts, that theſe animals were found in the Indus ; which is not confirmed by any modern traveller.”

HIPPURIS, MARE'S-TAIL ; a genus of the monandria order, belonging to the monogynia claſs of plants. There is only one ſpecies, a native of Britain, and which grows in ditches and ſtagnant waters. The flower of this plant is found at the baſe of each leaf, and is as ſimple as can be conceived ; there being neither empalement nor bloſſom ; and only one chive, one pointal, and one ſeed. It is a very weak aſtringent. Goats eat it ; cows, ſheep, horſes, and ſwine, refuſe it.

HIRAM, a king of Tyre, cotemporary with Solomon, whom he ſupplied with cedar, gold, ſilver, and other materials for building the temple. He died 1000 years B. C.

HIRAM of Tyre, an artiſt who aſſiſted in the conſtruction of Solomon's temple, and other public buildings at Jeruſalem, flouriſhed 1015. B. C.

HIRCANIA, (anc. geog.) See HYRCANIA.

HIRCH-HORN, a town of Germany, in the circle of the lower Rhine, with a ſtrong caſtle. It is ſeated on the ſide of a hill on the river Neckar, and belongs to the elector Palatine. E. Long. 9. 0. N. Lat. 49. 28.

Hire ‖ Hirudo.

HIRE (Philip de la), an eminent French mathematician and aſtronomer, born at Paris in 1640. His father, who was painter in ordinary to the king, deſigned him for the ſame profeſſion : but he devoted himſelf to mathematical ſtudies, and was nominated together with M. Picard to make the neceſſary obſervations for a new map of France by the directions of M. Colbert. In 1683, he was employed in continuing the famous meridian line begun by M. Picard ; and was next engaged in conſtructing thoſe grand aqueducts which were projected by Lewis XIV. He died in 1718, after having wrote a great number of works, beſides ſeveral occaſional papers diſperſed in journals, and in memoirs of the Academy of Sciences.

HIRING, in law. See BORROWING *and Hiring*.

HIRSBERG, a town of Sileſia, in the territory of Jauer, famous for its mineral baths. It is ſeated on the river Boſar, in E. Long. 17. 50. N. Lat. 50. 50.

HIRSCHFELD, a town of Germany in the circle of the upper Rhine, and capital of a principality of the ſame name, depending on a famous abbey which was ſecularized in favour of the houſe of Caſſel. It is ſeated on the river Fulda, in E. Long. 9. 52. N. Lat. 51. 46.

HIRUDO, the LEECH ; a genus of inſects belonging to the order of vermes inteſtina. The body moves either forward or backward. There are nine ſpecies, principally diſtinguiſhed by their colour. The moſt remarkable are the following.

1. The medicinalis, or common leech, hath an oblong brown body, marked with ſix yellow ſpots, and is an inhabitant of ponds, ditches, and other ſtagnant waters. This animal is well known for the purpoſe of bleeding, children eſpecially. This practice is as old as the days of Pliny, who gives the creature the name of *hirudo ſanguiſuga*. In his time, leeches were uſed inſtead of cupping-glaſſes for perſons of plethoric habits, and thoſe who were troubled with the gout in the feet. He aſſerts, that if they left their head in the wound, as was ſometimes the caſe, the wound was incurable ; and he informs us, that Meſſalinus, a perſon of conſular dignity, loſt his life by ſuch an accident. Some imagine, that leeches have a poiſonous quality, becauſe the wound they make is not always eaſily healed ; but this depends on the habit of the body, and will alſo happen when the lancet is uſed. To make leeches faſten ſoon, keep them hungry, and rub the part to which they are to be applied with warm milk or blood. If they ſtick longer than is thought convenient, they muſt not be pulled off ; but if their heads are touched with common ſalt, they ſoon fall off of themſelves. If they are thought not to have drawn a ſufficient quantity of blood, apply cloths wrung out of warm water upon the orifice ; or, if convenient, put the part into warm water ; and thus the bleeding may be prolonged. They are to be kept in bottles not quite filled with water, which ought to be renewed every three or four days at fartheſt. A little ſugar may be added to the water in which they are kept. For the caſes in which the application of leeches is adviſable, ſee (the *Index* ſubjoined to) MEDICINE.

2. The ſanguiſuga, or horſe-leech, hath a depreſſed body; in the bottom of the mouth are certain great ſharp tubercles or whitiſh caruncles. The ſlendereſt part is about the mouth, and the thickeſt about the tail. The tail itſelf is very ſlender; the belly of a yellowiſh green; the back duſky. This ſpecies is alſo a blood-ſucker, though not uſed in medicine. The inſtruments with which both ſpecies perforate the ſkin, are found, on a nice diſſection, to be a number of very fine teeth diſpoſed in a regular order on three ribs, or jaws, placed between the aperture of the lips and the bottom of the mouth; each of them along a ſtrong muſcle of its own length. Hence the wound made by leeches conſiſts of three cuts proceeding like radii from a centre, and making equal angles with each other. This ſtructure of the wound is moſt diſtinctly ſeen when the ſwelling has gone down, and the ſkin is clean, which is uſually on the fourth day.—Leeches are able to live in oil; and when taken out of this liquid and put into water again, they throw off a tender ſkin or film, of the regular ſhape of the whole body. Their being able to live in this fluid ſhews, that they reſpire by the mouth: which is alſo further proved, by gently warming the water in which they are kept; for then the animals being uneaſy, breathe hard, and very viſibly. Theſe animals may in ſome ſhape anſwer the purpoſes of barometers; for when preſerved in glaſſes, they predict bad weather by their great reſtleſsneſs and change of place.

3. The geometra, or geometrical leech, is a native of the ſame places with the two former. It hath a filiform body, greeniſh, ſpotted with white; both ends dilatable, and equally tenacious. It moves as if meaſuring the ſpaces it paſſes over like a compaſs, whence its name. It is found on trout and other fiſh after the ſpawning ſeaſon.

4. The muricata, or tuberculated leech, hath a taper body, rounded at the greater extremity, and furniſhed with two ſmall horns; ſtrongly annulated and tuberculated upon the rings; the tail dilated. It inhabits the ſea, adheres ſtrongly to fiſh, and leaves a black mark on the ſpot.

5. The myxine, or hag, is about eight inches long, with a ſlender body, carinated beneath, and an adipoſe or rayleſs fin round the tail, and under the belly. It inhabits the ocean; enters the mouths of fiſh, when on the hooks of lines that remain a whole tide under water; and devours the whole, except the ſkin and bones. The Scarbourough fiſhermen often take it in the *robbed fiſh*, on drawing up their lines. Linnæus attributes to it the property of turning water into glue.

HIRUNDO, in ornithology, a genus of birds of the order of paſſeres. There are twelve ſpecies, chiefly diſtinguiſhed by their colour. The moſt remarkable are,

1. The domeſtica, or chimney-ſwallow, appears in Great Britain near 20 days before the martin, or any other of the ſwallow tribe. They leave us the latter end of September; and for a few days previous to their departure, they aſſemble in vaſt flocks on houſe-tops, churches, and even trees, from whence they take their flight. It is now known that ſwallows take their winter-quarters in Senegal, and poſſibly they may be found along the whole Morocco ſhore. We are indebted to M. Adanſon for this diſcovery, who firſt obſerved them in the month of October, after their migration out of Europe, on the ſhores of that kingdom: but whether it was this ſpecies alone, or all the European kinds, he is ſilent.

The name of *chimney-ſwallow* may almoſt be confined to Great Britain; for in ſeveral other countries they chooſe different places for their neſts. In Sweden, they prefer barns; ſo are ſtyled there *ladu-ſwala*, or the *barn-ſwallow*: and in the hotter climates, they make their neſts in porches, gate-ways, galleries, and open halls.

The houſe-ſwallow is diſtinguiſhed from all others by the ſuperior forkineſs of its tail, and by the red ſpot on the forehead and under the chin. The crown of the head, the whole upper-part of the body, and the coverts of the wings, are black, gloſſed with a rich purpliſh blue, moſt reſplendent in the male: the breaſt and belly white, that of the male tinged with red: the tail is black; the two middle feathers are plain, the others marked tranſverſely near their ends with a white ſpot. The exterior feathers of the tail are much longer in the male than in the female.

Its food is the ſame with the others of its kind, viz. inſects. For the taking of theſe, in their ſwifteſt flight, nature hath admirably contrived their ſeveral parts: their mouths are very wide to take in flies, &c. in their quickeſt motion; their wings are long, and adapted for diſtant and continual flight; and their tails are forked, to enable them to turn the readier in purſuit of their prey. This ſpecies, in our country, builds in chimneys; and makes its neſt of clay mixed with ſtraw, leaving the top quite open. It lines the bottom with feathers and graſſes: and uſually lays from four to ſix eggs, white ſpeckled with red; but, by taking away one of the eggs daily, it will ſucceſſively lay as far as 19, as Dr Liſter has experienced. It breeds earlier than any other ſpecies. The firſt brood are obſerved to quit the neſt the laſt week in June, or the firſt in July; the laſt brood towards the middle or end of Auguſt. The neſt being fixed five or ſix feet deep within the chimney, it is with difficulty that the young can emerge. They even ſometimes fall into the rooms below: but as ſoon as they ſucceed, they perch for a few days on the chimney-top, and are there fed by their parents. Their next eſſay is to reach ſome leafleſs bough, where they ſit in rows, and receive their food. Soon after they take to the wing, but ſtill want ſkill to take their own prey. They hover near the place where their parents are in chaſe of flies, attend their motions, meet them, and receive from their mouths the offered ſuſtenance.—It has a ſweet note, which it emits in Auguſt and September, perching on houſe-tops.

2. The urbica, or martin, is inferior in ſize to the former, and its tail much leſs forked. The head and upper-part of the body, except the rump, is black gloſſed with blue: the breaſt, belly, and rump, are white: the feet are covered with a ſhort white down. This is the ſecond of the ſwallow-kind that appears in our country. It builds under the eaves of houſes, with the ſame materials, and in the ſame form, as the houſe-ſwallow; only its neſt is covered above, having only a ſmall hole for admittance. It will alſo build againſt the ſides of high cliffs over the ſea. For the

time that the young keep the neſt, the old one feeds them, adhering by the claws to the outſide; but as ſoon as they quit it, ſhe feeds them flying, by a motion quick and almoſt imperceptible to thoſe who are not uſed to obſerve it.

It is a later breed than the preceding by ſome days, but both will lay twice in the ſeaſon; and the latter brood of this ſpecies have been obſerved to come forth ſo late as the 18th of September; yet that year (1766) they entirely quitted our ſight by the 5th of October: not but that they ſometimes continue here much later; the martins and red-wing thruſhes having been ſeen flying in view on the 7th of November. Neſtlings have been remarked in Hampſhire as late as the 21ſt of October, 1772.

3. The riparia, or ſand-martin, is the leaſt of the genus that frequents Great Britain. The head and whole upper-part of the body are mouſe-coloured; the throat white, encircled with a mouſe-coloured ring; the belly white; the feet ſmooth and black.—It builds in holes in ſand-pits, and in the banks of rivers, penetrating ſome feet deep into the bank, boring through the ſoil in a wonderful manner with its feet, claws, and bill. It makes its neſt of hay, ſtraw, &c. and lines it with feathers: it lays five or ſix white eggs. It is the earlieſt of the ſwallow-tribe in bringing out its young.

4. The apus, or ſwift, is the largeſt of our ſwallows; but the weight is moſt diſproportionately ſmall to its extent of wing of any bird: the former being ſcarce one ounce, the latter 18 inches. The length near eight. The feet of this bird are ſo ſmall, that the action of walking and riſing from the ground is extremely difficult; ſo that nature hath made it full amends, by furniſhing it with ample means for an eaſy and continual flight. It is more on the wing than any other ſwallows; its flight is more rapid, and that attended with a ſhrill ſcream. It reſts by clinging againſt ſome wall, or other apt body; from whence Klein ſtyles this ſpecies *hirundo muraria*. It breeds under the eaves of houſes, in ſteeples, and other lofty buildings; makes its neſt of graſſes and feathers; and lays only two eggs, of a white colour. It is entirely of a gloſſy dark ſooty colour, only the chin is marked with a white ſpot: but by being ſo conſtantly expoſed to all weathers, the gloſs of the plumage is loſt before it retires. A pair of theſe birds were found adhering by their claws, and in a torpid ſtate, in Feb. 1766, under the roof of Longnor-chapel, Shropſhire: on being brought to a fire, they revived, and moved about the room. The feet are of a particular ſtructure, all the toes ſtanding foreward; the leaſt conſiſts of only one bone; the others of an equal number, viz. two each; in which they differ from thoſe of all other birds.

This appears in our country about 14 days later than the ſand-martin; but differs greatly in the time of its departure, retiring invariably about the 10th of Auguſt, being the firſt of the genus that leaves us.

The fabulous hiſtory of the *manucodiata*, or *bird of paradiſe*, is, in the hiſtory of this ſpecies, in great meaſure verified. It was believed to have no feet; to live upon the celeſtial dew; to float perpetually on the atmoſphere; and to perform all its functions in that element.

The ſwift actually performs what has been in theſe enlightened times diſproved of the former, except the ſmall time it takes in ſleeping, and what it devotes to incubation; every other action is done on wing. The materials of its neſt it collects either as they are carried about by the winds, or picks them up from the ſurface in its ſweeping flight. Its food is undeniably the inſects that fill the air. Its drink is taken in tranſient ſips from the water's ſurface. Even its amorous rites are performed on high. Few perſons who have attended to them in a fine ſummer's morning, but muſt have ſeen them make their aërial courſes at a great height, encircling a certain ſpace with an eaſy ſteady motion. On a ſudden they fall into each others embraces, then drop precipitate with a loud ſhriek for numbers of yards. This is the critical conjuncture; and to be no more wondered at, than that inſects (a familiar inſtance) ſhould diſcharge the ſame duty in the ſame element.

Theſe birds and ſwallows are inveterate enemies to hawks. The moment one appears, they attack him immediately: the ſwifts ſoon deſiſt; but the ſwallows purſue and perſecute thoſe rapacious birds, till they have entirely driven them away.

Swifts delight in ſultry thundery weather, and ſeem thence to receive freſh ſpirits. They fly at thoſe times in ſmall parties with particular violence; and as they paſs near ſteeples, towers, or any edifices where their mates perform the office of incubation, emit a loud ſcream, a ſort of ſerenade, as Mr White ſuppoſes, to their reſpective females.

Concerning the diſappearance of ſwallows in the winter, Mr Pennant hath given the following diſſertation.

“ There are three opinions among naturaliſts concerning the manner the ſwallow-tribes diſpoſe of themſelves after their diſappearance from the countries in which they make their ſummer reſidence. Herodotus mentions one ſpecies that reſides in Egypt the whole year: Proſper Alpinus aſſerts the ſame; and Mr Loten, late governor of Ceylon, aſſured us, that thoſe of Java never remove. Theſe excepted, every other known kind obſerve a periodical migration, or retreat. The ſwallows of the cold Norway, and of North America, of the diſtant Kamtſchatka, of the temperate parts of Europe, of Aleppo, and of the hot Jamaica, all agree in this one point.

“ In cold countries, a defect of inſect-food on the approach of winter, is a ſufficient reaſon for theſe birds to quit them: but ſince the ſame cauſe probably does not ſubſiſt in the warm climates, recourſe ſhould be had to ſome other reaſon for their vaniſhing.

“ Of the three opinions, the firſt has the utmoſt appearance of probability; which is, that they remove nearer the ſun, where they can find a continuance of their natural diet, and a temperature of air ſuiting their conſtitutions. That this is the caſe with ſome ſpecies of European ſwallows, has been proved beyond contradiction (as above cited) by M. Adanſon. We often obſerve them collected in flocks innumerable on churches, on rocks, and on trees, previous to their departure hence: and Mr Collinſon proves their return here in perhaps equal numbers, by two curious relations of undoubted credit; the one communicated to him by Mr Wright, maſter of a ſhip; the other by the late Sir Charles Wager; who both deſcribed (to the ſame purpoſe) what happened to each in their voyages. “ Returning home, (ſays Sir Charles), in “ the ſpring of the year, as I came into ſounding in “ our channel, a great flock of ſwallows came and “ ſettled on all my rigging; every rope was covered; “ they hung on one another like a ſwarm of bees; “ the decks and carving were filled with them. They “ ſeemed almoſt famiſhed and ſpent, and were only “ feathers and bones; but, being recruited with a “ night's reſt, took their flight in the morning.” This vaſt fatigue proves that their journey muſt have been very great, conſidering the amazing ſwiftneſs of theſe birds: in all probability they had croſſed the Atlantic ocean, and were returning from the ſhores of Senegal, or other parts of Africa; ſo that this account from that moſt able and honeſt ſeaman, confirms the later information of M. Adanſon.

“ Mr White, on Michaelmas day 1768, had the good fortune to have ocular proof of what may reaſonably be ſuppoſed an actual migration of ſwallows. Travelling the morning very early between his houſe and the coaſt, at the beginning of his journey he was environed with a thick fog; but on a large wild heath the miſt began to break, and diſcovered to him numberleſs ſwallows, cluſtered on the ſtanding buſhes, as if they had rooſted there: as ſoon as the ſun burſt out, they were inſtantly on wing, and with an eaſy and placid flight proceeded towards the ſea. After this he ſaw no more flocks, only now and then a ſtraggler.

In Kalm's voyage to America, is a remarkable inſtance of the diſtant flight of ſwallows; for one lighted on the ſhip he was in, September 2d, when he had paſſed over only two thirds of the Atlantic ocean. His paſſage was uncommonly quick, being performed from Deal to Philadelphia in leſs than ſix weeks; and when this accident happened, he was fourteen days ſail from Cape Hinlopen.

“ This rendevouz of ſwallows about the ſame time of year is very common on the willows, in the little iſles in the Thames. They ſeem to aſſemble for the ſame purpoſe as thoſe in Hampſhire, notwithſtanding no one yet has been eye-witneſs of their departure. On the 26th of September 1775, two gentlemen who happened to lie at Maidenhead Bridge, furniſhed at leaſt a proof of the multitudes there aſſembled: they went by torch-light to an adjacent iſle, and in leſs than half an hour brought aſhore fifty dozen; for they had nothing more to do than to draw the willow-twigs through their hands, the birds never ſtirring till they were taken.

“ The northern naturaliſts will perhaps ſay, that this aſſembly met for the purpoſe of plunging into their ſubaqueous winter-quarters: but were that the caſe, they would never eſcape diſcovery in a river perpetually fiſhed as the Thames, as ſome of them muſt inevitably be brought up in the nets that harraſs that water.

“ The ſecond notion has great antiquity on its ſide. Ariſtotle and Pliny give it as their belief, that ſwallows do not remove very far from their ſummer habitation, but winter in the hollows of rocks, and during that time loſe their feathers. The former part of their opinion has been adopted by ſeveral ingenious men; and of late, ſeveral proofs have been brought of ſome ſpecies, at leaſt, having been diſcovered in a torpid ſtate. Mr Collinſon favoured us with the evidence of three gentlemen, eye-witneſſes to numbers of ſand martins being drawn out of a cliff on the Rhine, in the month of March 1762. And the honourable Daines Barrington communicated to us the following fact, on the authority of the late lord Belhaven, That numbers of ſwallows have been found in old dry walls, and in ſand-hills near his Lordſhip's ſeat in Eaſt Lothian; not once only, but from year to year; and that when they were expoſed to the warmth of a fire, they revived. We have alſo heard of the ſame annual diſcoveries near Morpeth, in Northumberland, but cannot ſpeak of them with the ſame aſſurance as the two former: neither in the two laſt inſtances are we certain of the particular ſpecies.

“ Other witneſſes crowd on us to prove the reſidence of thoſe birds in a torpid ſtate during the ſevere ſeaſon.

“ Firſt, In the chalky cliffs of Suſſex; as was ſeen on the fall of great fragment ſome years ago.

“ Secondly, In a decayed hollow tree that was cut down, near Dolgelli, in Merionethſhire.

“ Thirdly, In a cliff near Whitby, Yorkſhire; where, on digging out a fox, whole buſhels of ſwallows were found in a torpid condition. And,

“ Laſtly, the reverend Mr Conway, of Sychton, Flintſhire, was ſo obliging as to communicate the following fact: A few years ago, on looking down an old lead-mine in that county, he obſerved numbers of ſwallows clinging to the timbers of the ſhaft, ſeemingly aſleep; and on flinging ſome gravel on them, they juſt moved, but never attempted to fly or change their place: this was between All Saints and Chriſtmas.

“ Theſe are doubtleſs the lurking places of the later hatches, or of thoſe young birds, who are incapable of diſtant migrations. There they continue inſenſible and rigid; but like flies may ſometimes be reanimated by an unſeaſonable hot day in the midſt of winter: for very near Chriſtmas a few appeared on the moulding of a window of Merton college, Oxford, in a remarkably warm nook, which prematurely ſet their blood in motion, having the ſame effect as laying them before the fire at the ſame time of year. Others have been known to make this premature appearance; but as ſoon as the cold natural to the ſeaſon returns, they withdraw again to their former retreats.

“ I ſhall conclude with one argument drawn from the very late hatches of two ſpecies.

“ On the 23d of October 1767, a martin was ſeen in Southwark, flying in and out of his neſt: and on the 29th of the ſame month, four or five ſwallows were obſerved hovering round and ſettling on the county hoſpital at Oxford. As theſe birds muſt have been of a late hatch, it is highly improbable that at ſo late a ſeaſon of the year, they would attempt, from one of our midland counties, a voyage almoſt as far as the equator to Senegal or Goree: we are therefore confirmed in our notion, that there is only a partial migration of theſe birds; and that the feeble late hatches conceal themſelves in this country.

“ The above are circumſtances we cannot but aſſent to, though ſeemingly contradictory to the common courſe of nature in regard to other birds. We muſt, therefore, divide our belief relating to theſe two ſo different opinions; and conclude, that one part of the ſwallow-tribe migrate, and that others have their winter-quarters near home. If it ſhould be demanded, why ſwallows alone are found in a torpid ſtate, and not the other many ſpecies of ſoft-billed birds, which likewiſe diſappear about the ſame time? the following reaſon may be aſſigned:

"No birds are ſo much on the wing as ſwallows, none fly with ſuch ſwiftneſs and rapidity, none are obliged to ſuch ſudden and various evolutions in their flight, none are at ſuch pains to take their prey, and, we may add, none exert their voice more inceſſantly: all theſe occaſion a vaſt expence of ſtrength and of ſpirits, and may give ſuch a texture to the blood as other animals cannot experience; and ſo diſpoſe, or we may ſay neceſſitate, this tribe of birds, or part of them at leaſt, to a repoſe more laſting than that of any others.

"The third notion is, even at firſt ſight, too amazing and unnatural to merit mention, if it was not that ſome of the learned have been credulous enough to deliver for fact, what has the ſtrongeſt appearance of impoſſibility; we mean the relation of ſwallows paſſing the winter immerſed under ice, at the bottom of lakes, or lodged beneath the water of the ſea at the foot of rocks. The firſt who broached this opinion, was Olaus Magnus, archbiſhop of Upſal, who very gravely informs us, that theſe birds are often found in cluſtered maſſes at the bottom of the northern lakes, mouth to mouth, wing to wing, foot to foot; and that they creep down the reeds in autumn, to their ſubaqueous retreats: That when old fiſhermen diſcover ſuch a maſs, they throw it into the water again; but when young inexperienced ones take it, they will, by thawing the birds at a fire, bring them indeed to the uſe of their wings, which will continue but a very ſhort time, being owing to a premature and forced revival.

"That the good archbiſhop did not want credulity in other inſtances, appears from this, that after having ſtocked the bottoms of the lakes with birds, he ſtores the clouds with mice, which ſometimes fall in plentiful ſhowers on Norway and the neighbouring countries.

"Some of our own countrymen have given credit to the ſubmerſion of ſwallows; and Klein patroniſes the doctrine ſtrongly, giving the following hiſtory of their manner of retiring, which he received from ſome countrymen and others. They aſſerted, that ſometimes the ſwallows aſſembled in numbers on a reed, till it broke and ſunk with them to the bottom; and their immerſion was preceded by a dirge of a quarter of an hour's length: That others would unite in laying hold of a ſtraw with their bills, and ſo plunge down in ſociety. Others again would form a large maſs, by clinging together with their feet, and ſo commit themſelves to the deep.

"Such are the relations given by thoſe that are fond of this opinion; and though delivered without exaggeration, muſt provoke a ſmile. They aſſign not the ſmalleſt reaſon to account for theſe birds being able to endure ſo long a ſubmerſion without being ſuffocated, or without decaying, in an element ſo unnatural to ſo delicate a bird; when we know that the otter, the corvorant, and the grebes, ſoon periſh, if caught under ice, or entangled in nets: and it is well known, that thoſe animals will continue much longer under water than any others to whom nature hath denied that particular ſtructure of heart neceſſary for a long reſidence beneath that element. Though entirely ſatisfied in our own mind of the impoſſibility of theſe relations; yet, deſirous of ſtrengthening our opinion with ſome better authority, we applied to that able anatomiſt, Mr John Hunter; who was ſo obliging as to inform us, that he had diſſected many ſwallows, but found nothing in them different from other birds as to the organs of reſpiration: That all thoſe animals which he had diſſected of the claſs that ſleep during winter, ſuch as lizards, frogs, &c. had a very different conformation as to thoſe organs: That all theſe animals, he believes, do breathe in their torpid ſtate; and, as far as his experience reaches, he knows they do: and that therefore he eſteems it a very wild opinion, that terreſtrial animals can remain any long time under water without drowning."

To this reaſoning of Mr Pennant's, however, the following anſwer hath appeared in Kalm's travels in North America.—"It has been a ſubject of conteſt among naturaliſts, to determine the winter-retreat of ſwallows. Some think they go to warmer climates when they diſappear in the northern countries: others ſay, they creep into hollow trees, and holes in clefts of rocks, and lie there all the winter in a torpid ſtate: and others affirm, that they make their retreat into water, and revive again in ſpring. The two firſt opinions have been proved, and it ſeems have found credit; the laſt has been treated as ridiculous, and almoſt as an old woman's tale. Natural hiſtory, as all other hiſtories, depends not always upon the intrinſic degree of probability, but upon facts founded on the teſtimony of people of noted veracity.—Swallows are ſeldom ſeen ſinking down into the water; ſwallows have not ſuch organs as frogs or lizards, which are torpid during winter; *ergo*, ſwallows live not, and cannot live, under water.—This way of arguing, I believe, would carry us, in a great many caſes, too far; for, though it is not clear to every one, it may however be true; and lizards and frogs are animals of a claſs widely different from that of birds, and muſt therefore of courſe have a different ſtructure; hence it is they are claſſed ſeparately. The bear and the marmot are in winter in a torpid ſtate, and have however not ſuch organs as lizards and frogs; and nobody doubts of their being, during ſome time, in the moſt rigid climates, in a torpid ſtate: for the Alpine nations hunt the marmots frequently, by digging their holes up; and find them ſo torpid, that they cut their throats, without their reviving or giving the leaſt ſign of life during the operation; but when the torpid marmot is brought into a warm room, and placed before the fire, it revives from its lethargy. The queſtion muſt therefore be decided by facts; nor are theſe wanting here. Dr Wallerius, the celebrated Swediſh chemiſt, informs us, That he has ſeen, more than once, ſwallows aſſembling on a reed, till they were all immerſed and went to the bottom; this being preceded by a dirge of a quarter of an hour's length. He atteſts likewiſe, that he had ſeen a ſwallow caught during winter out of a lake with a net, drawn, as is com-

Hirundo.

common in northern countries, under the ice; this bird was brought into a warm room, revived, fluttered about, and ſoon after died.

"Mr Klein applied to many fermiers generaux of the king of Pruſſia's domains, who had great lakes in their diſtricts, the fiſhery in them being a part of the revenue. In winter the fiſhery thereon is the moſt conſiderable under the ice, with nets ſpreading more than 200 or 300 fathoms, and they are often wound by ſcrews and engines on account of their weight. All the people queſtioned made affidavits upon oath before the magiſtrates. Firſt, The mother of the counteſs Lehndorf ſaid, that ſhe had ſeen a bundle of ſwallows brought from the Friſh-Haff, (a lake communicating with the Baltic at Pillaw), which, when brought into a moderately warm room, revived and fluttered about. Secondly, Count Schileben gave an inſtrument on ſtamped paper, importing, that by fiſhing on the lake belonging to his eſtate of Gerdauen in winter, he ſaw ſeveral ſwallows caught in the net, one of which he took up with his hand, brought it into a warm room, where it lay about an hour, when it began to ſtir, and half an hour after it flew about in the room. Thirdly, Fermier-general (Amtman) Witkouſki made affidavit, that, in the year 1740, three ſwallows were brought up with the net in the great pond at Didlacken; in the year 1741, he got two ſwallows from another part of the pond, and took them home (they being all caught in his preſence;) after an hour's ſpace they revived all in a warm room, fluttered about, and died in three hours after. Fourthly, Amtman Bönke ſays, that having had the eſtate Kleſkow in farm, he had ſeen nine ſwallows brought up in the net from under the ice, all which he took into a warm room, where he diſtinctly obſerved how they gradually revived; but a few hours after they all died. Another time his people got likewiſe ſome ſwallows in a net, but he ordered them to be again thrown into the water. Fifthly, Andrew Rutta, a maſter fiſherman at Oletſko, made affidavit, in 1747, that 22 years ago, two ſwallows were taken up by him in a net, under the ice, and, being brought into a warm room, they flew about.—Sixthly, Jacob Koſiulo, a maſter fiſherman at Stradauen, made affidavit, that, in 1736, he brought up in winter, in a net, from under the ice of the lake at Raſki, a ſeemingly dead ſwallow, which revived in half an hour's time in warm room, and he ſaw, in a quarter of an hour after, the bird grow weaker, and ſoon after dying. Seventhly, I can reckon myſelf among the eye-witneſſes of this paradoxon of natural hiſtory. In the year 1735, being a little boy, I ſaw ſeveral ſwallows brought in winter by fiſhermen, from the river Viſtula, to my father's houſe; where two of them were brought into a warm room, revived, and flew about. I ſaw them ſeveral times ſettling on the warm ſtove (which the northern nations have in their rooms); and I recollect well, that the ſame forenoon they died, and I had them, when dead, in my hand. In the year 1754, after the death of my uncle Godefroy Wolf, captain in the Poliſh regiment of footguards; being myſelf one of his heirs, I adminiſtered for my co-heirs, ſeveral eſtates called the *Staroſty of Diſchau*, in Poliſh Pruſſia, which my late uncle farmed under the king. In January, the lake of Lybſhaw, belonging to theſe eſtates, being covered with ice, I ordered the fiſhermen to fiſh therein, and in my preſence ſeveral ſwallows were taken, which the fiſhermen to fiſh therein, and in my preſence ſeveral ſwalermen threw in again; but one I took up to myſelf, brought it home, which was five miles from thence, and it revived, but died about an hour after its reviving.

Hirundo, Hiſpaniola.

"Theſe are facts, atteſted by people of the higheſt quality, by ſome in public offices, and by others who, tho' of a low rank, however made theſe affidavits upon oath. It is impoſſible to ſuppoſe indiſcriminately, that they were prompted, by views of intereſt, to aſſert as a fact, a thing which had no truth in it. It is therefore highly probable, or rather inconteſtably true, that ſwallows retire in the northern countries during winter, into the water, and ſtay there in a torpid ſtate, till the return of warmth revives them again in ſpring. The queſtion therefore, I believe, ought for the future to be thus ſtated: The ſwallows in Spain, Italy, France, and perhaps ſome from England, remove to warmer climates; ſome Engliſh ones, and ſome in Germany and other mild countries, retire into clefts and holes in rocks, and remain there in a torpid ſtate. In the colder northern countries the ſwallows immerſe in the ſea, in lakes, and rivers; and remain in a torpid ſtate, under ice, during winter. There are ſtill ſome objections to this latter aſſertion, which we muſt remove. It is ſaid, Why do not rapacious fiſh, and aquatic quadrupeds and birds, devour theſe ſwallows? The anſwer is obvious. Swallows chooſe only ſuch places in the water for their winter-retreat, as are near reeds and ruſhes; ſo that ſinking down there between them and their roots, they are by them ſecured againſt the rapaciouſneſs of their enemies. But others object, Why are not theſe birds caught in ſuch waters as are continually harraſſed by nets? I believe the ſame anſwer which has been made to the firſt objection will ſerve for this likewiſe. Fiſhermen take care to keep off with their nets from places filled with reeds and ruſhes, for fear of entangling and tearing their net; and thus the ſituation of ſwallows under water, is the reaſon that they are ſeldom diſturbed in their ſilent winter-retreats. What confirms this opinion ſtill more is, that ſwallows were never caught in Pruſſia, according to the above-mentioned affidavits, but with thoſe parts of the net which paſſed near to the reeds and ruſhes; and ſometimes the ſwallows were yet faſtened with their feet to a reed, when they were drawn up by the net. As to the argument taken from their being ſo long under water without corruption, I believe, there is a real difference between animals ſuffocated in water and animals being torpid therein. We have examples of things being a long time under water; to which we may add the intenſe cold of theſe northern regions, which preſerves them. Who would have thought it, that ſnails and polypes may be diſſected, and could reproduce the parts ſevered from their body, if it was not a fact? Natural hiſtory ought to be ſtudied as a collection of facts, not as the hiſtory of our gueſſes or opinions. Nature varies in an infinite manner; and Providence has diverſified the inſtinct of animals and their œconomy, and adapted it to the various ſeaſons and climates."

HISPANIOLA, called alſo St Domingo, the

largeſt of the Antilles or Caribbee iſlands, extending about 420 miles from eaſt to weſt, and 120 in breadth from north to ſouth; lying between 17° 37′ and 20° of N. Lat. and between 67° 35′ and 74° 15′ W. Long. The climate his hot, but not reckoned unwholeſome; and ſome of the inhabitants are ſaid to arrive at the age of 120. It is ſometimes refreſhed by breezes and rains; and its ſalubrity is likewiſe in a great meaſure owing to the beautiful variety of hills and valleys, woods and rivers, which every where preſent themſelves. It is indeed reckoned by far the fineſt and moſt pleaſant iſland of the Antilles, as being the beſt accommodated to all the purpoſes of life when duly cultivated.

This iſland, famous for being the earlieſt ſettlement of the Spaniards in the new world, was at firſt in high eſtimation for the quantity of gold it ſupplied: this wealth diminiſhed with the inhabitants of the country, whom they obliged to dig it out of the bowels of the earth; and the ſource of it was entirely dried up, when they were exterminated, which was quickly done, by a ſeries of the moſt ſhocking barbarities that ever diſgraced the hiſtory of any nation. Benzoni relates, that of two millions of inhabitants, contained in the iſland when diſcovered by Columbus in 1492, ſcarce 153 were alive in 1545. A vehement deſire of opening again this ſource of wealth inſpired the thought of getting ſlaves from Africa; but, beſides that theſe were found unfit for the labours they were deſtined to, the multitude of mines, which then began to be wrought on the continent, made thoſe of Hiſpaniola no longer of any importance. An idea now ſuggeſted itſelf, that their negroes, which were healthy, ſtrong, and patient, might be uſefully employed in huſbandry; and they adopted, through neceſſity, a wiſe reſolution, which, had they known their own intereſt, they would have embraced by choice.

The produce of their induſtry was at firſt extremely ſmall, becauſe the labourers were few. Charles V. who, like moſt ſovereigns, preferred his favourites to every thing, had granted an excluſive right of the ſlave-trade to a Flemiſh nobleman, who made over his privilege to the Genoeſe. Thoſe avaricious republicans conducted this infamous commerce as all monopolies are conducted; they reſolved to ſell dear, and they ſold but few. When time and competition had fixed the natural and neceſſary price of ſlaves, the number of them increaſed. It may eaſily be imagined, that the Spaniards, who had been accuſtomed to treat the Indians as beaſts, did not entertain a higher opinion of theſe negro Africans, whom they ſubſtituted in their place. Degraded ſtill further in their eyes by the price they had paid for them, even religion could not reſtrain them from aggravating the weight of their ſervitude. It became intolerable, and theſe wretched ſlaves made an effort to recover the unalienable rights of mankind. Their attempt proved unſucceſsful; but they reaped this benefit from their deſpair, that they were afterwards treated with leſs inhumanity.

This moderation (if tyranny cramped by the apprehenſion of revolt can deſerve that name) was attended with good conſequences. Cultivation was purſued with ſome degree of ſucceſs. Soon after the middle of the 16th century, the mother-country drew annually from this colony ten million weight of ſugar, a large quantity of wood for dying, tobacco, cocoa, caſſia, ginger, cotton, and peltry in abundance. One might imagine, that ſuch favourable beginnings would give both the deſire and the means of carrying them further; but a train of events, more fatal each than the other, ruined theſe hopes.

The firſt misfortune aroſe from the depopulation of the iſland. The Spaniſh conqueſts on the continent ſhould naturally have contributed to promote the ſucceſs of an iſland, which nature ſeemed to have formed to be the centre of that vaſt dominion ariſing around it, to be the ſtaple of the different colonies. But it fell out quite otherwiſe: on a view of the immenſe fortunes raiſing in Mexico, and other parts, the richeſt inhabitants of Hiſpaniola began to deſpiſe their ſettlements, and quitted the true ſource of riches, which is on the ſurface of the earth, to go and ranſack the bowels of it for veins of gold, which are quickly exhauſted. The government endeavoured in vain to put a ſtop to this emigration; the laws were always either artfully eluded, or openly violated.

The weakneſs, which was a neceſſary conſequence of ſuch a conduct, leaving the coaſts without defence, encouraged the enemies of Spain to ravage them. Even the capital of this iſland was taken and pillaged by that celebrated Engliſh ſailor, Sir Francis Drake. The cruizers of leſs conſequence contented themſelves with intercepting veſſels in their paſſage through thoſe latitudes, the beſt known at that time of any in the new world. To complete theſe misfortunes, the Caſtilians themſelves commenced pirates. They attacked no ſhips but thoſe of their own nation; which were more rich, worſe provided, and worſe defended, than any others. The cuſtom they had of fitting out ſhips clandeſtinely, in order to procure ſlaves, prevented them from being known; and the aſſiſtance they purchaſed from the ſhips of war, commiſſioned to protect the trade, inſured to them impunity.

The foreign trade of the colony was its only reſource in this diſtreſs; and that was illicit: but as it continued to be carried on, notwithſtanding the vigilance of the governors, or, perhaps, by their connivance, the policy of an exaſperated and ſhort-ſighted court exerted itſelf in demoliſhing moſt of the ſea-ports, and driving the miſerable inhabitants into the inland country. This act of violence threw them into a ſtate of dejection; which the incurſions and ſettlement of the French on the iſland afterwards carried to the utmoſt pitch. The latter, after having made ſome unſucceſsful attempts to ſettle on the iſland, had part of it yielded to them in 1697, and now enjoy by far the beſt ſhare.

Spain, totally taken up with that vaſt empire which ſhe had formed on the continent, uſed no pains to diſſipate this lethargy. She even refuſed to liſten to the ſolicitations of her Flemiſh ſubjects, who earneſtly preſſed that they might have permiſſion to clear thoſe fertile lands. Rather than run the riſk of ſeeing them carry on a contraband trade on the coaſts, ſhe choſe to bury in oblivion a ſettlement which had been of conſequence, and was likely to become ſo again.

This colony, which had no longer any intercourſe with the mother-country but by a ſingle ſhip, of no great burthen, that arrived from thence every third year, conſiſted, in 1717, of 18410 inhabitants, including Spaniards, Meſtees, Negroes, or Mulattoes. The complexion and character of theſe people differed according to the different proportions of American, European, and African blood they had received from that natural and tranſient union which reſtores all races and conditions to the ſame level. Theſe demi-ſavages, plunged in the extreme of ſloth, lived upon fruits and roots, dwelt in cottages without furniture, and moſt of them without clothes. The few among them, in whom indolence had not totally ſuppreſſed the ſenſe of decency, and taſte for the conveniences of life, purchaſed clothes of their neighbours the French, in return for their cattle, and the money ſent to them for the maintenance of two hundred ſoldiers, the prieſts, and the government. It does not appear that the company, formed at Barcelona in 1757, with excluſive privileges for the re-eſtabliſhment of St Domingo, hath as yet made any conſiderable progreſs. They ſend out only two ſmall veſſels annually, which are freighted back with ſix thouſand hides, and ſome other commodities of little value. See St Domingo.

HISTORIOGRAPHER, a profeſſed hiſtorian, or writer of hiſtory.

HISTORY.

HISTORY, in general, ſignifies an account of ſome remarkable facts which have happened in the world, arranged in the true order in which they actually took place, together with the cauſes to which they were owing, and the different effects they have produced, as far as can be diſcovered.—The word is Greek, Iϛορια; and literally denotes a ſearch of curious things, or a deſire of knowing, or even a rehearſal of things we have ſeen; being formed from the verb Iϛορειν, which properly ſignifies to know a thing by having ſeen it. But the idea is now much more extenſive, and is applied to the knowledge of things taken from the report of others. The origin is from the verb ιϛημι, "I know;" and hence it is, that among the ancients ſeveral of their great men were called *polyhiſtores*, i. e. perſons of various and general knowledge.

Sometimes, however, the word hiſtory is uſed to ſignify a deſcription of things, as well as an account of facts. Thus Theophraſtus calls his work, in which he has treated of the nature and properties of plants, an *hiſtory of plants*; and we have a treatiſe of Ariſtotle, intitled an *hiſtory of animals*; and to this day the deſcriptions of plants, animals, and minerals, are called by the general name of *natural hiſtory*.

But what chiefly merits the name of hiſtory, and what is here conſidered as ſuch, is an account of the principal tranſactions of mankind ſince the beginning of the world; and which naturally divides itſelf into two parts, namely, *civil* and *eccleſiaſtical*. The firſt contains the hiſtory of mankind in their various relations to one another, and their behaviour, for their own emolument, or that of others, in common life; the ſecond conſiders them as acting, or pretending to act, in obedience to what they believe to be the will of the Supreme Being.—Civil hiſtory, therefore, includes an account of all the different ſtates that have exiſted in the world, and likewiſe of thoſe men who in different ages of the world have moſt eminently diſtinguiſhed themſelves either for their good or evil actions. This laſt part of civil hiſtory is uſually termed Biography.

Hiſtory is now conſidered as a very conſiderable branch of polite literature: few accompliſhments are more valued than an accurate knowledge of the hiſtories of different nations; and ſcarce any literary production is more regarded than a well-written hiſtory of any nation.

With regard to the ſtudy of hiſtory, we muſt conſider, that all the revolutions which have happened in the world, have been owing to two cauſes. 1. The connections between the different ſtates exiſting together in the world at the ſame time, or their different ſituations with regard to one another; and, 2. The different characters of the people who in all ages conſtituted theſe ſtates, their different geniuſes and diſpoſitions, &c. by which they were either prompted to undertake ſuch and ſuch actions of themſelves, or were eaſily induced to it by others. The perſon who would ſtudy hiſtory, therefore, ought in the firſt place to make himſelf acquainted with the ſtate of the world in general in all different ages; what nations inhabited the different parts of it; what their extent of territory was; at what particular time they aroſe, and when they declined. He is then to inform himſelf of the various events which have happened to each particular nation; and, in ſo doing, he will diſcover many of the cauſes of thoſe revolutions, which before he only knew as facts. Thus, for inſtance, a perſon may know the Roman hiſtory from the time of Romulus, without knowing in the leaſt why the city of Rome happened to be built at that time. This cannot be underſtood without a particular knowledge of the former ſtate of Italy, and even of Greece and Aſia; ſeeing the origin of the Romans is commonly traced as high as Æneas, one of the heroes of Troy. But when all this is done, which indeed requires no ſmall labour, the hiſtorian hath yet to ſtudy the genius and diſpoſitions of the different nations, the characters of thoſe who were the principal directors of their actions, whether kings, miniſters, generals, or prieſts; and when this is accompliſhed, he will diſcover the cauſes of thoſe tranſactions in the different nations which have given riſe to the great revolutions above mentioned: after which, he may aſſume the character of one who is perfectly verſed in hiſtory.

The firſt *outline* of hiſtory, as it may be called, is moſt eaſily obtained by the inſpection of an hiſtorical chart; and that ſubjoined to the preſent treatiſe, will anſwer the purpoſe as well as any. Along with this it will be proper to peruſe a ſhort abridgment of general hiſtory, from the creation of the world to the preſent time; but in this way there have been but very few attempts attended with any tolerable ſucceſs. The following is collected from reſpectable authorities, and may ſerve to help the ideas of the reader on this ſubject.

Sect. I. Civil Hiſtory.

History, tho' ſeemingly incapable of any natural diviſion, will yet be found, on a nearer inſpection, to reſolve itſelf into the following periods, at each of which a great revolution took place, either with regard to the whole world, or a very conſiderable part of it. 1. The creation of man. 2. The flood. 3. The beginning of profane hiſtory, *i. e.* when all the fabulous relations of heroes, demi-gods, &c. were expelled from hiſtorical narrations, and men began to relate facts with ſome regard to truth and credibility. 4. The conqueſt of Babylon by Cyrus, and the deſtruction of the Babylonian empire. 5. The reign of Alexander the Great, and the overthrow of the Perſian empire. 6. The deſtruction of Carthage by the Romans, when the latter had no longer any rival capable of oppoſing their deſigns. 7. The reign of the emperor Trajan, when the Roman empire was brought to its utmoſt extent. 8. The diviſion of the empire under Conſtantine. 9. The deſtruction of the Weſtern empire by the Heruli, and the ſettlement of the different European nations. 10. The riſe of Mahomet, and the conqueſts of the Saracens and Turks. 11. The cruſades, and all the ſpace intervening between that time and the preſent. 3 Civil hiſtory how divided.

Concerning the number of years which have elapſed ſince the creation of the world, there have been many diſputes. The compilers of the Univerſal Hiſtory determine it to have taken place in the year 4305 B. C. ſo that, according to them, the world is now in the 6085th year of its age. Others think it was created only 4000 years B. C. ſo that it hath not yet attained its 6000th year. Be this as it will, however, the whole account of the creation reſts on the truth of the Moſaic hiſtory; and which we muſt of neceſſity accept, becauſe we can find no other which does not either abound with the groſſeſt abſurdities, or lead us into abſolute darkneſs. The Chineſe and Egyptian pretenſions to antiquity are ſo abſurd and ridiculous, that the bare reading muſt be a ſufficient confutation of them to every reaſonable perſon. See the articles China and Egypt. Some hiſtorians and philoſophers are inclined to diſcredit the Moſaic accounts, from the appearances of volcanoes, and other natural phænomena: but their objections are by no means ſufficient to invalidate the authority of the ſacred writings; not to mention that every one of their own ſyſtems is liable to inſuperable objections. See the article Earth. It is therefore reaſonable for every perſon to accept of the Moſaic account of the creation as truth: but an hiſtorian is under an abſolute neceſſity of doing it, becauſe, without it, he is quite deſtitute of any ſtandard or ſcale by which he might reduce the chronology of different nations to any agreement; and, in ſhort, without receiving this account as true, it would be in a manner impoſſible at this day to write a general hiſtory of the world. 4 Moſaic account of the creation the only probable one.

5 Hiſtory from the creation to the flood. 1. The tranſactions during the firſt period, viz. from the creation to the flood, are very much unknown, nothing indeed being recorded of them but what is to be found in the firſt ſix chapters of Geneſis. In general, we know, that men were not at that time in a ſavage ſtate; they had made ſome progreſs in the arts, had invented muſic, and found out the method of working metals. They ſeem alſo to have lived in one vaſt community, without any of theſe diviſions into different nations which have ſince taken place, and which evidently proceeded from the confuſion of languages. The moſt material part of their hiſtory, however, is, that having once begun to tranſgreſs the divine commands, they proceeded to greater and greater lengths of wickedneſs, till at laſt the Deity thought proper to ſend a flood on the earth, which deſtroyed the whole human race except eight perſons, viz. Noah and his family. This terrible cataſtrophe happened, according to the Hebrew copy of the Bible, 1656 years after the creation; according to the Samaritan copy, 1307. For the different conjectures concerning the natural cauſes of the flood, ſee the article Deluge.

6 From the flood to the beginning of profane hiſtory. 2. For the hiſtory of the ſecond period we muſt again have recourſe to the Scriptures, almoſt as much as for that of the firſt. We now find the human race reduced to eight perſons poſſeſſed of nothing but what they had ſaved in the ark, and the whole world to be ſtored with animals from thoſe which had been preſerved along with theſe eight perſons. In what country their original ſettlement was, no mention is made. The ark is ſuppoſed to have reſted on Mount Ararat in Armenia *; but it is impoſſible to know whether Noah and his ſons made any ſtay in the neighbourhood of this mountain or not. Certain it is, that, ſome time after, the whole or the greateſt part of the human race were aſſembled in Babylonia, where they engaged in building a tower. This gave offence to the Deity; ſo that he puniſhed them by confounding their language; whence the diviſion of mankind into different nations.

According to a common opinion, Noah when dying left the whole world to his ſons, giving Aſia to Shem, Africa to Ham, and Europe to Japhet. But this hath not the leaſt foundation in Scripture. By the moſt probable accounts, Gomer the ſon of Japhet was the father of the Gomerians or Celtes; that is, all the barbarous nations who inhabited the northern parts of Europe under the various names of *Gauls*, *Cimbrians*, *Goths*, &c. and who alſo migrated into Spain, where they were called *Celtiberians*. From Magog, Meſhech, and Tubal, three of Gomer's brethren, proceeded the Scythians, Sarmatians, Tartars, and Moguls. The three other ſons of Japhet, Madai, Javan, and Tiras, are ſaid to have been the fathers of the Medes, the Ionians, Greeks, and Thracians. 7 Nations deſcended from Japhet.

The children of Shem were Elam, Aſhur, Arphaxad, Lud, and Aram. The firſt ſettled in Perſia, where he was the father of that mighty nation: The deſcendants of Aſhur peopled Aſſyria, (now *Curdeſtan*): Arphaxad ſettled in Chaldæa. Lud is ſuppoſed by Joſephus to have taken up his reſidence in Lydia; though this is much controverted. Aram, with more certainty, is thought to have ſettled in Meſopotamia and Syria. 8 From S

The children of Ham were Cuſh, Mizraim, Phut, and Canaan. The firſt is thought to have remained in Babylonia, and to have been king of the ſouth-eaſtern parts of it afterwards called *Khuzeſtan*. His deſcendants are ſuppoſed to have removed into the eaſtern parts of Arabia; from whence they by degrees migrated into the correſponding part of Africa. The ſecond peopled Egypt, Ethiopia, Cyrenaica, Libya, and 9 From H and the reſt of the northern parts of the ſame continent. The place where Phut ſettled is not known: but Canaan is univerſally allowed to have ſettled in Phœnicia; and to have founded thoſe nations who inhabited Judæa, and were afterwards exterminated by the Jews.

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* See *Ararat*.

Almoſt all the countries of the world, at leaſt of the eaſtern continent, being thus furniſhed with inhabitants, it is probable that for many years there would be few or no quarrels between the different nations. The paucity of their numbers, their diſtance from one another, and their diverſity of language, would contribute to keep them from having much communication with each other. Hence, according to the different circumſtances in which the different tribes were placed, ſome would be more civilized, and others more barbarous. In this interval, alſo, the different nations probably acquired different characters, which afterwards they obſtinately retained, and manifeſted on all occaſions; hence the propenſity of ſome nations to monarchy, as the Aſiatics, and the enthuſiaſtic deſire of the Greeks for liberty and republicaniſm, &c.

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The beginning of monarchical government was very early; Nimrod, the ſon of Cuſh, having found means to make himſelf king of Babylonia. In a ſhort time Aſhur emigrated from the new kingdom; built Nineveh, afterwards capital of the Aſſyrian empire; and two other cities called *Rezen* and *Rehoboth*, concerning the ſituation of which we are now much in the dark. Whether Aſhur at this time ſet up as a king for himſelf, or whether he held theſe cities as vaſſal to Nimrod, is now unknown. It is probable, however, that about the ſame time various kingdoms were founded in different parts of the world; and which were great or ſmall, according to different circumſtances. Thus the ſcripture mentions the kings of Egypt, Gerar, Sodom, Gomorrah, &c. in the time of Abraham; and we may reaſonably ſuppoſe, that theſe kings reigned over nations which had exiſted for ſome conſiderable time before.

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The firſt conſiderable revolution we read of is the migration of the Iſraelites out of Egypt, and their eſtabliſhment in the land of Canaan. For the hiſtory of theſe tranſactions we muſt refer to the Old Teſtament, where the reader will ſee that it was attended with the moſt terrible cataſtrophe to the Egyptians, and with the utter extermination of ſome nations, the deſcendants of Ham, who inhabited Judæa. Whether the overthrow of Pharaoh in the Red Sea could affect the Egyptian nation in ſuch a manner as to deprive them of the greateſt part of their former learning, and to keep them for ſome ages after in a barbarous ſtate, is not eaſily determined; but unleſs this was the caſe, it ſeems exceedingly difficult to account for the total ſilence of their records concerning ſuch a remarkable event, and indeed for the general confuſion and uncertainty in which the early hiſtory of Egypt is involved. The ſettlement of the Jews in the promiſed land of Canaan is ſuppoſed to have happened about 1491 B. C.

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For near 200 years after this period, we find no accounts of any other nations than thoſe mentioned in ſcripture. About 1280 B. C. the Greeks began to make other nations feel the effects of that enterpriſing and martial ſpirit for which they were ſo remarkable, and which they had undoubtedly exerciſed upon one another long before. Their firſt enterpriſe was an invaſion of Colchis (now *Mingrelia*), for the ſake of the golden fleece. Whatever was the nature of this expedition, it is probable they ſucceeded in it; and it is likewiſe probable, that it was this ſpecimen of the riches of Aſia which inclined them ſo much to Aſiatic expeditions ever after. All this time we are totally in the dark about the ſtate of Aſia and Africa, except in ſo far as can be conjectured from Scripture. The ancient empires of Babylon, Aſſyria, and Perſia, probably ſtill continued in the former continent, and Egypt and Ethiopia ſeem to have been conſiderable kingdoms in the latter.

About 1184 years B. C. the Greeks again diſtinguiſhed themſelves by their expedition againſt Troy, a city of Phrygia Minor; which they plundered and burnt, maſſacring the inhabitants with the moſt unrelenting cruelty. Æneas, a Trojan prince, eſcaped with ſome followers into Italy, where he became the remote founder of the Roman empire. At this time Greece was divided into a number of ſmall principalities, moſt of which ſeem to have been in ſubjection to Agamemnon king of Mycene. In the reign of Atreus, the father of this Agamemnon, the Heraclidæ, or deſcendants of Hercules, who had been formerly baniſhed by Euriſtheus, were again obliged to leave this country. Under their champion Hyllus, they claimed the kingdom of Mycenæ as their right, pretending that it belonged to their great anceſtor Hercules, who was unjuſtly deprived of it by Euryſtheus *. The controverſy was decided by ſingle combat; but Hyllus being killed, they departed as had been before agreed, under a promiſe of not making any attempt to return for 50 years. About the time of the Trojan war alſo, we find the Lydians, Myſians, and ſome other nations of Aſia Minor, firſt mentioned in hiſtory. The names of the Greek ſtates mentioned during this uncertain period are, 1. Sicyon. 2. Leleg. 3. Meſſina. 4. Athens. 5. Crete. 6. Argos. 7. Sparta. 8. Pelaſgia. 9. Theſſaly. 10. Attica. 11. Phocis. 12. Locris. 13. Ozela. 14. Corinth. 15. Eleuſina. 16. Elis. 17. Pilus. 18. Arcadia. 19. Egina. 20. Ithaca. 21. Cephalone. 22. Phthia. 23. Phocidia. 24. Ephyra. 25. Eolia. 26. Thebes. 27. Caliſta. 28. Etolia. 29. Doloppa. 30. Oechalia. 31. Mycenæ. 32. Eubœa. 33. Mynia. 34. Doris. 35. Phera. 36. Iola. 37. Trachina. 38. Thraſprocia. 39. Myrmidonia. 40. Salamine. 41. Scyros. 42. Hyperia or Melité. 43. The Vulcanian iſles. 44. Megara. 45. Epirus. 46. Achaia. 47. The iſles of the Egean Sea. Concerning many of theſe, we know nothing beſides their names; the moſt remarkable particulars concerning the reſt may be found under their reſpective articles.

13
Of the Jews.

About 1048 B. C. the kingdom of Judæa under king David approached its utmoſt extent of power. In its moſt flouriſhing condition, however, it never was remarkable for the largeneſs of its territory. In this reſpect it ſcarce exceeded the kingdom of Scotland; though, according to the accounts given in Scripture, the magnificence of Solomon was ſuperior to that of the moſt potent monarchs on earth. This extraordinary wealth was owing partly to the ſpoils amaſſed by king David in his conqueſts over his various enemies, and partly to the commerce with the Eaſt Indies which

* See *Hercules*.

which Solomon had eſtabliſhed. Of this commerce he owed his ſhare to the friendſhip of Hiram king of Tyre, a city of Phœnicia, whoſe inhabitants were now the moſt famed for commerce and ſkill in maritime affairs of any in the whole world.

After the death of Solomon, which happened about 975 B. C. the Jewiſh empire began to decline, and ſoon after many powerful ſtates aroſe in different parts of the world. The diſpoſition of mankind in general ſeems now to have taken a new turn, not eaſily accounted for. In former times, whatever wars might have taken place between neighbouring nations, we have no account of any extenſive empire in the whole world, or that any prince undertook to reduce far diſtant nations to his ſubjection. The empire of Egypt indeed is ſaid to have been extended immenſely to the eaſt, even before the days of Seſoſtris. Of this country, however, our accounts are ſo imperfect, that ſcarce any thing can be concluded from them. But now, as it were all at once, we find almoſt every nation aiming at univerſal monarchy, and refuſing to ſet any bounds whatever to its ambition. The firſt ſhock given to the Jewiſh grandeur was the diviſion of the kingdom into two through the imprudence of Rehoboam. This rendered it more eaſily a prey to Shiſhak king of Egypt; who five years after came and pillaged Jeruſalem, and all the fortified cities of the kingdom of Judah. The commerce to the Eaſt Indies was now diſcontinued, and conſequently the ſources of wealth in a great meaſure ſtopped; and this, added to the perpetual wars between the kings of Iſrael and Judah, contributed to that remarkable and ſpeedy decline which is now ſo eaſily to be obſerved in the Jewiſh affairs.

Whether this king Shiſhak was the Seſoſtris of profane writers or not, his expedition againſt Jeruſalem as recorded in Scripture ſeems very much to reſemble the deſultory conqueſts aſcribed to Seſoſtris. His infantry is ſaid to have been innumerable, compoſed of different African nations; and his cavalry 60,000, with 1200 chariots; which agrees pretty well with the mighty armament aſcribed to Seſoſtris, and of which an account is given under the article Egypt, n° 2. There indeed his cavalry are ſaid to have been only 24,000; but the number of his chariots are increaſed to 27,000; which laſt may not unreaſonably be reckoned an exaggeration, and theſe ſupernumerary chariots may have been only cavalry: but, unleſs we allow Seſoſtris to be the ſame with Shiſhak, it ſeems impoſſible to fix on any other king of Egypt that can be ſuppoſed to have undertaken this expedition in the days of Solomon.

14
Of the Syrians.

Though the Jews obtained a temporary deliverance from Shiſhak, they were quickly after attacked by new enemies. In 941 B. C. one Zerah, an Ethiopian, invaded Judæa with an army of a million of infantry and 300 chariots; but was defeated with great ſlaughter by Aſa king of Judah, who engaged him with an army of 580,000 men. About this time alſo we find the Syrians grown a conſiderable people, and bitter enemies both to the kings of Iſrael and Judah; aiming in fact at the conqueſt of both nations. Their kingdom commenced in the days of David, under Hadadezer, whoſe capital was Zobah, and who probably was at laſt obliged to become David's tributary, after having been defeated by him in ſeveral engagements. Before the death of David, however, one Rezon, who it ſeems had rebelled againſt Hadadezer, having found means to make himſelf maſter of Damaſcus, erected there a new kingdom, which ſoon became very powerful. The Syrian princes being thus in the neighbourhood of the two rival ſtates of Iſrael and Judah (whoſe capitals were Samaria and Jeruſalem), found it an eaſy matter to weaken them both, by pretending to aſſiſt the one againſt the other; but a detail of the tranſactions between the Jews and Syrians is only to be found in the Old Teſtament, to which we refer. In 740 B. C. however, the Syrian empire was totally deſtroyed by Tiglath Pileſer king of Aſſyria; as was alſo the kingdom of Samaria by Shalmaneſer his ſucceſſor, in 721. The people were either maſſacred, or carried into captivity into Media, Perſia, and the countries about the Caſpian ſea.

15
Of the Weſtern nations.

While the nations of the eaſt were thus deſtroying each other, the foundations of very formidable empires were laid in the weſt, which in proceſs of time were to ſwallow up almoſt all the eaſtern ones. In Africa, Carthage was founded by a Tyrian colony, about 869 B. C. according to thoſe who aſcribe the higheſt antiquity to that city; but, according to others, it was founded only in 769 or 770 B. C. In Europe a very conſiderable revolution took place about 900 B. C. The Heraclidæ, whom we have formerly ſeen expelled from Greece by Atreus the father of Agamemnon, after ſeveral unſucceſsful attempts, at laſt conquered the whole Peloponneſus. From this time the Grecian ſtates became more civilized, and their hiſtory becomes leſs obſcure. The inſtitution, or rather the revival and continuance, of the Olympic games, in 776 B. C. alſo greatly facilitated the writing not only of their hiſtory, but that of other nations; for as each Olympiad conſiſted of four years, the chronology of every important event became indubitably fixed by referring it to ſuch and ſuch an Olympiad. In 748 B. C. or the laſt year of the ſeventh Olympiad, the foundations of the city of Rome were laid by Romulus; and, 43 years after, the Spartan ſtate was new modelled, and received from Lycurgus thoſe laws, by obſerving of which it afterwards arrived at ſuch a pitch of ſplendor.

16
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3. With the beginning of the 28th Olympiad, or 568 B. C. commences the third general period above mentioned, when profane hiſtory becomes ſomewhat more clear, and the relations concerning the different nations may be depended upon with ſome degree of certainty. The general ſtate of the world was at that time as follows.—The northern parts of Europe were either thinly inhabited, or filled with unknown and barbarous nations, the anceſtors of thoſe who afterwards deſtroyed the Roman empire. France and Spain were inhabited by the Gomerians or Celtes. Italy was divided into a number of petty ſtates ariſing partly from Gauliſh, and partly from Grecian colonies; among which the Romans had already become formidable. They were governed by their king Servius Tullius; had increaſed their city by the demolition of Alba Longa, and the removal of its inhabitants to Rome; and had enlarged their dominions by ſeveral cities taken from their neighbours. Greece was alſo divided into a number of ſmall ſtates, among

which the Athenians and Spartans, being the moſt remarkable, were rivals to each other. The former had, about 599 B. C. received an excellent legiſlation from Solon, and were enriching themſelves by navigation and commerce: the latter were become formidable by the martial inſtitutions of Lycurgus; and, having conquered Meſſina, and added its territory to their own, were juſtly eſteemed the moſt powerful people in Greece. The other ſtates of moſt conſideration were Corinth, Thebes, Argos, and Arcadia.—In Aſia great revolutions had taken place. The ancient kingdom of Aſſyria was deſtroyed by the Medes and Babylonians, its capital city Nineveh utterly ruined, and the greateſt part of its inhabitants carried to Babylon. Nay, the very materials of which it was built were carried off, to adorn and give ſtrength to that ſtately metropolis, which was then undoubtedly the firſt city in the world. Nebuchadnezzar, a wiſe and valiant prince, now ſat on the throne of Babylon. By him the kingdom of Judæa was totally overthrown in 587 B.C. Three years before this, he had taken and razed the city of Tyre, and overrun all the kingdom of Egypt. He is even ſaid by Joſephus to have conquered Spain, and reigned there nine years, after which he abandoned it to the Carthaginians; but this ſeems by no means probable. The extent of the Babylonian empire is not certainly known: but, from what is recorded of it, we may conclude, that it was not at all inferior even in this reſpect to any that ever exiſted; as the Scripture tells us it was ſuperior in wealth to any of the ſucceeding ones. We know that it comprehended Phœnicia, Paleſtine, Syria, Babylonia, Media, and Perſia, and not improbably India alſo; and from a conſideration of this vaſt extent of territory, and the riches with which every one of theſe countries abounded, we may form ſome idea of the wealth and power of this monarch. When we conſider alſo, that the whole ſtrength of this mighty empire was employed in beautifying the metropolis, we cannot look upon the wonders of that city as related by Herodotus to be at all incredible. See BABYLON; and ARCHITECTURE, n° 13. As to what paſſed in the republic of Carthage about this time, we are quite in the dark; there being a chaſm in its hiſtory for no leſs than 300 years.

17

4. The fourth general period of hiſtory, namely, from the end of the fabulous times to the conqueſt of Babylon by Cyrus, is very ſhort, including no more than 31 years. This ſudden revolution was occaſioned by the miſconduct of Evil-merodach Nebuchadnezzar's ſon, even in his father's life-time. For having, in a great hunting match on occaſion of his marriage, entered the country of the Medes, and ſome of his troops coming up at the ſame time to relieve the garriſons in thoſe places, he joined them to thoſe already with him, and without the leaſt provocation began to plunder and lay waſte the neighbouring country. This produced an immediate revolt, which quickly extended over all Media and Perſia. The Medes, headed by Aſtyages and his ſon Cyaxares, drove back Evil-merodach and his party with great ſlaughter; nor doth it appear that they were afterwards reduced even by Nebuchadnezzar himſelf. The new empire continued daily to gather ſtrength; and at laſt Cyrus, Aſtyages's grandſon, a prince of great prudence and valour, being made generaliſſimo of the Median and Perſian forces, took Babylon itſelf, in the year 538 B. C. as related under the article BABYLON.

18 Of the Romans, Greeks, Lydians, and Perſians.

During this period the Romans increaſed in power under the wiſe adminiſtration of their king Servius Tullius, who, though a pacific prince, rendered his people more formidable by a peace of 20 years than his predeceſſors had done by all their victories. The Greeks, even at this early period, began to interfere with the Perſians, on account of the Ionians or Grecian colonies in Aſia Minor. Theſe had been ſubdued by Crœſus king of Lydia about the year 562, the time of Nebuchadnezzar's death. Whether the Lydians had been ſubdued by the Babyloniſh monarch or not, is not now to be aſcertained; though it is very probable that they were either in ſubjection to him, or greatly awed by his power, as before his death nothing conſiderable was undertaken by them. It is indeed probable, that during the inſanity of Nebuchadnezar, ſpoken of by Daniel, the affairs of his kingdom would fall into confuſion; and many of thoſe princes whom he formerly retained in ſubjection would ſet up for themſelves. Certain it is, however, that if the Babylonians did not regard Crœſus as their ſubject, they looked upon him to be a very faithful ally; inſomuch that they celebrated an annual feaſt in commemoration of a victory obtained by him over the Scythians. After the death of Nebuchadnezzar, Crœſus ſubdued many nations in Aſia Minor, and among the reſt the Ionians, as already related. They were, however, greatly attached to his government; for though they paid him tribute, and were obliged to furniſh him with ſome forces in time of war, they were yet free from all kind of oppreſſion. When Cyrus therefore was proceeding in his conqueſts of different parts of the Babyloniſh empire, before he proceeded to attack the capital, the Ionians refuſed to ſubmit to him, though he offered them very advantageous terms. But ſoon after, Crœſus himſelf being defeated and taken priſoner, the Ionians ſent ambaſſadors to Cyrus, offering to ſubmit on the terms which had formerly been propoſed. Theſe terms were now refuſed; and the Ionians, being determined to reſiſt, applied to the Spartans for aid. Though the Spartans at that time could not be prevailed upon to give their countrymen any aſſiſtance, they ſent ambaſſadors to Cyrus with a threatening meſſage; to which he returned a contemptuous anſwer, and then forced the Ionians to ſubmit at diſcretion, five years before the taking of Babylon. Thus commenced the hatred between the Greeks and Perſians; and thus we ſee, that in the two firſt great monarchies the ſeeds of their deſtruction were ſown even before the monarchies themſelves were eſtabliſhed. For while Nebuchadnezzar was raiſing the Babyloniſh empire to its utmoſt height, his ſon was deſtroying what his father built up; and at the very time when Cyrus was eſtabliſhing the Perſian monarchy, by his ill-timed ſeverity to the Greeks he made that warlike people his enemies, whom his ſucceſſors were by no means able to reſiſt, and who would probably have overcome Cyrus himſelf, had they united in order to attack him. The tranſactions of Africa during this period are almoſt entirely unknown; though we cannot doubt that the Carthaginians enriched themſelves by means of their commerce, which enabled them afterwards to attain ſuch a conſiderable ſhare of power.

19 Fifth general period. Hiſtory of the Jews, Babylonians, Egyptians, &c.

5. Cyrus having now become maſter of all the eaſt, the Aſiatic affairs continued for ſome time in a ſtate of tranquillity. The Jews obtained leave to return to their own country, rebuild their temple, and again eſtabliſh their worſhip, of all which an account is given in the ſacred writings, though undoubtedly they muſt have been in a ſtate of dependance on the Perſians from that time forward. Cambyſes the ſucceſſor of Cyrus added Egypt to his empire, which had either not ſubmitted to Cyrus, or revolted ſoon after his death. He intended alſo to have ſubdued the Carthaginians; but as the Phœnicians refuſed to ſupply him with ſhips to fight againſt their own countrymen, he was obliged to lay this deſign aſide.

In 517 B. C. the Babylonians finding themſelves grievouſly oppreſſed by their Perſian maſters, reſolved to ſhake off the yoke, and ſet up for themſelves. For this purpoſe, they took care to ſtore their city with all manner of proviſions; and when Darius Hyſtaſpes, then king of Perſia, advanced againſt them, they took the moſt barbarous method that can be imagined of preventing an unneceſſary conſumption of thoſe proviſions, which they had ſo carefully amaſſed. Having collected all the women, old men, and children, into one place, they ſtrangled them without diſtinction, whether wives, fathers, mothers, brothers, or ſiſters; every one being allowed to ſave only the wife he liked beſt, and a maid ſervant to do the work of the houſe. This cruel policy did not avail them: their city was taken by treachery (for it was impoſſible to take it by force); after which the king cauſed the walls of it to be beat down from 200 to 50 cubits height, that their ſtrength might no longer give encouragement to the inhabitants to revolt. Darius then turned his arms againſt the Scythians; but finding that expedition turn out both tedious and unprofitable, he directed his courſe eaſtward, and reduced all the country as far as the river Indus. In the mean time, the Ionians revolted; and being aſſiſted by the Greeks, a war commenced between the two nations, which was not thoroughly extinguiſhed but by the deſtruction of the Perſian empire in 330 B. C. The Ionians, however, were for this time obliged to ſubmit, after a war of ſix years; and were treated with great ſeverity by the Perſians. The conqueſt of Greece itſelf was then projected: but the expeditions for that purpoſe ended moſt unfortunately for the Perſians, and encouraged the Greeks to make repriſals on them, in which they ſucceeded according to their utmoſt wiſhes; and had it only been poſſible for them to have agreed among themſelves, the downfal of the Perſian empire would have happened much ſooner than it did. See Athens, Sparta, Macedon, and Persia.

In 459 B. C. the Egyptians made an attempt to recover their liberty, but were reduced after a war of ſix years. In 413 B. C. they revolted a ſecond time: and being aſſiſted by the Sidonians, drew upon the latter that terrible deſtruction foretold by the prophets; while they themſelves were ſo thoroughly humbled, that they never after made any attempt to recover their liberty.

20 Xenophon's retreat.

The year 403 B. C. proved remarkable for the revolt of Cyrus againſt his brother Artaxerxes Mnemon; in which, through his own raſhneſs, he miſcarried, and loſt his life at the battle of Cunaxa in the province of Babylon. Ten thouſand Greek mercenaries, who ſerved in his army, made their way back into Greece, tho' ſurrounded on all ſides by the enemy, and in the heart of a hoſtile country. In this retreat they were commanded by Xenophon, who has received the higheſt praiſes on account of his conduct and military ſkill in bringing it to a happy concluſion. Two years after, the invaſions of Ageſilaus king of Sparta threatened the Perſian empire with total deſtruction; from which however it was relieved by his being recalled in order to defend his own country againſt the other Grecian ſtates; and after this the Perſian affairs continued in a more proſperous way till the time of Alexander.

21 Hiſtory of the Greeks.

During all this time, the volatile and giddy temper of the Greeks, together with their enthuſiaſtic deſire of romantic exploits, were preparing fetters for themſelves, which indeed ſeemed to be abſolutely neceſſary to prevent them from deſtroying one another. A zeal for liberty was what they all pretended; but on every occaſion it appeared that this love of liberty was only a deſire of dominion. No ſtate in Greece could bear to ſee another equal to itſelf; and hence their perpetual conteſts for pre-eminence, which could not but weaken the whole body, and render them an eaſy prey to an ambitious and politic prince, who was capable of taking advantage of thoſe diviſions. Being all equally impatient of reſtraint they never could bear to ſubmit to any regular government; and hence their determinations were nothing but the deciſions of a mere mob, of which they had afterwards almoſt conſtantly reaſon to repent. Hence alſo their baſe treatment of thoſe eminent men whom they ought moſt to have honoured, as Miltiades, Ariſtides, Themiſtocles, Alcibiades, Socrates, Phocion, &c. The various tranſactions between the Grecian ſtates, though they make a very conſiderable figure in particular hiſtory, make none at all in a general ſketch of the hiſtory of the world. We ſhall therefore only obſerve, that in 404 B. C. the Athenian power was in a manner totally broken by the taking of their city by the Spartans. In 370, that of the Spartans received a ſevere check from the Thebans at the battle of Leuctra; and, eight years after, was ſtill further reduced by the battle of Mantinea. Epaminondas, the great enemy of the Spartans, was killed; but this only proved a more ſpeedy means of ſubjugating all the ſtates to a foreign, and at that time deſpicable, power. The Macedonians, a barbarous nation, lying to the north of the ſtates of Greece, were, two years after the death of Epaminondas reduced to the loweſt ebb by the Illyrians, another nation of barbarians in the neighbourhood. The king of Macedon being killed in an engagement, Philip, his brother, departed from Thebes, where he had ſtudied the art of war under Epaminondas, in order to take poſſeſſion of his kingdom. Being a man of great prudence and policy, he quickly ſettled his own affairs; vanquiſhed the Illyrians; and, being no ſtranger to the weakened ſituation of Greece, began almoſt immediately to meditate the conqueſt of it. The particulars of this enterprize are related under the article Macedon: here it is ſufficient to take notice, that by firſt attacking thoſe he was ſure he could overcome, by corrupting thoſe whom he thought it dangerous to attack, by ſometimes pretending to aſſiſt one ſtate and ſometimes another, and by impoſing upon all as beſt ſerved his turn, he at laſt put it out of the power of the Greeks to make any reſiſtance, at leaſt ſuch as could keep him from gaining his end. In 338 B. C. he procured himſelf to be elected general of the Amphictyons, or council of the Grecian ſtates, under pretence of ſettling ſome troubles at that time in Greece; but having once obtained liberty to enter that country with an army, he quickly convinced the States that they muſt all ſubmit to his will. He was oppoſed by the Athenians and Thebans; but the inteſtine wars of Greece had cut off all her great men, and no general was now to be found capable of oppoſing Philip with ſucceſs.

The king of Macedon, being now maſter of all Greece, projected the conqueſt of Aſia. To this he was encouraged by the ill ſucceſs which had attended the Perſians in their expeditions againſt Greece, the ſucceſſes of the Greeks in their invaſions, and the retreat of the ten thouſand under Xenophon. All theſe events ſhewed the weakneſs of the Perſians, their vaſt inferiority to the Greeks in military ſkill, and how eaſily their empire might be overthrown by a proper union among the ſtates.

22 onqueſt of erſia by lexander.

Philip was preparing to enter upon his grand deſign, when he was murdered by ſome aſſaſſins. His ſon Alexander was poſſeſſed of every quality neceſſary for the execution of ſo great a plan; and his impetuoſity of temper made him execute it with a rapidity unheard of either before or ſince. It muſt be confeſſed, indeed, that the Perſian empire was now ripe for deſtruction, and could not in all probability have withſtood an enemy much leſs powerful than Alexander. The Aſiatics have in all ages been much inferior to the European nations in valour and military ſkill. They were now ſunk in luxury and effeminacy; and what was worſe, they ſeem at this period to have been ſeized with that infatuation and diſtraction of counſels which ſcarce ever fails to be a forerunner of the deſtruction of any nation. The Perſian miniſters perſuaded their ſovereign to reject the prudent advice that was given him, of diſtreſſing Alexander by laying waſte the country, and thus forcing him to return for want of proviſions. Nay, they even prevented him from engaging the enemy in the moſt proper manner, by dividing his forces; and perſuaded him to put Charidemus the Athenian to death, who had promiſed, with 100,000 men, of whom one third were mercenaries, to drive the Greeks out of Aſia. In ſhort, Alexander met with only two checks in his Perſian expedition. The one was from the city of Tyre, which for ſeven months reſiſted his utmoſt efforts; the other was from Memnon the Rhodian, who had undertaken to invade Macedonia. The firſt of theſe obſtacles Alexander at laſt got over, and treated the governor and inhabitants with the utmoſt cruelty. The other was ſcarce felt; for Memnon died after reducing ſome of the Grecian iſlands, and Darius had no other general capable of conducting the undertaking. The power of the Perſian empire was totally broke by the victory gained over Darius at Arbela in 331 B. C. and next year a total end was put to it by the murder of the king by Beſſus one of his ſubjects.

23 His conqueſt of other nations.

The ambition of Alexander was not to be ſatisfied with the poſſeſſion of the kingdom of Perſia, or indeed of any other on earth. Nothing leſs then the total ſubjection of the world itſelf ſeemed ſufficient to him; and therefore he was now prompted to invade every country of which he could only learn the name, whether it had belonged to the Perſians or not. In conſequence of this diſpoſition, he invaded and reduced Hyrcania, Bactria, Sogdia, and all that vaſt tract of country now called *Bukharia*. At laſt, having entered India, he reduced all the nations to the river Hyphaſis, one of the branches of the Indus. But when he would have proceeded farther, and extended his conqueſts quite to the eaſtern extremities of Aſia, his troops poſitively refuſed to follow him farther, and he was conſtrained to return. In 323, this mighty conqueror died of a fever; without having time to ſettle the affairs of his vaſt extended empire, or even to name his ſucceſſor.

24 Hiſtory of the Romans.

While the Grecian empire thus ſuddenly ſprung up in the eaſt, the rival ſtates of Rome and Carthage were making conſiderable advances in the weſt. The Romans were eſtabliſhing their empire on the moſt ſolid foundations; to which their particular ſituation naturally contributed. Being originally little better than a parcel of lawleſs banditti, they were deſpiſed and hated by the neighbouring ſtates. This ſoon produced wars; in which, at firſt from accidental circumſtances, and afterwards from their ſuperior valour and conduct, the Romans proved almoſt conſtantly victorious. The jealouſies which prevailed among the Italian ſtates, and their ignorance of their true intereſt, prevented them from combining againſt that aſpiring nation, and cruſhing it in its infancy, which they might eaſily have done; while in the mean time the Romans, being kept in a ſtate of continual warfare, became at laſt ſuch expert ſoldiers, that no other ſtate on earth could reſiſt them. During the time of their kings they had made a very conſiderable figure among the Italian nations; but after their expulſion, and the commencement of the republic, their conqueſts became much more rapid and extenſive. In 501 B. C. they ſubdued the Sabines; eight years after, the Latins; and in 399 the city of Veii, the ſtrongeſt in Italy excepting Rome itſelf, was taken after a ſiege of ten years. But in the midſt of their ſucceſſes a ſudden irruption of the Gauls had almoſt put an end to their power and nation at once. The city was burnt to the ground in 383 B.C. and the capitol on the point of being ſurprized, when the Gauls, who were climbing up the walls in the night, were accidentally diſcovered and repulſed *. In a ſhort time Rome was rebuilt with much greater ſplendor than before, but now a general revolt and combination of the nations formerly ſubdued took place. The Romans, however, ſtill got the better of their enemies; but, even at the time of the celebrated Camillus's death, which happened about 352 B. C. their territories ſcarce extended ſix or ſeven leagues from the capital. The republic from the beginning was agitated by thoſe diſſenſions which at laſt proved its ruin. The people had been divided by Romulus into two claſſes, namely *Patricians* and *Plebeians*, anſwering

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* See *Rome*.

ing to our nobility and commonalty. Between theſe two bodies were perpetual jealouſies and contentions; which retarded the progreſs of the Roman conqueſts, and revived the hopes of the nations they had conquered. The tribunes of the people were perpetually oppoſing the conſuls and military tribunes. The ſenate had often recourſe to a dictator endowed with abſolute power; and then the valour and experience of the Roman troops made them victorious: but the return of domeſtic ſeditions gave the ſubjugated nations an opportunity of ſhaking off the yoke. Thus had the Romans continued for near 400 years, running the ſame round of wars with the ſame enemies, and reaping very little advantage from their conqueſts, till at laſt matters were compounded by chooſing one of the conſuls from among the plebeians; and from this time chiefly we may date the proſperity of Rome, ſo that by the time that Alexander the Great died they were held in conſiderable eſtimation among foreign nations.

25 Of the Carthaginians, and of Sicily.

The Carthaginians in the mean time continued to enrich themſelves by commerce; but, being leſs converſant in military affairs, were by no means equal to the Romans in power, though they excelled them in wealth. A new ſtate, however, makes its appearance during this period; which may be ſaid to have taught the Carthaginians the art of war, and by bringing them into the neighbourhood of the Romans proved the firſt ſource of contention between theſe two powerful nations. This was the iſland of Sicily. At what time people were firſt ſettled on it, is not now to be aſcertained. The firſt inhabitants we read of were called *Sicani*, *Siculi*, *Læſtrigones*, &c. but of theſe we know little or nothing. In the ſecond year of the ſeventeenth Olympiad, or 710 B. C. ſome Greek colonies are ſaid to have arrived on the iſland, and in a ſhort time founded ſeveral cities, of which Syracuſe was the chief. The Syracuſans at laſt ſubdued the original inhabitants; though it doth not appear that the latter were ever well affected to their government, and therefore were on all occaſions ready to revolt. The firſt conſiderable prince, or (as he is called by the Greeks) *tyrant* of Syracuſe, was Gelon, who obtained the ſovereignty about the year 483 B. C. At what time the Carthaginians firſt carried their arms into Sicily, is not certainly known; only we are aſſured, that they poſſeſſed ſome part of the iſland as early as 505 B. C. For in the time of the firſt conſuls, the Romans and Carthaginians entered into a treaty chiefly in regard to matters of navigation and commerce; by which it was ſtipulated, that the Romans who ſhould touch at Sardinia, or that part of Sicily which belonged to Carthage, ſhould be received there in the ſame manner as the Carthaginians themſelves. Whence it appears, that the dominion of Carthage already extended over Sardinia and part of Sicily: but in 28 years after, they had been totally driven out by Gelon; which probably was the firſt exploit performed by him. This appears from his ſpeech to the Athenian and Spartan ambaſſadors who deſired his aſſiſtance againſt the forces of Xerxes king of Perſia. The Carthaginians made many attempts to regain their poſſeſſions in this iſland, which occaſioned long and bloody wars between them and the Greeks, as related under the articles CARTHAGE and SICILY. This iſland alſo proved the ſcene of much ſlaughter and bloodſhed in the wars of the Greeks with one another *. Before the year 323 B. C. however, the Carthaginians had made themſelves maſters of a very conſiderable part of the iſland; from whence all the power of the Greeks could not diſlodge them. It is proper alſo to obſerve, that after the deſtruction of Tyre by Alexander the Great, almoſt all the commerce in the weſtern part of the world fell to the ſhare of the Carthaginians. Whether they had at this time made any ſettlements in Spain, is not known. It is certain, that they traded to that country for the ſake of the ſilver, in which it was very rich; as they probably alſo did to Britain, for the tin with which it abounded.

26 Sixth period. Hiſtory of the Macedonian empire.

6. The beginning of the ſixth period preſents us with a ſtate of the world entirely different from the foregoing. We now behold all the eaſtern part of the world, from the confines of Italy to the river Indus, and beyond it, newly united into one vaſt empire, and at the ſame time ready to fall to pieces for want of a proper head; the weſtern world filled with fierce and ſavage nations, whom the rival republics of Carthage and Rome were preparing to enſlave as faſt as they could. The firſt remarkable events took place in the Macedonian empire.—Alexander, as already obſerved, had not diſtinctly named any ſucceſſor; but he had left behind him a victorious, and, we may ſay, invincible army, commanded by moſt expert officers, all of them ambitious of ſupreme authority. It is not to be ſuppoſed that peace could long be preſerved in ſuch a ſituation. For a number of years, indeed, nothing was to be ſeen or heard of but the moſt horrid ſlaughters, and wickedneſs of every kind; until at laſt the mother, wives, childen, brothers, and even ſiſters, of Alexander were cut off; not one of the family of that great conqueror being left alive. When matters were a little ſettled, four new empires, each of them of no ſmall extent, had ariſen out of the empire of Alexander. Caſſander, the ſon of Antipater, had Macedonia, and all Greece; Antigonus, Aſia-Minor; Seleucus had Babylon, and the eaſtern provinces; and Ptolemy Lagus, Egypt, and the weſtern ones. One of theſe empires, however, quickly fell; Antigonus being defeated and killed by Seleucus and Lyſimachus at the battle of Ipſus, in 301 B C. The greateſt part of his dominions then fell to Seleucus: but ſeveral provinces took the opportunity of theſe confuſions to ſhake off the Macedonian yoke altogether; and thus were formed the kingdoms of Pontus, Bithynia, Pergamus, Armenia, and Cappadocia. The two moſt powerful and permanent empires, however, were thoſe of Syria founded by Seleucus, and Egypt by Ptolemy Lagus. The kings of Macedon, though they did not preſerve the ſame authority over the Grecian ſtates that Alexander, Antipater, and Caſſander, had done, yet effectually prevented them from thoſe outrages upon one another, for which they had formerly been ſo remarkable. Indeed, it is ſomewhat difficult to determine, whether their condition was better or worſe than before they were conquered by Philip; ſince, though they were now prevented from deſtroying one another, they were moſt grievouſly oppreſſed by the Macedonian tyrants.

While the eaſtern parts of the world were thus deluged with blood, and the ſucceſſors of Alexander were pulling to pieces the empire which he had eſtabliſhed; the Romans and Carthaginians proceeded in their attempts to enſlave the nations of the weſt. The Romans, ever engaged in war, conquered one city and ſtate after another, till, about the year 253 B C. they had made themſelves maſters of almoſt the whole of Italy. During all this time they had met only with a ſingle check in their conqueſts; and that was the invaſion of Pyrrhus, king of Epirus. That ambitious and fickle prince had projected the conqueſt of Italy, which he fancied would be an eaſy matter. Accordingly, in 271 B. C. he entered that country, and maintained a war with the Romans for ſix years; till at laſt, being utterly defeated by Curius Dentatus, he was obliged to return.

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* See Athens and Sparta.

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ans.

The Romans had no ſooner made themſelves maſters of Italy, than they wanted only a pretence to carry their arms out of it; and this pretence was ſoon found out. Being invited into Sicily to aſſiſt the Mamertines againſt Hiero king of Syracuſe and the Carthaginians, they immediately commenced a war with the latter, which continued with the utmoſt fury for 23 years. The war ended greatly to the diſadvantage of the Carthaginians, chiefly owing to the bad conduct of their generals; none of whom, Hamilcar Barcas alone excepted, ſeem to have been poſſeſſed of any degree of military ſkill; and the ſtate had ſuffered too many misfortunes before he entered upon the command, for him or any other to retrieve it at that time. The conſequence of this war was the entire loſs of Sicily to the Carthaginians; and ſoon after, the Romans ſeized on the iſland of Sardinia.

Hamilcar perceiving that there was now no alternative, but that in a ſhort time either Carthage muſt conquer Rome, or Rome would conquer Carthage, bethought himſelf of a method by which his country might become equal to that haughty republic. This was by reducing all Spain, in which the Carthaginians had already conſiderable poſſeſſions, and from the mines of which they drew great advantages. He had, therefore, no ſooner finiſhed the war with the mercenaries, which ſucceeded that with the Romans, than he ſet about the conqueſt of Spain. This, however, he did not live to accompliſh, though he made great progreſs in it. His ſon Aſdrubal continued the war with ſucceſs; till at laſt, the Romans, jealous of his progreſs, perſuaded him to enter into a treaty with them, by which he engaged himſelf to make the river Iberus the boundary of his conqueſts. This treaty probably was never ratified by the ſenate of Carthage; nor, though it had, would it have been regarded by Hannibal, who ſucceeded Aſdrubal in the command, and had ſworn perpetual enmity with the Romans. The tranſactions of the ſecond Punic war are perhaps the moſt remarkable which the hiſtory of the world can afford. Certain it is, that nothing can ſhew more clearly the ſlight foundations upon which the greateſt empires are built. We now ſee the Romans, the nation moſt remarkable for their military ſkill in the whole world, and who, for more than 500 years, had been conſtantly victorious, unable to reſiſt the efforts of one ſingle man. At the ſame time we ſee this man, though evidently the firſt general in the world, loſt ſolely for want of a ſlight ſupport. In former times, the republic of Carthage ſupplied her generals in Sicily with hundreds of thouſands, though their enterprizes were almoſt conſtantly unſucceſsful; but now Hannibal, the conqueror of Italy, was obliged to abandon his deſign, merely for want of 20 or 30,000 men. That degeneracy and infatuation, which never fails to overwhelm a falling nation, or rather which is the cauſe of its fall, had now infected the counſels of Carthage, and the ſupplies were denied. Neither was Carthage the only infatuated nation at this time. Hannibal, whoſe prudence never forſook him either in proſperity or adverſity, in the height of his good fortune had concluded an alliance with Philip king of Macedon. Had that prince ſent an army to the aſſiſtance of the Carthaginians in Italy immediately after the battle of Cannæ, there can be no doubt but the Romans would have been forced to accept of that peace which they ſo haughtily refuſed †; and indeed, this offer of peace in the midſt of ſo much ſucceſs, is an inſtance of moderation which perhaps does more honour to the Carthaginian general, than all the military exploits he performed. Philip, however, could not be rouſed from his indolence, nor ſee that his own ruin was connected with that of Carthage. The Romans had now made themſelves maſters of Sicily: after which they recalled Marcellus, with his victorious army, to be employed againſt Hannibal; and the conſequence at laſt was, that the Carthaginian armies, unſupported in Italy, could not conquer it, but were recalled into Africa, which the Romans had invaded. The ſouthern nations ſeem to have been as blind to their own intereſt as the northern ones. They ought to have ſeen, that it was neceſſary for them to preſerve Carthage from being deſtroyed; but, inſtead of this, Maſiniſſa king of Numidia allied with the Romans, and by his means Hannibal was overcome at the battle of Zama, * which finiſhed the ſecond Punic war, in 188 B C.

† See *Carthage*, n° 125.

* See *Zama*.

28
Of Egypt
and Syria.

The event of the ſecond Punic war determined the fate of almoſt all the other nations in the world. All this time, indeed, the empires of Egypt, Syria, and Greece, had been promoting their own ruin by mutual wars and inteſtine diviſions. The Syrian empire was now governed by Antiochus the Great, who ſeems to have had little right to ſuch a title. His empire, though diminiſhed by the defection of the Parthians, was ſtill very powerful; and to him Hannibal applied, after he was obliged to leave his country, as related under CARTHAGE, n° 152. Antiochus, however, had not ſufficient judgment to ſee the neceſſity of following that great man's advice; nor would the Carthaginians be prevailed upon to contribute their aſſiſtance againſt the nation which was ſoon to deſtroy them without any provocation. The pretence for war on the part of the Romans was, that Antiochus would not declare his Greek ſubjects in Aſia to be free and independent ſtates; a requiſition which neither the Romans nor any other nation had a right to make. The event of all was, that Antiochus was every-where defeated, and forced to conclude a peace upon very diſadvantageous terms.

29
Of Greece.

In Europe, matters went on in the ſame way; the ſtates of Greece, weary of the tyranny of the Macedonians, entered into a reſolution of recovering their liberties. For this purpoſe was framed the Achæan League †; but, as they could not agree among themſelves, they at laſt came to the imprudent determination of calling in the Romans, to defend them againſt Philip king of Macedon. This produced a war, in which the Romans were victorious. The Macedonians, however, were ſtill formidable; and, as the intention of the Romans to enſlave the whole world could no longer be doubted, Perſeus, the ſucceſſor of Philip, renewed the war. Through his own cowardice he loſt a deciſive engagement, and with it his kingdom, which ſubmitted to the Romans in 167 B.C.

30
Deſtruction of Carthage and Corinth.

Macedon being thus conquered, the next ſtep was utterly to exterminate the Carthaginians; whoſe republic, notwithſtanding the many diſaſters that had befallen it, was ſtill formidable. It is true, the Carthaginians were giving no offence; nay, they even made the moſt abject ſubmiſſions to the republic of Rome: but all was not ſufficient. War was declared a third time againſt that unfortunate ſtate; there was now no Hannibal to command their armies, and the city was utterly deſtroyed 146 B. C. The ſame year the Romans put an end to the liberties they had pretended to grant the cities of Greece, by the entire deſtruction of Corinth. See that article.

31
Hiſtory of Egypt, Syria, and Judæa.

After the death of Antiochus the Great, the affairs of Syria and Egypt went on from bad to worſe. The degenerate princes which filled the thrones of thoſe empires, regarding only their own pleaſures, either ſpent their time in oppreſſing their ſubjects, or in attempting to deprive each other of their dominions, by which means they became a more eaſy prey to the Romans. So far indeed were they from taking any means to ſecure themſelves againſt the overgrown power of that republic, that the kings both of Syria and Egypt ſometimes applied to the Romans as protectors. Their downfal, however, did not happen within the period of which we now treat.—The only other tranſaction which makes any conſiderable figure in the Syrian empire, is the oppreſſion of the Jews by Antiochus Epiphanes. After their return from the Babyloniſh captivity, they continued in ſubjection to the Perſians till the time of Alexander. From that time they were ſubject to the kings of Egypt or Syria, as the fortune of either happened to prevail. Egypt being reduced to a low ebb by Antiochus Epiphanes, the Jews fell under his dominion, and being ſeverely treated by him, imprudently ſhewed ſome ſigns of joy on a report of his death. This brought him againſt them with a powerful army; and in 170 B. C. he took Jeruſalem by ſtorm, committing the moſt horrid cruelties on the inhabitants, inſomuch that they were obliged to hide themſelves in caverns and in holes of rocks to avoid his fury. Their religion was totally aboliſhed, their temple profaned, and an image of Jupiter Olympius ſet up on the altar of burnt-offerings; which profanation is thought to be the *abomination of deſolation* mentioned by the prophet Daniel. This revolution, however, was of no long continuance. In 167 B. C. Mattathias reſtored the true worſhip in moſt of the cities of Judea; and, in 165, the temple was purified, and the worſhip there reſtored by Judas Maccabæus. This was followed by a long ſeries of wars between the Syrians and Jews, in which the latter were almoſt always victorious; and before theſe wars were finiſhed, the deſtruction of Carthage happened, which puts an end to the ſixth general period formerly mentioned.

32
Seventh period. General ſtate of the world.

7. The beginning of the ſeventh period preſents us with a view of the ruins of the Greek empire in the declining ſtates of Syria and Egypt; both of them much circumſcribed in bounds. The empire of Syria at firſt comprehended all Aſia to the river Indus, and beyond it; but in 312 B. C. moſt of the Indian provinces were by Seleucus ceded to one *Sandrocottus*, or *Androcottus*, a native, who in return gave him 500 elephants. Of the empire of Sandrocottus we know nothing farther than that he ſubdued all the countries between the Indus and the Ganges; ſo that from this time we may reckon the greateſt part of India independent on the Syro-Macedonian princes. In 250 B. C. however, the empire ſuſtained a much greater loſs by the revolt of the Parthians and Bactrians from Antiochus Theus. The former could not be ſubdued; and as they held in ſubjection to them the vaſt tract which now goes under the name of *Perſia*, we muſt look upon their defection as an irreparable loſs. Whether any part of their country was afterwards recovered by the kings of Egypt or Syria, is not very certain; nor is it of much conſequence, ſince we are aſſured that in the beginning of the ſeventh period, i. e. 146 B. C. the Greek empires of Syria and Egypt were reduced by the loſs of India, Perſia, Armenia, Pontus, Bithynia, Cappadocia, Pergamus, &c. The general ſtate of the world in 146 B. C. therefore was as follows. In Aſia were the empires of India, Parthia, and Syria, with the leſſer ſtates of Armenia, Pontus, &c. above-mentioned; to which we muſt add that of Arabia, which, during the ſixth period, had grown into ſome conſequence, and had maintained its independency from the days of Iſhmael the ſon of Abraham. In Africa were the kingdoms of Egypt and Ethiopia; the Carthaginian territories, now ſubject to the Romans; and the kingdoms of Numidia, Mauritania, and Getulia, ready to be ſwallowed up by the ſame ambitious and inſatiable power, now that Carthage was deſtroyed, which ſerved as a barrier againſt it. To the ſouth lay ſome unknown and barbarous nations, ſecure by reaſon of their ſituation and inſignificance, rather than their ſtrength, or diſtance from Rome. In Europe we find none to oppoſe the progreſs of the Roman arms, except the Gauls, Germans, and ſome Spaniſh nations. Theſe were brave indeed; but, through want of military ſkill, incapable of contending with ſuch maſters in the art of war as the Romans then were.

33
Conque of the R mans.

The Spaniards had indeed been ſubdued by Scipio Africanus in the time of the ſecond Punic war: but, in 155 B. C. they revolted; and, under the conduct of one Viriathus, formerly a robber, held out for a long time againſt all the armies the Romans could ſend into Spain. Him the Conſul Cæpio cauſed to be murdered about 138 B. C. becauſe he found it impoſſible to reduce him by force. The city of Numantia defied the whole Roman power for ſix years longer; till at laſt, by dint of treachery, numbers, and perſeverance, it was not taken, but the inhabitants, reduced to extremity by famine, ſet fire to their houſes, and periſhed in the flames, or killed one another, ſo that not one remained to grace the triumph of the

† See Greece.

the conqueror; and this for the preſent quieted the reſt of the Spaniards.—About the ſame time Attalus, king of Pergamus, left by will the Roman people heirs to all his goods; upon which they immediately ſeized on his kingdom as part of thoſe goods, and reduced it to a Roman province, under the name of *Aſia Proper*. Thus they continued to enlarge their dominions on every ſide, without the leaſt regard to juſtice, to the means they employed, or to the miſeries they brought upon the conquered people. In 122 B. C. the Balearic iſlands, now called *Majorca*, *Minorca*, and *Ivica*, were ſubdued, and the inhabitants exterminated; and, ſoon after, ſeveral of the nations beyond the Alps were obliged to ſubmit.

In Africa the crimes of Jugurtha ſoon gave this ambitious republic an opportunity of conquering the kingdoms of Numidia and Mauritania: and indeed this is almoſt the only war in which we find the Romans engaged, where their pretenſions had the leaſt colour of juſtice; though in no caſe whatever could a nation ſhew more degeneracy than the Romans did on this occaſion. The particulars of this war are related under the articles NUMIDIA and ROME. The event of it was the total reduction of the former about the year 105 B. C. but Mauritania and Getulia preſerved their liberty for ſome time longer.

In the eaſt, the empire of Syria continued daily to decline; by which means the Jews not only had an opportunity of recovering their liberty, but even of becoming as powerful, or at leaſt of extending their dominions as far, as in the days of David and Solomon. This declining empire was ſtill farther reduced by the civil diſſenſions between the two brothers Antiochus Grypus and Antiochus Cyzicenus; during which the cities of Tyre, Sidon, Ptolemais, and Gaza, declared themſelves independent, and in other cities tyrants ſtarted up who refuſed allegiance to any foreign power. This happened about 100 B. C.; and 17 years after, the whole was reduced by Tigranes, king of Armenia. On his defeat by the Romans, the latter reduced Syria to a province of their empire. The kingdom of Armenia itſelf, with thoſe of Pontus, Cappadocia, and Bithynia, ſoon ſhared the ſame fate; Pontus, the moſt powerful of them all, being ſubdued about 64 B. C.—The kingdom of Judea alſo was reduced under the ſame power much about this time. This ſtate owed the loſs of its liberty to the ſame cauſe that had ruined ſeveral others, namely, calling in the Romans as arbitrators between two contending parties. The two ſons of Alexander Jannæus (Hyrcanus and Ariſtobulus) contended for the kingdom. Ariſtobulus, being defeated by the party of Hyrcanus, applied to the Romans. Pompey the Great, who acted as ultimate judge in this affair, decided it againſt Ariſtobulus, but at the ſame time deprived Hyrcanus of all power as a king; not allowing him even to aſſume the regal title, or to extend his territory beyond the ancient borders of Judæa. To ſuch a length did Pompey carry this laſt article, that he obliged him to give up all thoſe cities in Cœloſyria and Phœnicia which had been gained by his predeceſſors, and added them to the newly acquired Roman province of Syria.

Thus the Romans became maſters of all the eaſtern parts of the world, from the Mediterranean ſea to the borders of Parthia. In the weſt, however, the Gauls were ſtill at liberty, and the Spaniſh nations bore the Roman yoke with great impatience. The Gauls infeſted the territories of the republic by their frequent incurſions, which were ſometimes very terrible; and tho' ſeveral attempts had been made to ſubdue them, they always proved inſufficient till the time of Julius Cæſar. By him they were totally reduced, from the river Rhine to the Pyrenæan mountains, and many of their nations almoſt exterminated. He carried his arms alſo into Germany and the ſouthern parts of Britain; but in neither of theſe parts did he make any permanent conqueſts. The civil wars between him and Pompey gave him an opportunity of ſeizing on the kingdom of Mauritania and thoſe parts of Numidia which had been allowed to retain their liberty. The kingdom of Egypt alone remained, and to this nothing belonged except the country properly ſo called. Cyrenaica was bequeathed by will to the Romans about 58 B. C.; and about the ſame time the iſland of Cyprus was ſeized by them without any pretence, except a deſire of poſſeſſing the treaſures of the king.—The kingdom of Egypt continued for ſome time longer at liberty; which in ſome meaſure muſt be aſcribed to the internal diſſenſions of the republic, but more eſpecially to the amours of Pompey, Julius Cæſar, and Marc Antony, with the famous Cleopatra queen of Egypt. The battle of Actium, however, determined the fate of Antony, Cleopatra, and Egypt itſelf; which laſt was reduced to a Roman province, about 9 B. C.

34
Origin and progreſs of the civil wars in Rome.

While the Romans thus employed all means to reduce the world to their obedience, they were making one another feel the ſame miſeries at home, which they inflicted upon other nations abroad. The firſt civil diſſenſions took their riſe at the ſiege of Numantia in Spain. We have already obſerved, that this ſmall city reſiſted the whole power of the Romans for ſix years. Once they gave them a moſt terrible and ſhameful defeat, wherein 30,000 Romans fled before 4000 Numantines. Twenty thouſand were killed in the battle, and the remaining ten thouſand ſo ſhut up, that there was no poſſibility of eſcaping. In this extremity they were obliged to negotiate with the enemy, and a peace was concluded upon the following terms: 1. That the Numantines ſhould ſuffer the Romans to retire unmoleſted; and, 2. That Numantia ſhould maintain its independence, and be reckoned among the Roman allies.—The Roman ſenate, with an injuſtice and ingratitude hardly to be matched, broke this treaty, and in return ordered the commander of their army to be delivered up to the Numantines: but they refuſed to accept of him, unleſs his army was delivered along with him; upon which the war was renewed, and ended as already related. The fate of Numantia, however, was ſoon revenged. Tiberius Sempronius Gracchus, brother-in-law to Scipio Africanus the ſecond, had been a chief promoter of the peace with the Numantines already mentioned, and of conſequence had been in danger of being delivered up to them along with the commander in chief. This diſgrace he never forgot; and, in order to revenge himſelf, undertook the cauſe of the Plebeians againſt the Patricians, by whom the former were greatly oppreſſed. He began with reviving an old law, which had enacted that no Roman citizen ſhould poſſeſs more than 500 acres of land. The overplus he deſigned to diſtribute among thoſe who had no lands, and to reimburſe the rich out of the public treaſury. This law met with great oppoſition, bred many tumults, and at laſt ended in the death of Gracchus and the perſecution of his friends, ſeveral hundreds of whom were put to cruel deaths without any form of law.

The diſturbances did not ceaſe with the death of Gracchus. New conteſts enſued on account of the Sempronian law, and the giving to the Italian allies the privilege of Roman citizens. This laſt not only produced great commotions in the city, but occaſioned a general revolt of the ſtates of Italy againſt the republic of Rome. This rebellion was not quelled without the utmoſt difficulty: and in the mean time, the city was deluged with blood by the contending factions of Sylla and Marius; the former of whom ſided with the patricians, and the latter with the plebeians. Theſe diſturbances ended in the perpetual dictatorſhip of Sylla, about 80 B. C.

From this time we may date the loſs of the Roman liberty; for though Sylla reſigned his dictatorſhip two years after, the ſucceeding conteſts between Cæſar and Pompey proved equally fatal to the republic. Theſe conteſts were decided by the battle of Pharſalia, by which Cæſar became in effect maſter of the empire in 43 B. C. Without loſs of time, he then croſſed over into Africa; totally defeated the republican army in that continent; and, by reducing the country of Mauritania to a Roman province, completed the Roman conqueſts in theſe parts. His victory over the ſons of Pompey at Munda 40 B. C. ſecured him from any further apprehenſions of a rival. Being therefore ſole maſter of the Roman empire, and having all the power of it at his command, he projected the greateſt ſchemes; tending, according to ſome, not leſs to the happineſs than to the glory of his country: when he was aſſaſſinated in the ſenate-houſe, in the 56th year of his age, and 39 B. C.

Without inveſtigating the political juſtice of this action, or the motives of the perpetrators; it is impoſſible not to regret the death of this great man, when we contemplate his virtues, and the deſigns which he is ſaid to have formed: (See ROME.) Nor is it poſſible to juſtify, from ingratitude at leaſt, even the moſt virtuous of the conſpirators, when we conſider the obligations under which they lay to him. And as to the meaſure itſelf, even in the view of expediency, it ſeems to be generally condemned. In fact, from the tranſactions which had long preceded, as well as thoſe which immediately followed, the murder of Cæſar, it is evident, that Rome was incapable of preſerving its liberty any longer, and that the people had become unfit for being free. The efforts of Brutus and Caſſius were therefore unſucceſsful, and ended in their own deſtruction and that of great numbers of their followers in the battles of Philippi. The defeat of the republicans was followed by numberleſs diſturbances, murders, proſcriptions, &c. till at laſt Octavianus, having cut off all who had the courage to oppoſe him, and finally got the better of his rivals by the victory at Actium, put an end to the republic in the year 27 B. C.

35
Octavianus puts an end to the republic.

The deſtruction of the Roman commonwealth proved advantageous to the few nations of the world who ſtill retained their liberty. That outrageous deſire of conqueſt, which had ſo long marked the Roman character, now in a great meaſure ceaſed; becauſe there was now another way of ſatisfying the deſires of ambitious men, namely, by courting the favour of the emperor. After the final reduction of the Spaniards, therefore, and the conqueſt of the countries of Mæſia, Pannonia, and ſome others adjacent to the Roman territories, and which in a manner ſeemed naturally to belong to them, the empire enjoyed for ſome time a profound peace.

The only remarkable tranſactions which took place during the remainder of the period of which we treat were the conqueſt of Britain by Claudius and Agricola, and the deſtruction of Jeruſalem by Veſpaſian and Titus. The war with the Jews began A. D. 67; and was occaſioned by their obſtinately claiming the city of Cæſarea, which the Romans had added to the province of Syria. It ended in 73, with the moſt terrible deſtruction of their city and nation; ſince which time they have never been able to aſſemble as a diſtinct people. The ſouthern parts of Britain were totally ſubdued by Agricola about ten years after.

In the 98th year of the Chriſtian æra, Trajan was created emperor of Rome; and being a man of great valour and experience in war, carried the Roman conqueſts to their utmoſt extent. Having conquered the Dacians, a German nation beyond the Danube, and who had of late been very troubleſome, he turned his arms eaſtward; reduced all Meſopotamia, Chaldæa, Aſſyria; and having taken Cteſiphon, the capital of the Parthian empire, appointed them a king, which he thought would be a proper method of keeping that warlike people in ſubjection. After this, he propoſed to return to Italy, but died by the way; and with his reign the ſeventh general period abovementioned is concluded.

36
Eighth period. General ſtate of world.

8. The beginning of the eighth period preſents us with a view of one vaſt empire, in which almoſt all the nations of the world were ſwallowed up. This empire comprehended the beſt part of Britain, all Spain, France, the Netherlands, Italy, part of Germany, Egypt, Barbary, Bildulgerid, Turky in Europe, Turky in Aſia, and Perſia. The ſtate of India at this time is unknown. The Chineſe lived in a remote part of the world, unheard of and unmoleſted by the weſtern nations who ſtruggled for the empire of the world. The northern parts of Europe and Aſia were filled with barbarous nations, already formidable to the Romans, and who were ſoon to become more ſo. The vaſt empire of the Romans, however, had no ſooner attained its utmoſt degree of power, than, like others before it, it began to decline. The provinces of Babylonia, Meſopotamia, and Aſſyria, almoſt inſtantly revolted, and were abandoned by Adrian the ſucceſſor of Trajan in the empire. The Parthians having recovered their liberty, continued to be very formidable enemies, and the barbarians of the northern parts of Europe continued to increaſe in ſtrength; while the Romans, weakened by inteſtine diviſions, became daily leſs able to reſiſt them. At different times, however, ſome warlike emperors aroſe, who put a ſtop to the incurſions of theſe barbarians; and about the year 215, the Parthian empire was totally overthrown by the Perſians,

ſians, who had long been ſubject to them. This revolution proved of little advantage to the Romans. The Perſians were enemies ſtill more troubleſome than the Parthians had been; and though often defeated, they ſtill continued to infeſt the empire on the eaſt, as the barbarous nations of Europe did on the north. In 260, the defeat and captivity of the emperor Valerian by the Perſians, with the diſturbances which followed, threatened the empire with utter deſtruction. Thirty tyrants ſeized the government at once, and the barbarians pouring in on all ſides in prodigious numbers ravaged almoſt all the provinces of the empire. By the vigorous conduct of Claudius, Aurelian, Tacitus, Probus, and Carus, the empire was reſtored to its former luſtre; but as the barbarians were only repulſed, and never thoroughly ſubdued, this proved only a temporary relief. What was worſe, the Roman ſoldiers, grown impatient of reſtraint, commonly murdered thoſe emperors who attempted to revive among them the ancient military diſcipline which alone could enſure the victory over their enemies. Under Diocleſian, the diſorders were ſo great, that though the government was held by two perſons, they found themſelves unable to bear the weight of it, and therefore took other two partners in the empire. Thus was the Roman empire divided into four parts; which by all hiſtorians is ſaid to have been productive of the greateſt miſchiefs. As each of the four ſovereigns would have as many officers both civil and military, and the ſame number of forces that had been maintained by the ſtate when governed only by one emperor, the people were not able to pay the ſums neceſſary for ſupporting them. Hence the taxes and impoſts were increaſed beyond meaſure, the inhabitants in ſeveral provinces reduced to beggary, the land left untilled for want of hands, &c. An end was put to theſe evils when the empire was again united under Conſtantine the Great; but in 330 a mortal blow was given to it by removing the imperial ſeat to Byzantium, now Conſtantinople, and making it equal to Rome. The introduction and eſtabliſhment of Chriſtianity, already corrupted with the groſſeſt ſuperſtitions, proved alſo a moſt grievous detriment to the empire. Inſtead of that ferocious and obſtinate valour in which the Romans had ſo long been accuſtomed to put their truſt, they now imagined themſelves ſecured by ſigns of the croſs, and other external ſymbols of the Chriſtian religion. Theſe they uſed as a kind of magical incantations, which undoubtedly proved at all times ineffectual, and hence alſo in ſome meaſure proceeded the great revolution which took place in the next period.

37

9. The ninth general period ſhews us the decline and miſerable end of the weſtern part of the Roman empire. We ſee that mighty empire, which formerly occupied almoſt the whole world, now weakened by diviſion, and ſurrounded by enemies. On the eaſt, the Perſians; on the north, the Scythians, Sarmatians, Goths, and a multitude of other barbarous nations, watched all occaſions to break into it; and miſcarried in their attempts, rather through their own barbarity, than the ſtrength of their enemies. The devaſtations committed by thoſe barbarians when they made their incurſions are incredible, and the relation ſhocking to human nature. Some authors ſeem much inclined to favour them; and even inſinuate, that barbarity and ignorant ferocity were their chief, if not their only faults: but from their hiſtory it plainly appears, that not only barbarity and the moſt ſhocking cruelty, but the higheſt degrees of avarice, perfidy, and diſregard to the moſt ſolemn promiſes, were to be numbered among their vices. It was ever a ſufficient reaſon for them to make an attack, that they thought their enemies could not reſiſt them. Their only reaſon for making peace, or for keeping it, was becauſe their enemies were too ſtrong; and their only reaſon for committing the moſt horrid maſſacres, rapes, and all manner of crimes, was, becauſe they had gained a victory. The Romans, degenerate as they were, are yet to be eſteemed much better than theſe ſavages; and therefore we find not a ſingle province of the empire that would ſubmit to the barbarians, while the Romans could poſſibly defend them.

Some of the Roman emperors indeed withſtood this inundation of ſavages; but as the latter grew daily more numerous, and the Romans continued to weaken themſelves by their inteſtine diviſions, they were at laſt obliged to take large bodies of barbarians into their pay, and teach them their military diſcipline, in order to drive away their countrymen, or others who invaded the empire. This at laſt proved its total deſtruction; for, in 476, the barbarians who ſerved in the Roman armies, and were dignified with the title of *allies*, demanded the third part of the lands of Italy as a reward for their ſervices: but meeting with a refuſal, they revolted, and made themſelves maſters of the whole country, and of Rome itſelf, which from that time ceaſed to be the head of an empire of any conſequence.

38 General ſtate of the world.

This period exhibits a moſt unfavourable view of the weſtern parts of the world: The Romans, from the height of grandeur, ſunk to the loweſt ſlavery, nay, in all probability, almoſt exterminated; the provinces they formerly governed, inhabited by human beings ſcarce a degree above the brutes; every art and ſcience loſt; and the ſavage conquerors even in danger of ſtarving for want of a ſufficient knowledge of agriculture, having now no means of ſupplying themſelves by plunder and robbery as before. Britain had long been abandoned to the mercy of the Scots and Picts; and in 450 the inhabitants had called in the Saxons to their aſſiſtance, whom they ſoon found worſe enemies than thoſe againſt whom they had implored their aid. Spain was held by the Goths and Suevians; Africa (that is, Barbary and Bildulgerid,) by the Vandals; the Burgundians, Goths, Franks, and Alans, had erected ſeveral ſmall ſtates in Gaul; and Italy was ſubjected to the Heruli under Odoacer, who had taken upon him the title of *king of Italy*. In the eaſt, indeed, matters wore an aſpect ſomewhat more agreeable. The Roman empire continued to live in that of Conſtantinople, which was ſtill very extenſive. It comprehended all Aſia-Minor and Syria, as far as Perſia; in Africa, the kingdom of Egypt; and Greece in Europe. The Perſians were powerful, and rivalled the emperors of Conſtantinople; and beyond them lay the Indians, Chineſe, and other nations, who, unheard-of by the inhabitants of the more weſtern parts, enjoyed peace and liberty.

The Conſtantinopolitan empire continued to decline by reaſon of its continual wars with the Perſians, Bulgarians, and other barbarous nations; to which alſo ſuperſtition and relaxation of military diſcipline largely contributed. The Perſian empire alſo declined, from the ſame cauſes, together with the inteſtine broils from which it was ſeldom free more than that of Conſtantinople. The hiſtory of the eaſtern part of the world during this period, therefore, conſiſts only of the wars between theſe two great empires, of which an account is given under the articles CONSTANTINOPLE and PERSIA; and which were productive of no other conſequence than that of weakening them both, and making them a more eaſy prey to thoſe enemies who were now as it were in embryo, but ſhortly about to erect an empire almoſt as extenſive as that of the Greeks or Romans.

39 Hiſtory of Italy.

Among the weſtern nations, the revolutions, as might naturally be expected from the character of the people, ſucceeded one another with rapidity. The Heruli under Odoacer were driven out by the Goths under Theodoric. The Goths were expelled by the Romans; and, while the two parties were contending, both were attacked by the Franks, who carried off an immenſe booty. The Romans were in their turn expelled by the Goths: the Franks again invaded Italy, and made themſelves maſters of the province of Venetia; but at laſt the ſuperior fortune of the emperor of Conſtantinople prevailed, and the Goths were finally ſubdued in 553. Narſes, the conqueror of the Goths, governed Italy as a province of the eaſtern empire till the year 568, when Longinus his ſucceſſor made conſiderable alterations. The Italian provinces had, ever ſince the time of Conſtantine the Great, been governed by *conſulares*, *correctores*, and *præſides*; no alteration having been made either by the Roman emperors or the Gothic kings. But Longinus, being inveſted with abſolute power by Juſtinian, ſuppreſſed thoſe magiſtrates; and, inſtead of them, placed in each city of note a governor, whom he diſtinguiſhed with the title of *duke*. The city of Rome was not more honoured than any other; for Longinus, having aboliſhed the very name of *ſenate* and *conſuls*, appointed a *duke* of Rome as well as of other cities. To himſelf he aſſumed the title of *exarch*; and, reſiding at Ravenna, his government was ſtyled the *exarchate of Ravenna*. But while he was eſtabliſhing this new empire, the greateſt part of Italy was conquered by the Lombards.

40 Of France.

In France a conſiderable revolution alſo took place. In 487, Clovis, the founder of the preſent French monarchy, poſſeſſed himſelf of all the countries lying between the Rhine and the Loire. By force or treachery, he conquered all the petty kingdoms which had been erected in that country; his dominions had been divided, re-united, and divided again; and were on the point of being united a ſecond time, when the great impoſtor Mahomet began to make a figure in the world.

41 Of Spain.

In Spain, the Viſigoths erected a kingdom, ten years before the conqueſt of Rome by the Heruli. This kingdom they had extended eaſtward, about the ſame time that Clovis was extending his conqueſts to the weſt; ſo that the two kingdoms met at the river Loire. The conſequence of this approach of ſuch barbarous conquerors towards each other, was an immediate war. Clovis proved victorious, and ſubdued great part of the country of the Viſigoths, which put a final ſtop to their conqueſts on that ſide.

Another kingdom had been founded in the weſtern parts of Spain by the Suevi, a conſiderable time before the Romans were finally expelled from that country. In 409 this kingdom was entirely ſubverted by Theodoric king of the Goths; and the Suevi were ſo pent up in a ſmall diſtrict of Luſitania and Galicia, that it ſeemed impoſſible for them to recover themſelves. During the abovementioned period, however, while the attention of the Goths was turned another way, they had found means again to erect themſelves into an independent ſtate, and to become maſters of conſiderably-extended territories. But this ſucceſs proved of ſhort duration. In 584 the Goths attacked them; totally deſtroyed their empire a ſecond time; and thus became maſters of all Spain, except ſome ſmall part which ſtill owned ſubjection to the emperors of Conſtantinople. Of this part, however, the Goths became maſters alſo in the year 623; which concludes the 9th general period.

42 Of Africa

Africa, properly ſo called, had changed its maſters three times during this period. The Vandals had expelled the Romans, and erected an independent kingdom, which was at laſt overturned by the emperors of Conſtantinople; and from them the greateſt part of it was taken by the Goths in 620.

43 Tenth ge neral pe riod. C quests of the Sara cens.

10. At the commencement of the tenth general period, (which begins with the flight of Mahomet in the year 622, from whence his followers date their æra, called the *Hegira*), we ſee every thing prepared for the great revolution which was now to take place: the Roman empire in the weſt annihilated; the Perſian empire and that of Conſtantinople weakened by their mutual wars and inteſtine diviſions; the Indians and other eaſtern nations unaccuſtomed to war, and ready to fall a prey to the firſt invader; the ſouthern parts of Europe in a diſtracted and barbarous ſtate; while the inhabitants of Arabia, from their earlieſt origin, accuſtomed to war and plunder, and now united by the moſt violent ſuperſtition and enthuſiaſtic deſire of conqueſt, were like a flood pent up, and ready to overwhelm the reſt of the world.—The northern nations of Europe and Aſia, however formidable in after-times, were at preſent unknown, and peaceable, at leaſt with reſpect to their ſouthern neighbours; ſo that there was in no quarter of the globe any power capable of oppoſing the conqueſts of the Arabs. With amazing celerity, therefore, they over-ran all Syria, Paleſtine, Perſia, Bukharia, and India, extending their conqueſts farther to the eaſtward than ever Alexander had done. On the weſt ſide their empire extended over Egypt, Barbary, and Spain, together with the iſlands of Sicily, Sardinia, Majorca, Minorca, &c. and many of the Archipelago iſlands: nor were the coaſts of Italy itſelf free from their incurſions; nay, they are even ſaid to have reached the diſtant and barren country of Iceland. At laſt this great empire, as well as others, began to decline. Its ruin was very ſudden, and owing to its internal diviſions. Mahomet had not taken care to eſtabliſh the apoſtleſhip in his family, or to give any particular directions about a ſucceſſor. The conſequence of this was, that the caliphat, or ſucceſſion

to the apoſtleſhip, was ſeized by many uſurpers in different parts of the empire; while the true caliphs, who reſided at Bagdad, gradually loſt all power, and were regarded only as a kind of high-prieſts. Of theſe diviſions the Turks took advantage to eſtabliſh their authority in many provinces of the Mohammedan empire: but as they embraced the ſame religion with the Arabs, and were filled with the ſame enthuſiaſtic deſire of conqueſt, it is of little conſequence to diſtinguiſh between them; as indeed it ſignified little to the world in general whether the Turks or Saracenes were the conquerors, ſince both were cruel, barbarous, ignorant, and ſuperſtitious.

44
Of the Pope's temporal power.

While the barbarians of the eaſt were thus graſping at the empire of the whole world, great diſturbances happened among the no leſs barbarous nations of the weſt. Superſtition ſeems to have been the ruling motive in both caſes. The Saracens and Turks conquered for the glory of God, or of his apoſtle Mahomet and his ſucceſſors; the weſtern nations profeſſed an equal regard for the divine glory, but which was only to be perceived in the reſpect they paid to the Pope and clergy. Ever ſince the eſtabliſhment of Chriſtianity by Conſtantine, the biſhops of Rome had been gradually extending their power, and attempting not only to render themſelves independent, but even to aſſume an authority over the emperors themſelves. The deſtruction of the empire was ſo far from weakening their power, that it afforded them opportunities of greatly extending it, and becoming judges of the ſovereigns of Italy themſelves, whoſe barbarity and ignorance prompted them to ſubmit to their deciſions. All this time, however, they themſelves had been in ſubjection to the emperors of Conſtantinople; but on the decline of that empire, they found means to get themſelves exempted from this ſubjection. The principal authority in the city of Rome was then engroſſed by the biſhop; though of right it belonged to the duke appointed by the exarch of Ravenna. But tho' they had now little to fear from the eaſtern emperors, they were in great danger from the ambition of the Lombards, who aimed at the conqueſt of all Italy. This aſpiring people the biſhops of Rome determined to check; and therefore, in 726, when Luitprand king of the Lombards had taken Ravenna and expelled the exarch, the pope undertook to reſtore him. For this purpoſe he applied to the Venetians, who are now firſt mentioned in hiſtory as a ſtate of any conſequence; and by their means the exarch was reſtored. Some time before, a quarrel had happened between the pope (Gregory II.) and Leo emperor of the eaſt, about the worſhip of images. Leo, who it ſeems, in the midſt of ſo much barbariſm, had ſtill preſerved ſome ſhare of common ſenſe and reaſon, reprobated the worſhip of images in the ſtrongeſt terms, and commanded them to be deſtroyed throughout his dominions. The pope, whoſe cauſe was favoured by the moſt abſurd ſuperſtitions, and by theſe only, refuſed to obey the emperor's commands. The exarch of Ravenna, as a ſubject of the emperor, was ordered to force the pope to a compliance, and even to ſeize or aſſaſſinate him in caſe of a refuſal. This excited the pious zeal of Luitprand to aſſiſt the pope, whom he had formerly deſigned to ſubdue: the exarch was firſt excommunicated, and then torn in pieces by the enraged multitude: the duke of Naples ſhared the ſame fate; and a vaſt number of the *Iconoclaſts*, or Image-breakers, as they were called, were ſlaughtered without mercy: and to complete all, the ſubjects of the exarchate, at the inſtigation of the pope, renounced their allegiance to the emperor.

Leo was no ſooner informed of this revolt, than he ordered a powerful army to be raiſed, in order to reduce the rebels, and take vengeance on the pope. Alarmed at theſe warlike preparations, Gregory looked round for ſome power on which he might depend for protection. The Lombards were poſſeſſed of ſufficient force, but they were too near and too dangerous neighbours to be truſted; the Venetians, though zealous Catholics, were as yet unable to withſtand the force of the empire; Spain was over-run by the Saracens: the French ſeemed, therefore, the only people to whom it was adviſable to apply for aid; as they were able to oppoſe the emperor, and were likewiſe enemies to his edict. Charles Martel, who at that time governed France as mayor of the palace, was therefore applied to; but before a treaty could be concluded, all the parties concerned were removed by death. Conſtantine Copronymus, who ſucceeded Leo at Conſtantinople, not only perſiſted in the oppoſition to image-worſhip, begun by his predeceſſor, but prohibited alſo the invocation of ſaints. Zachary, who ſucceeded Gregory III. in the pontificate, proved as zealous an adverſary as his predeceſſors. Pepin, who ſucceeded Charles Martel in the ſovereignty of France, proved as powerful a friend to the pope as his father had been. The people of Rome had nothing to fear from Conſtantinople; and therefore drove out all the emperor's officers. The Lombards, awed by the power of France, for ſome time allowed the pope to govern in peace the dominions of the Exarchate; but in 752, Aſtolphus, king of Lombardy, not only reduced the greateſt part of the pope's territories, but threatened the city of Rome itſelf. Upon this an application was made to Pepin, who obliged Aſtolphus to reſtore the places he had taken, and gave them to the pope, or, as he ſaid, to St Peter. The Greek emperor, to whom they of right belonged, remonſtrated to no purpoſe. The pope from that time became poſſeſſed of conſiderable territories in Italy; which, from the manner of their donation, go under the name of *St Peter's Patrimony*. It was not however before the year 774 that the pope was fully ſecured in theſe new dominions. This was accompliſhed when the kingdom of the Lombards was totally deſtroyed by Charlemagne, who was thereupon crowned king of Italy. Soon after this monarch made himſelf maſter of all the Low Countries, Germany, and part of Hungary; and in the year 800, was ſolemnly crownad emperor of the weſt by the pope.

45
General ſtate of the world.

Thus was the world once more ſhared among three great empires. The empire of the Arabs or Saracens extended from the river Ganges to Spain, comprehending almoſt all of Aſia and Africa which has ever been known to Europeans, the kingdoms of China and Japan excepted. The eaſtern Roman empire was reduced to Greece, Aſia Minor, and the provinces adjoining to Italy. The empire of the weſt under Charlemagne, comprehended France, Germany, and the greateſt part of Italy. The Saxons, however, as yet poſſeſſed Britain unmoleſted by external enemies, tho' the ſeven kingdoms erected by them were engaged in perpetual conteſts. The Venetians alſo enjoyed a nominal liberty; though it is probable, that their ſituation would render them very much dependent on the great powers which ſurrounded them. Of all nations on earth, the Scots and Picts, and the remote ones of China and Japan ſeem to have enjoyed, from their ſituation, the greateſt ſhare of liberty; unleſs, perhaps, we except the Scandinavians, who, under the names of *Danes* and *Normans*, were ſoon to infeſt their ſouthern neighbours. But of all the European potentates, the popes certainly exerciſed the greateſt authority; ſince even Charlemagne himſelf ſubmitted to accept the crown from their hands, and his ſucceſſors made them the arbiters of their differences.

Matters, however, did not long continue in this ſtate. The empire of Charlemagne, was, on the death of his ſon Lewis, divided among his three children. Endleſs diſputes and wars enſued among them, till at laſt the ſovereign power was ſeized by Hugh Capet in 987. The Saxon heptarchy was diſſolved in 827, and the whole kingdom of England reduced under one head. The Danes and Normans began to make depredations, and infeſt the neighbouring ſtates. The former conquered the Engliſh Saxons, and ſeized the government, but were in their turn expelled by the Normans in 1066. In Germany and Italy the greateſt diſturbances aroſe from the conteſts between the popes and the emperors. To all this, if we add the internal conteſts which happened through the ambition of the powerful barons of every kingdom, we can ſcarce form an idea of times more calamitous than thoſe of which we now treat. All Europe, nay, all the world, was one great field of battle; for the empire of the Mahometans was not in a more ſettled ſtate than that of the Europeans. Caliphs, ſultans, emirs, &c. waged continual war with each other in every quarter; new ſovereignties every day ſprung up, and were as quickly deſtroyed. In ſhort, thro' the ignorance and barbarity with which the whole world was overſpread, it ſeemed in a manner impoſſible that the human race could long continue to exiſt; when happily the cruſades, by directing the attention of the Europeans to one particular object, made them in ſome meaſure ſuſpend their ſlaughters of one another.

46 Eleventh period. The cruſades.

11. The cruſades originated from the ſuperſtition of the two grand parties into which the world was at that time divided, namely, the Chriſtians and Mahometans. Both looked upon the ſmall territory of Paleſtine, which they called the *Holy Land*, to be an invaluable acquiſition, for which no ſum of money could be an equivalent; and both took the moſt unjuſtifiable methods to accompliſh their deſires. The ſuperſtition of Omar the ſecond caliph had prompted him to invade this country, part of the territories of the Greek emperor, who was doing him no hurt; and now when it had been ſo long under the ſubjection of the Mahometans, a ſimilar ſuperſtition prompted the pope to ſend an army for the recovery of it. The cruſaders accordingly poured forth in multitudes, like thoſe with which the kings of Perſia formerly invaded Greece; and their fate was pretty ſimilar. Their impetuous valour at firſt, indeed, carried every thing before them: they recovered all Paleſtine, Phœnicia, and part of Syria, from the infidels; but their want of conduct ſoon loſt what their valour had obtained, and very few of that vaſt multitude which had left Europe ever returned to their native countries. A ſecond, a third, and ſeveral other cruſades, were preached, and were attended with a like ſucceſs in both reſpects; vaſt numbers took the croſs, and repaired to the Holy Land, which they polluted by the moſt abominable maſſacres and treacheries, and from which very few of them returned. In the third cruſade Richard I. of England was embarked, who ſeems to have been the beſt general that ever went into the eaſt; but even his valour and ſkill were not ſufficient to repair the faults of his companions, and he was obliged to return even after he had entirely defeated his antagoniſts, and was within ſight of Jeruſalem.

47 Conqueſts of the Moguls.

But while the Chriſtians and Mahometans were thus ſuperſtitiouſly contending for a ſmall territory in the weſtern parts of Aſia, the nations in the more eaſterly parts were threatened with total extermination. Jenghiz Kan, the greateſt, as well as the moſt bloody, conqueror that ever exiſted, now makes his appearance. The rapidity of his conqueſts ſeemed to emulate thoſe of Alexander the Great; and the cruelties he committed were altogether unparallelled. It is worth obſerving, that Jenghiz Khan and all his followers were neither Chriſtians nor Mahometans, but ſtrict deiſts. For a long time even the ſovereign had not heard of a temple or any particular place on earth appropriated by the Deity to himſelf, and treated the notion with ridicule when it was firſt mentioned to him.

The Moguls, over whom Jenghiz Khan aſſumed the ſovereignty, were a people of Eaſt Tartary, divided into a great number of petty governments as they are at this day, but who owned a ſubjection to one ſovereign whom they called *Vang-khan*, or the Great Khan. Temujin, afterwards *Jenghiz-Khan*, was one of theſe petty princes, but unjuſtly deprived of the greateſt part of his inheritance at the age of 13, which he could not recover till he arrived at that of 40. This correſponds with the year 1201, when he totally reduced the rebels, and as a ſpecimen of his lenity cauſed 70 of their chiefs to be thrown into as many caldrons of boiling water. In 1202, he defeated and killed Vang-khan himſelf (known to the Europeans by the name of *Preſter John of Aſia*); and poſſeſſing himſelf of his vaſt dominions, became from thenceforward altogether irreſiſtible. In 1206, having ſtill continued to enlarge his dominions, he was declared khan of the Moguls and Tartars; and took upon him the title of *Jenghiz Khan*, or *The moſt Great Khan of khans*. This was followed by the reduction of the kingdom of Hya in China, Tangut, Kitay, Turkeſtan, Karazm (the kingdom of GAZNA founded by Mahmud Gazni), Great Bukharia, Perſia, and part of India; and all theſe vaſt regions were reduced in 26 years. The devaſtations and ſlaughters with which they were accompanied are unparallelled, no fewer than 14,470,000 perſons being computed to have been maſſacred by Jenghiz Khan during the laſt 22 years of his reign. In the beginning of 1227 he died, thereby freeing the world from a moſt bloody tyrant. His ſucceſſors completed the conqueſt of China and Korea; but were foiled in their attempts on Cochin-china, Tong-king, and Japan. On the weſtern ſide the

Tartar dominions were not much enlarged till the time of Hulaku, who conquered Media, Babylonia, Meſopotamia, Aſſyria, Syria, Georgia, Armenia, and almoſt all Aſia Minor; putting an end to the empire of the Saracens by the taking of Bagdad in 1258.

The empire of Jenghiz Khan had the fate of all others. Being far too extenſive to be governed by one head, it ſplit into a multitude of ſmall kingdoms, as it had been before his time. All theſe princes, however, owned allegiance to the family of Jenghiz Khan till the time of Timur Bek, or Tamerlane. The Turks, in the mean time, urged forward by the inundation of Tartars who poured in from the eaſt, were forced upon the remains of the Greek empire; and at the time of Tamerlane above-mentioned, they had almoſt confined this once mighty empire within the walls of Conſtantinople.

48 Tamer-

In the year 1335 the family of Jenghiz Khan becoming extinct in Perſia, a long civil war enſued, during which Timur Bek, one of the petty princes among which the Tartar dominions were divided, found means to aggrandize himſelf in a manner ſimilar to what Jenghiz Khan had done about 150 years before. Jenghiz Khan, indeed, was the model whom he propoſed to imitate; but it muſt be allowed that Timur was more merciful than Jenghiz Khan, if indeed the word can be applied to ſuch inhuman tyrants. The plan on which Jenghiz Khan conducted his expeditions was that of total extermination. For ſome time he utterly extirpated the inhabitants of thoſe places which he conquered, deſigning to people them anew with his Moguls; and in conſequence of this reſolution, he would employ his army in beheading 100,000 priſoners at once. Timur's cruelty, on the other hand, ſeldom went farther than the pounding of 3 or 4000 people in large mortars, or building them among bricks and mortar into a wall. We muſt obſerve, however, that Timur was not a Deiſt, but a Mahometan, and conquered expreſsly for the purpoſe of ſpreading the Mahometan religion; for the Moguls had now adopted all the ſuperſtitions and abſurdities of Mahomet. Thus was all the eaſtern quarter of the world threatened anew with the moſt dreadful devaſtations, while the weſtern nations were exhauſting themſelves in fruitleſs attempts to regain the Holy Land. The Turks were the only people who ſeem at this period to have been gathering ſtrength, and by their perpetual encroachments threatened to ſwallow up the weſtern nations, as the Tartars had done the eaſtern ones.

In 1362, Timur invaded Bukharia, which he reduced in five years. He proceeded in his conqueſts, though not with the ſame celerity as Jengiz Khan, till the year 1387, when he had ſubdued all Perſia, Armenia, Georgia, Karazm, and great part of Tartary. After this he proceeded weſtward, ſubduing all the countries to the Euphrates; made himſelf maſter of Bagdad; and even entered Ruſſia, where he pillaged the city of Moſcow. From thence he turned his arms to the eaſt, and totally ſubdued India. In 1393, he invaded and reduced Syria; and having turned his arms againſt the Turks, forced their ſultan Bajazet to raiſe the ſiege of Conſtantinople. This brought on an engagement, in which Bajazet was entirely defeated and taken priſoner; which broke the power of the Turks to ſuch a degree, that they were not for ſome time able to recover themſelves. At laſt this great conqueror died in the year 1405, while on his way to conquer China, as Jenghiz Khan had done before him.

49 State of the world ſince that time.

The death of Timur was followed almoſt immediately by the diſſolution of his empire. Moſt of the nations he had conquered, recovered their liberty. The Turks had now no further obſtacle to their conqueſt of Conſtantinople. The weſtern nations having exhauſted themſelves in the *holy wars*, as they were called, had loſt that inſatiable thirſt after conqueſt which for ſo long time poſſeſſed the minds of men. They had already made conſiderable advances in civilization, and began to ſtudy the arts of peace. Gunpowder was invented, and its application to the purpoſes of war already known; and, though no invention threatened to be more deſtructive, perhaps none was ever more beneficial to the human race. By the uſe of fire-arms, nations are put more on a level with each other than formerly they were; war is reduced to a regular ſyſtem, which may be ſtudied with as much ſucceſs as any other ſcience. Conqueſts are not now to be made with the ſame eaſe as formerly; and hence the laſt ages of the world have been much more quiet and peaceable than the former ones. In 1453, the conqueſt of Conſtantinople by the Turks fixed that wandering people to one place; and though now they poſſeſs very large regions both in Europe, Aſia, and Africa, an effectual ſtop hath long been put to their further progreſs.

About this time alſo, learning began to revive in Europe, where it had been long loſt; and the invention of PRINTING, which happened about the ſame time, rendered it in a manner impoſſible for barbariſm ever to take place in ſuch a degree as formerly. All nations of the world, indeed, ſeem now at once to have laid aſide much of their former ferocity; and, though wars have by no means been uncommon, they have not been carried on with ſuch circumſtances of fury and ſavage cruelty as before. Inſtead of attempting to enrich themſelves by plunder, and the ſpoils of their neighbours, mankind in general have applied themſelves to commerce, the only true and durable ſource of riches. This ſoon produced improvements in navigation; and theſe improvements led to the diſcovery of many regions formerly unknown. At the ſame time, the European powers being at laſt thoroughly ſenſible, that extenſive conqueſts could never be permanent, applied themſelves more to provide for the ſecurity of thoſe dominions which they already poſſeſſed, than to attempt the conqueſt of one another: and this produced the policy to which ſo much attention was lately paid, namely, the *preſerving of the balance of Europe*; that is, preventing any one of the nations from acquiring ſufficient ſtrength to overpower another.

In the end of the 15th century, the vaſt continent of America was diſcovered; and, almoſt at the ſame time, the paſſage to the Eaſt-Indies by the Cape of Good-Hope. The diſcovery of theſe rich countries gave a new turn to the ambition of the Europeans. To enrich themſelves, either by the gold and ſilver produced in theſe countries, or by traffic with the natives, now became the object. The Portugueſe had the advantage of being the firſt diſcoverers of the eaſtern, and the Spaniards of the weſtern countries. The former did not neglect ſo favourable an opportunity of enriching themſelves by commerce. Many ſettlements were formed by them in the Eaſt-India iſlands, and on the continent; but their avarice and perfidious behaviour towards the natives, proved at laſt the cauſe of their total expulſion. The Spaniards enriched themſelves by the vaſt quantities of the precious metals imported from America, which were not obtained but by the moſt horrid maſſacres committed on the natives, and of which an account is given under the different names of the American countries. Theſe poſſeſſions of the Spaniards and Portugueſe ſoon excited other European nations to make attempts to ſhare with them in their treaſures, by planting colonies in different parts of America, and making ſettlements in the Eaſt-Indies: and thus has the rage of war in ſome meaſure been transferred from Europe to theſe diſtant regions; and, after various conteſts, the Britiſh at laſt obtained a great ſuperiority both in America and the Eaſt-Indies.

In Europe the only conſiderable revolutions which happened during this period, were, The total expulſion of the Moors or Saracens from Spain, by the taking of Grenada in 1491; the union of the kingdoms of Arragon and Caſtile, by the marriage of Ferdinand and Iſabella; and the revolt of the ſtates of Holland from the Spaniards. After much contention and bloodſhed, theſe laſt obtained their liberty, and were declared a free people in 1609; ſince which time they have continued an independent and very conſiderable nation of Europe.

The European nations at the beginning of the 17th century were, Sweden, Muſcovy, Denmark, Poland, Britain, Germany, Holland, France, Spain, Portugal, Italy, and Turky in Europe. Of theſe the Ruſſians, though the moſt barbarous, were by far the moſt conſiderable, both in regard to numbers and the extent of their empire; but their ſituation made them little feared by the others, who lay at a diſtance from them. The kingdom of Poland, which was firſt ſet up in the year 1000, proved a barrier betwixt Ruſſia and Germany; and at the ſame time the policy abovementioned of keeping up the balance of power in Europe, rendered it probable that no one European nation, whatever wars it might be engaged in, would have been totally deſtroyed, or ceaſed to exiſt as a diſtinct kingdom. The late diſmemberment of Poland, however, or its partition between the three powers Ruſſia, Hungary, and Pruſſia, ſeems to be a ſtep very unfavourable to the liberties of Europe in general. The revolt of the Britiſh colonies in America, muſt be a conſiderable diminution of the ſtrength of Great Britain: the advantage taken by France and Spain of an event ſo favourable to their ambition, the duplicity and evaſions of her allies, and the unconcerned or unfriendly aſpect of the other powers, ſeem to indicate a total diſregard of that equilibrium formerly ſo much and ſo wiſely attended to.

In Aſia nothing of importance hath happened ſince the taking of Conſtantinople by the Turks. That continent is now divided among the following nations. The moſt northerly part, called *Siberia*, extending to the very extremity of the continent, is under the power of Ruſſia. To the ſouthward, from Aſia Minor to China and Korea, are the Tartars, formidable indeed from their numbers, but, by reaſon of their barbarity and want of union, incapable of attempting any thing. The Turks poſſeſs the Weſtern part of the continent called *Aſia Minor*, to the river Euphrates. The Arabs are again confined within their own peninſula; which they poſſeſs, as they have ever done, without owning ſubjection to any foreign power. To the eaſt of Turky in Aſia lies Perſia, now more confined in its limits than before; and to the eaſtward of Perſia lies India, or the kingdom of the Mogul, comprehending all the country from the Indus to the Ganges, and beyond that river. Still farther to the eaſt lie the kingdoms of Siam, Pegu, Thibet, and Cochin-China, little known to the Europeans. The vaſt empire of China occupies the moſt eaſterly part of the continent, while that of Japan comprehends the iſlands which go by that name, and which are ſuppoſed to lie at no great diſtance from the weſtern coaſts of America.

In Africa the Turks poſſeſs Egypt, which they conquered in 1517, and have a nominal juriſdiction over the ſtates of Barbary. The interior parts are filled with barbarous and unknown nations, as they have always been. On the weſtern coaſts are many ſettlements of the European nations, particularly the Britiſh and Portugueſe, and the ſouthern extremity is poſſeſſed by the Dutch. The eaſtern coaſts are almoſt totally unknown. The Aſiatic and African iſlands are either poſſeſſed by the Europeans, or inhabited by ſavage nations.

SECT. II. *Eccleſiaſtical Hiſtory.*

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THE hiſtory of religion, among all the different nations that have exiſted in the world, is a ſubject no leſs important and intereſting than that of civil hiſtory. It is, however, leſs fertile of great events, affords an account of fewer revolutions, and is much more uniform, than civil hiſtory. The reaſon of this is plain. Religion is converſant about things which cannot be ſeen; and which of conſequence cannot ſuddenly and ſtrongly affect the ſenſes of mankind, as natural things are apt to do. The expectation of worldly riches can eaſily induce one nation to attack another; but it is not eaſy to find any thing which will induce a nation to change its religion. The inviſible nature of ſpiritual things, the prejudice of habit and of early education, all ſtand in the way of changes of this kind. Hence the revolutions in religion have been but few, and the duration of almoſt any religion, of longer ſtanding than the moſt celebrated empires; the changes which have happened, in general have acquired a long time to bring them about, and hiſtory ſcarce affords an inſtance of the religion of any nation being eſſentially and ſuddenly changed for another.

With regard to the origin of religion, we muſt have recourſe to the Scriptures; and are as neceſſarily conſtrained to adopt the account there given, as we are to adopt that of the creation given in the ſame book; namely, becauſe no other hath made its appearance which ſeems in any degree rational, or conſiſtent with itſelf.—In what manner the true religion given to Adam was falſified or corrupted by his deſcendants before the flood, doth not clearly appear from Scripture. Idolatry is not mentioned: nevertheleſs we are aſſured that the inhabitants of the world were then exceedingly wicked; and as their wickedneſs did not conſiſt in worſhipping falſe gods, it may be concluded that they worſhipped none at all; i. e. that the crime of the antediluvians was deiſm or atheiſm.

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latry.

After the flood, idolatry quickly made its appearance; but what gave riſe to it, is not certainly known. This ſuperſtition indeed ſeems to be natural to man, eſpecially when placed in ſuch a ſituation that he hath little opportunity of inſtruction, or of improving his rational faculties. This ſeems alſo probable from a caution given to the Jews, leſt, when they looked up to the ſun, moon, and ſtars, and the reſt of the hoſt of heaven, they ſhould be *driven to worſhip them*. The origin of idolatry among the Syrians and Arabians, and alſo in Greece, is therefore accounted for with great probability in the following manner by the author of *The Ruins of Balbec*. "In thoſe uncomfortable deſarts, where the *day* preſents nothing to the view but the uniform, tedious, and melancholy proſpect of barren ſands, the *night* diſcloſes a moſt delightful and magnificent ſpectacle, and appears arrayed with charms of the moſt attractive kind. For the moſt part unclouded and ſerene, it exhibits to the wondering eye the hoſt of heaven in all their variety and glory. In the view of this ſtupendous ſcene, the tranſition from admiration to idolatry was too eaſy to uninſtructed minds; and a people whoſe climate offered no beauties to contemplate but thoſe of the firmament, would naturally look thither for the objects of their worſhip. The form of idolatry in Greece was different from that of the Syrians, which perhaps may be attributed to that ſmiling and variegated ſcene of mountains, valleys, rivers, woods, groves, and fountains, which the tranſported imagination, in the midſt of its pleaſing aſtoniſhment, ſuppoſed to be the ſeats of inviſible deities."

A difficulty, however, ariſes on this ſuppoſition; for if idolatry is naturally produced in the mind of uninſtructed and ſavage man, from a view of the creation, why hath not idolatry of ſome kind or other taken place among all the different nations of the world. This certainly hath not been the caſe; of which the moſt ſtriking examples are the Perſians of old, and the Moguls in more modern times. Both theſe nations were ſtrict Deiſts: ſo that we muſt allow ſome other cauſes to concur in producing idolatry beſides thoſe already mentioned; and of theſe cauſes an imperfect and obſcure notion of the true religion ſeems to be the moſt probable.

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Though idolatry, therefore, was formerly very prevalent, it neither extended over the whole earth, nor were the ſuperſtitions of the idolaters all of one kind. Every nation had its reſpective gods, over which one more excellent than the reſt was ſaid to preſide; yet in ſuch a manner, that this ſupreme deity himſelf was controuled by the rigid empire of the fates, or by what philoſophers called *eternal neceſſity*. The gods of the eaſt were different from thoſe of the Gauls, the Germans, and the other northern nations. The Grecian divinities differed widely from thoſe of the Egyptians, who deified plants, animals, and a great variety of the productions both of nature and art. Each people alſo had their own particular manner of worſhipping and appeaſing their reſpective deities, entirely different from the ſacred rites of other countries. All this variety of religions, however, produced neither wars nor diſſenſions among the different nations; each nation ſuffered its neighbours to follow their own method of worſhip, without diſcovering any diſpleaſure on that account. There is nothing ſurpriſing in this mutual toleration, when we conſider, that they all looked upon the world as one great empire, divided into various provinces, over each of which a certain order of divinities preſided; for which reaſon they imagined that none could behold with contempt the gods of other nations, or force ſtrangers to pay homage to theirs.—The Romans exerciſed this toleration in the moſt ample manner; for though they would not allow any change to be made in the religions that were publicly profeſſed in the empire, nor any new form of worſhip to be openly introduced, yet they granted to their citizens a full liberty of obſerving in private the ſacred rites of other nations, and of honouring foreign deities as they thought proper.

The heathen deities were honoured with rites and ſacrifices of various kinds, according to their reſpective natures and offices. Their rites were abſurd and ridiculous; while the prieſts, appointed to preſide over this ſtrange worſhip, abuſed their authority, by deceiving and impoſing upon the people in the groſſeſt manner.

52
State of religion at the appearance of Chriſt.

From the time of the flood to the coming of Chriſt, idolatry prevailed among almoſt all the nations of the world, the Jews alone excepted; and even they were on all occaſions ready to run into it, as is evident from their hiſtory in the Old Teſtament. At the time of Chriſt's appearance, the religion of the Romans, as well as their empire, extended over a great part of the world. Some people there were among the heathens who perceived the abſurdities of that ſyſtem; but being deſtitute of means, as well as of abilities, to effect a reformation, matters went on in their old way. Though there were at that time various ſects of philoſophers, yet all of them proceeded upon falſe principles, and conſequently could be of no ſervice to the advancement or reformation of religion. Nay, ſome, among whom were the Epicureans and Academics, declared openly againſt every kind of religion whatever.

Two religions at this time flouriſhed in Paleſtine, viz. The Jewiſh and Samaritan; between whoſe reſpective followers reigned the moſt violent hatred and contempt. The difference between them ſeems to have been chiefly about the place of worſhip; which the Jews would have to be in Jeruſalem, and the Samaritans on Mount Gerizzim. But though the Jews were certainly right as to this point, they had greatly corrupted their religion in other reſpects. They expected a Saviour indeed, but they miſtook his character; imagining that he was to be a powerful and warlike prince, who ſhould ſet them free from the Roman yoke, which they bore with the utmoſt impatience. They alſo imagined that the whole of religion conſiſted in obſerving the rites of Moſes, and ſome others which they had added to them, without the leaſt regard to what is commonly called *morality* or *virtue*;

as is evident from the many charges our Saviour brings againſt the Phariſees, who had the greateſt reputation for ſanctity among the whole nation. To theſe corrupt and vicious principles they added ſeveral abſurd and ſuperſtitious notions concerning the divine nature, inviſible powers, magic, &c. which they had partly imbibed during the Babylonian captivity, and partly derived from their neighbours in Arabia, Syria, and Egypt. The principal ſects among them were the ESSENES or Eſſenians, PHARISEES, and SADDUCEES. The Samaritans, according to the moſt general opinion had corrupted their religion ſtill more than the Jews.

When the true religion was preached by the Saviour of mankind, it is not to be wondered at if he became on that account obnoxious to a people ſo deeply ſunk in corruption and ignorance as the Jews then were. It is not here requiſite to enter into the particulars of the doctrine advanced by him, or of the oppoſition he met with from the Jews; as a full account of theſe things, and likewiſe of the preaching of the goſpel by the Apoſtles, may be found in the New Teſtament.—The rapid progreſs of the Chriſtian religion, under theſe faithful and inſpired miniſters, ſoon alarmed the Jews, and raiſed various perſecutions againſt its followers. The Jews, indeed, ſeem at firſt to have been every where the chief promoters of perſecution; for we find that they officiouſly went from place to place, where-ever they heard of the increaſe of the goſpel, and by their calumnies and falſe ſuggeſtions endeavoured to excite the people againſt the Apoſtles. The Heathens, however, though at firſt they ſhowed no very violent ſpirit of perſecution againſt the Chriſtians, ſoon came to hate them as much as the Jews themſelves. Tacitus acquaints us with the cauſes of this hatred, when ſpeaking of the firſt general perſecution under Nero. That inhuman emperor having, as was ſuppoſed, ſet fire to the city of Rome, to avoid the imputation of this wickedneſs, transferred it on the Chriſtians. Our author informs us that they were already abhorred on account of their many and enormous crimes. "The author of this name (*Chriſtians*)," ſays he, "was CHRIST, who, in the reign of Tiberius, was executed under Pontius Pilate, procurator of Judæa. The peſtilent ſuperſtition was for a while ſuppreſſed: but it revived again, and ſpread, not only over Judæa, where this evil was firſt broached; but reached Rome, whither from every quarter of the earth is conſtantly flowing whatever is hideous and abominable amongſt men, and is there readily embraced and practiſed. Firſt, therefore, were apprehended ſuch as openly avowed themſelves to be of that ſect; then by them were diſcovered an immenſe multitude; and all were convicted, not of the crime of burning Rome, but of hatred and enmity to mankind. Their death and tortures were aggravated by cruel deriſion and ſport; for they were either covered with the ſkins of wild beaſts and torn in pieces by devouring dogs, or faſtened to croſſes, or wrapped up in combuſtible garments, that, when the day-light failed, they might, like torches, ſerve to diſpel the darkneſs of the night. Hence, towards the miſerable ſufferers, however guilty and deſerving the moſt examplary puniſhment, compaſſion aroſe; ſeeing they were doomed to periſh, not with a view to the public good, but to gratify the cruelty of one man."

53
Tacitus's account of the firſt perſecution by Nero.

That this account of Tacitus is downright miſrepreſentation and calumny, muſt be evident to every one who reads it. It is impoſſible that any perſon can be convicted of hatred and enmity to mankind, without ſpecifying a number of facts by which this hatred ſhewed itſelf. The burning of Rome would indeed have been a very plain indication of enmity to mankind; but of this Tacitus himſelf clears them, and mentions no other crime of which they were guilty. It is probable, therefore, that the only reaſon of this charge againſt the Chriſtians, was their abſolute refuſal to have any ſhare in the Roman worſhip, or to countenance the abſurd ſuperſtitions of Paganiſm in any degree.

54
Second perſecutio

The perſecution under Nero was ſucceeded by another under Domitian, during which the Apoſtle John was baniſhed to Patmos, where he ſaw the viſions, and wrote the book called his *Revelation*, which completes the canon of Scripture. This perſecution commenced in the 95th year of the Chriſtian æra; and John is ſuppoſed to have wrote his Revelation the year after, or in the following one.

During the firſt century, the Chriſtian religion ſpread over a great number of different countries; but as we have now no athentic records concerning the travels of the apoſtles, or the ſucceſs which attended them in their miniſtry, it was impoſſible to determine how far the goſpel was carried during this period. We are, however, aſſured, that even during this early period many corruptions were creeping in, the progreſs of which was with difficulty prevented even by the apoſtles themſelves. Some corrupted their profeſſion by a mixture of Judaiſm, others by mixing it with the oriental philoſophy; while others were already attempting to deprive their brethren of liberty, ſetting themſelves up as eminent paſtors, in oppoſition even to the apoſtles, as we learn from the epiſtles of St Paul, and the third epiſtle of St John. Hence aroſe the ſects of the Gnoſtics, Cerinthians, Nicolaitans, Nazarenes, Ebionites, &c. with which the church was troubled during this century.

Concerning the ceremonies and method of worſhip uſed by the Chriſtians of the firſt century, it is impoſſible to ſay any thing with certainty. Neither is the church order, government, and diſcipline, during this period, aſcertained with any degree of exactneſs. Each of thoſe parties, therefore, which exiſt at this day, contends with the greateſt earneſtneſs for that particular mode of worſhip which they themſelves have adoptted, and ſome of the moſt bigotted would willingly monopoliſe the word *church* in ſuch a manner as to exclude from all hope of ſalvation every one who is not attacked to their particular party. It doth not however appear that, excepting baptiſm, the Lord's ſupper, and anointing the ſick with oil, any external ceremonies or ſymbols were properly of divine appointment. According to Dr Moſheim, "there are ſeveral circumſtances which inclines us to think, that the friends and apoſtles of our bleſſed Lord either tolerated through neceſſity, or appointed for wiſe reaſons, many other external rites in various places. At the ſame time, we are not to imagine, that they ever conferred upon any perſon a perpetual, indelible, pontifical authority,

thority, or that they enjoined the ſame rites in all churches. We learn on the contrary, from authentic records, that the Chriſtian worſhip was, from the beginning, celebrated in a different manner in different places; and that, no doubt, by the orders, or at leaſt with the approbation, of the apoſtles and their diſciples. In thoſe early times, it was both wiſe and neceſſary to ſhew, in the eſtabliſhment of outward forms of worſhip, ſome indulgence to the ancient opinions, manners, and laws, of the reſpective nations to whom the goſpel was preached."

55 iſtory of e ſecond tury.

The ſecond century commences with the third year of the emperor Trajan. The Chriſtians were ſtill perſecuted; but as the Roman emperors were for the moſt part of this century princes of a mild and moderate turn, they perſecuted leſs violently than formerly. Marcus Aurelius, notwithſtanding the clemency and philoſophy for which he is ſo much celebrated, treated the Chriſtians worſe than Trajan, Adrian, or even Severus himſelf did, who was noted for his cruelty. This reſpite from rigorous perſecution proved a very favourable circumſtance for the ſpreading of the Chriſtian religion; yet it is by no means eaſy to point out the particular countries through which it was diffuſed. We are, however, aſſured, that, in the ſecond century, Chriſt was worſhipped as God almoſt through the whole eaſt; as alſo among the Germans, Spaniards, Celts, and many other nations: but which of them received the goſpel in the firſt century, and which in the ſecond, is a queſtion unanſwerable at this diſtance of time. The writers of this century attribute the rapid progreſs of Chriſtianity chiefly to the extraordinary gifts that were imparted to the firſt Chriſtians, and the miracles which were wrought at their command; without ſuppoſing that any part of the ſucceſs ought to be aſcribed to the intervention of human means, or ſecondary cauſes. Many of the moderns, however, are ſo far from being of this opinion, that they are willing either to deny the authenticity of all miracles ſaid to have been wrought ſince the days of the apoſtles, or to aſcribe them to the power of the devil. To enter into the particulars of this controverſy is foreign to our preſent purpoſe; for which reaſon we muſt refer to the writers of polemic divinity, who have largely treated of this and other points of a ſimilar nature.

56 emonies tiplied.

The corruptions which had been introduced in the firſt century, and which were almoſt coeval with Chriſtianity itſelf, continued to gain ground in the ſecond. Ceremonies, in themſelves futile and uſeleſs, but which muſt be conſidered as highly pernicious when joined to a religion incapable of any other ornament than the upright and virtuous conduct of its profeſſors, were multiplied for no other purpoſe than to pleaſe the ignorant multitude. The immediate conſequence of this was, that the attention of Chriſtians was drawn aſide from the important duties of morality; and they were led to imagine, that a careful obſervance of the ceremonies might make amends for the neglect of moral duties. This was the moſt pernicious opinion that could poſſibly be entertained; and was indeed the very foundation of that enormous ſyſtem of eccleſiaſtical power which afterwards took place, and held the whole world in ſlavery and barbariſm for many ages.

57 ſteries duced.

Another miſchief was the introduction of *myſteries*, as they were called, into the Chriſtian religion; that is, inſinuating, that ſome parts of the worſhip in common uſe had a hidden efficacy and power, far ſuperior to the plain and obvious meaning aſſigned to them by the vulgar: and by paying peculiar reſpect to theſe *myſteries*, the pretended teachers of the religion of Jeſus accommodated their doctrines to the taſte of their heathen neighbours, whoſe religion conſiſted in a heap of myſteries, of which nobody knew the meaning.

58 The teachers aſſume a power over the people.

By theſe, and other means of a ſimilar kind, the Chriſtian paſtors greatly abridged the liberty of their flock. Being maſters of the ceremonies and myſteries of the Chriſtian religion, they had it in their power to make their followers worſhip and believe whatever they thought proper, and this they did not fail to make uſe of for their own advantage. They perſuaded the people, that the miniſters of the Chriſtian church ſucceeded to the character, rights, and privileges, of the Jewiſh prieſthood; and accordingly, the biſhops conſidered themſelves as inveſted with a rank and character ſimilar to thoſe of the high-prieſt among the Jews, while the preſbyters repreſented the prieſts, and the deacons the Levites. This notion, which was firſt introduced in the reign of Adrian, proved a ſource of very conſiderable honour and profit to the clergy.

59 Form of church government.

The form of eccleſiaſtical government was in this century rendered permanent and uniform. One inſpector or biſhop preſided over each Chriſtian aſſembly, to which office he was elected by the voices of the whole people. To aſſiſt him in his office, he formed a council of preſbyters, which was not confined to any ſtated number. To the biſhops and preſbyters the miniſters or *deacons* were ſubject; and the latter were divided into a variety of claſſes, as the different exigencies of the church required. During a great part of this century, the churches were independent of each other; nor were they joined together by aſſociation, confederacy, or any other bonds but thoſe of charity. Each aſſembly was a little ſtate governed by its own laws; which were either enacted, or at leaſt approved of, by the ſociety. But, in proceſs of time, all the Chriſtian churches of a province were formed into one large eccleſiaſtical body, which, like confederate ſtates, aſſembled at certain times, in order to deliberate about the common intereſts of the whole. This inſtitution had its origin among the Greeks; but in a ſhort time it became univerſal, and ſimilar aſſemblies were formed in all places where the goſpel had been planted. Theſe aſſemblies, which conſiſted of the deputies or commiſſioners from ſeveral churches, were called *ſynods* by the Greeks, and *councils* by the *Latins*; and the laws enacted in theſe general meetings were called *canons*, i. e. *rules*.

60 Changes produced by the inſtitution of councils.

Theſe councils, of which we find not the ſmalleſt trace before the middle of this century, changed the whole face of the church, and gave it a new form; for by them the ancient privileges of the people were conſiderably diminiſhed, and the power and authority of the biſhops greatly augmented. The humility indeed, and prudence, of theſe pious prelates hindered them from aſſuming all at once the power with which they were afterwards inveſted. At their firſt appearance in theſe general councils, they acknowledged that they were no more than the delegates of their reſpective churches, and that they acted in the name and by the appointment of their people. But they ſoon changed this humble tone; imperceptibly extended the limits of their authority; turned their influence into dominion, their counſels into laws; and at length openly aſſerted, that Chriſt had empowered them to preſcribe to his people *authoritative rules* of *faith* and *manners*. Another effect of theſe councils was the gradual abolition of that perfect equality which reigned among all biſhops in the primitive times. For the order and decency of theſe aſſemblies required, that ſome one of the provincial biſhops met in council ſhould be inveſted with a ſuperior degree of power and authority; and hence the rights of Metropolitans derive their origin. In the mean time, the bounds of the church were enlarged; the cuſtom of holding councils was followed wherever the ſound of the goſpel had reached; and the univerſal church had now the appearance of one vaſt republic formed by a combination of a great number of little ſtates. This occaſioned the creation of a new order of eccleſiaſtics, who were appointed in different parts of the world as heads of the church, and whoſe office it was to preſerve the conſiſtence and union of that immenſe body, whoſe members were ſo widely diſperſed throughout the nations. Such was the nature and office of the *Patriarchs;* among whom, at length, ambition, being arrived at its moſt inſolent period, formed a new dignity, inveſting the biſhop of Rome with the title and authority of the *prince of the patriarchs*.

62
Account of the Aſcetics.

During the ſecond century, all the ſects continued which had ſprung up in the firſt, with the addition of ſeveral others, the moſt remarkable of which were the *Aſcetics*. Theſe owed their riſe to an error propagated by ſome doctors of the church, who aſſerted that Chriſt had eſtabliſhed *a double rule of ſanctity and virtue* for two different orders of Chriſtians. Of theſe rules, one was ordinary, the other extraordinary; the one of a lower dignity, the other more ſublime: the firſt for perſons in the active ſcenes of life; the other for thoſe who, in a ſacred retreat, aſpired after the glory of a celeſtial ſtate. In conſequence of this ſyſtem, they divided into two parts all thoſe moral doctrines and inſtructions, which they had received either by writing or tradition. One of theſe diviſions they called *precepts*, and the other *counſels*. They gave the name of *precepts* to thoſe laws that were univerſally obligatory upon all orders of men; and that of *counſels* to thoſe which related to Chriſtians of a more ſublime rank, who propoſed to themſelves great and glorious ends, and breathed after an intimate communion with the Supreme Being.—Thus were produced all at once a new ſet of men, who made pretenſions to uncommon ſanctity and virtue, and declared their reſolution of obeying all the *precepts* and *counſels* of Chriſt, in order to their enjoyment of communion with God here; and alſo that, after the diſſolution of their mortal bodies, they might aſcend to him with the greater facility, and find nothing to retard their approach to the centre of happineſs and perfection. They looked upon themſelves as prohibited from the uſe of things which it was lawful for other Chriſtians to enjoy, ſuch as wine, fleſh, matrimony, and commerce. They thought it their indiſpenſable duty to extenuate their body by watchings, abſtinence, labour, and hunger. They looked for felicity in ſolitary retreats, and deſart places; where, by ſevere and aſſiduous efforts of ſublime meditation, they raiſed the ſoul above all external objects, and all ſenſual pleaſures. They were diſtinguiſhed from other Chriſtians, not only by their title of *Aſcetics*, Σπουδαιοι, Εκλεκτοι, and philoſophers, but alſo by their garb. In this century, indeed, thoſe who embraced ſuch an auſtere kind of life, ſubmitted themſelves to all theſe mortifications in private, without breaking aſunder their ſocial bands, or withdrawing themſelves from mankind; but in proceſs of time they retired into deſarts, and, after the example of the Eſſenes and Therapeutæ, they formed themſelves into certain companies.

This auſtere ſect aroſe from an opinion which has been more or leſs prevalent in all ages and in all countries, namely, That religion conſiſts more in prayers, meditations, and a kind of ſecret intercourſe with God, than in fulfilling the ſocial duties of life in acts of benevolence and humanity to mankind. Nothing can be more evident than that the Scripture reckons the fulfilling of theſe infinitely ſuperior to the obſervance of all the ceremonies that can be imagined: yet it ſomehow or other happens, that almoſt every body is more inclined to obſerve the ceremonial part of devotion, than the moral; and hence, according to the different humours or conſtitutions of different perſons, there have been numberleſs forms of Chriſtianity, and the moſt virulent contentions among thoſe who profeſſed themſelves followers of the Prince of Peace. It is obvious, that if the moral conduct of Chriſtians was to be made the ſtandard of faith, inſtead of ſpeculative opinions, all theſe diviſions muſt ceaſe in a moment; but while Chriſtianity, or any part of it, is made to conſiſt in ſpeculation, or the obſervance of ceremonies, it is impoſſible there can be any end of ſects or hereſies. No opinion whatever is ſo abſurd, but ſome people have pretended to argue in its defence; and no ceremony ſo inſignificant, but it hath been explained and ſanctified by hot-headed enthuſiaſts: and hence ceremonies, ſects, and abſurdities, have been multiplied without number, to the prejudice of ſociety and of the Chriſtian religion.—This ſhort relation of the riſe of the Aſcetic ſect will alſo ſerve to account for the riſe of any other; ſo that we apprehend it is needleſs to enter into particulars concerning the reſt, as they all took their origin from the ſame general principle variouſly modified, according to the different diſpoſitions of mankind.

The Aſcetic ſect began firſt in Egypt, from whence it paſſed into Syria and the neighbouring countries. At length it reached the European nations: and hence that train of auſtere and ſuperſtitious vows and rites which totally obſcured, or rather annihilated, Chriſtianity; the celibacy of the clergy, and many other abſurdities of the like kind.—The errors of the Aſcetics, however, did not ſtop here. In compliance with the doctrines of ſome Pagan philoſophers, they affirmed that it was not only lawful, but even praiſe-worthy to deceive, and to uſe the expedient of a lie, in order to advance the cauſe of piety and truth; and hence the *pious frauds* for which the church of Rome hath been ſo notorious, and with which ſhe hath been ſo often and juſtly reproached.

As Chriſtians thus deviated more and more from the

63 onteſts ncerning ſtivals.

the true practice of their religion, they became more zealous in the external profeſſion of it. Anniverſary feſtivals were celebrated in commemoration of the death and reſurrection of Chriſt, and of the effuſion of the Holy Ghoſt on the apoſtles. Concerning the days on which theſe feſtivals were to be kept, there aroſe violent conteſts. The Aſiatic churches in general differed in this point from thoſe of Europe; and towards the concluſion of the century, Victor, biſhop of Rome, took it in his head to force the eaſtern churches to follow the rules laid down by the weſtern ones. This they abſolutely refuſed to comply with: upon which Victor cut them off from communion with the church of Rome; though, by means of the interceſſion of ſome prudent people, the difference was made up for the preſent.

64 hird cen- ry.

During moſt of the third century, the Chriſtians were allowed to enjoy their religion, ſuch as it was, without moleſtation. The emperors Maximinus and Decius, indeed, made them feel all the rigours of a ſevere perſecution; but their reigns were ſhort, and from the death of Decius to the time of Diocleſian the church enjoyed tranquillity. Thus vaſt multitudes were converted; but at the ſame time, the doctrine grew daily more corrupt, and the lives of profeſſed Chriſtians more wicked and ſcandalous. New ceremonies were invented in great numbers, and an unaccountable paſſion now prevailed for the oriental ſuperſtitions concerning demons; whence proceeded the whole train of exorciſms, ſpells, and fears for the apparition of evil ſpirits, which to this day are nowhere eradicated. Hence alſo the cuſtom of avoiding all connections with thoſe who were not baptized, or who lay under the penalty of excommunication, as perſons ſuppoſed to be under the dominion of ſome evil ſpirit. And hence the rigour and ſeverity of that diſcipline and penance impoſed upon thoſe who had incurred, by their immortalities, the cenſures of the church.—Several alterations were now made in the manner of celebrating the Lord's ſupper. The prayers uſed on this occaſion were lengthened, and the ſolemnity and pomp with which it was attended were conſiderably increaſed. Gold and ſilver veſſels were uſed in the celebration; it was thought eſſential to ſalvation, and for that reaſon adminiſtered even to infants.—Baptiſm was celebrated twice a-year to ſuch as, after a long courſe of trial and preparation, offered themſelves candidates. The remiſſion of ſins was thought to be its immediate conſequence; while the biſhop, by prayer and impoſition of hands, was ſuppoſed to confer thoſe ſanctifying gifts of the Holy Ghoſt, that are neceſſary to a life of righteouſneſs and virtue. An evil demon was ſuppoſed naturally to reſide in every perſon, who was the author and ſource of all the corrupt diſpoſitions and unrighteous actions of that perſon. The driving out of this demon was therefore an eſſential requiſite for baptiſm; and, in conſequence of this opinion, the baptized perſons returned home clothed in white garments, and adorned with crowns, as ſacred emblems, the former of their inward purity and innocence, and the latter of their victory over ſin and the world.—Faſting began now to be held in more eſteem than formerly. A high degree of ſanctity was attributed to this practice; it was even looked upon as indiſpenſably neceſſary, from a notion that the demons directed their force chiefly againſt thoſe who pampered themſelves with delicious fare, and were leſs troubleſome to the lean and hungry who lived under the ſeverities of a rigorous abſtinence.—The ſign of the croſs alſo was ſuppoſed to adminiſter a victorious power over all ſorts of trials and calamities; and was more eſpecially conſidered as the ſureſt defence againſt the ſnares and ſtratagems of malignant ſpirits; for which reaſon, no Chriſtian undertook any thing of moment, without arming himſelf, as he imagined, with the power of this triumphant ſign.—The hereſies which troubled the church during this century, were the Gnoſtics, (whoſe doctrines were new-modelled and improved by Manes, from whom they were afterwards chiefly called *Manicheans*); the Hieracites, Noetians, Sabellians, and Novatians; for a particular account of which, ſee thoſe articles.

65 Fourth century.

The fourth century is remarkable for the eſtabliſhment of Chriſtianity by law in the Roman empire; which, however, did not take place till the year 324. In the beginning of the century, the empire was governed by four chiefs, viz. Diocleſian, Maximian, Conſtantius Chlorus, and Galerius, under whom the church enjoyed a perfect toleration. Diocleſian, tho' much addicted to ſuperſtition, had no ill-will againſt the Chriſtians; and Conſtantius Chlorus, having abandoned polytheiſm, treated them with condeſcenſion and benevolence. This alarmed the Pagan prieſts, whoſe intereſts were ſo cloſely connected with the continuance of the ancient ſuperſtitions; and who apprehended, not without reaſon, that the Chriſtian religion would at length prevail throughout the empire. To prevent the downfal of the Pagan ſuperſtition, therefore, they applied to Diocleſian and Galerius Cæſar; by whom a moſt bloody perſecution was commenced in the year 303, and continued till 311. An aſylum, however, was opened for the Chriſtians in the year 304. Galerius having dethroned Diocleſian and Maximian, declared himſelf emperor in the eaſt; leaving all the weſtern provinces, to which great numbers of Chriſtians reſorted to avoid the cruelty of the former, to Conſtantius Chlorus. At length Galerius, being overtaken with an incurable and dreadful diſeaſe, publiſhed an edict ordering the perſecution to ceaſe, and reſtoring freedom to the Chriſtians, whom he had moſt inhumanly oppreſſed for eight years. Galerius died the ſame year: and in a ſhort time after, when Conſtantine the Great aſcended the throne, the Chriſtians were freed from any farther uneaſineſs, by his abrogating all the penal laws againſt them; and afterwards iſſuing edicts, by which no other religion than the Chriſtian was tolerated throughout the empire.

66 Chriſtianity eſtabliſhed by Conſtantine.

67 Increaſe of its corruptions.

This event however, ſo favourable to the outward peace of the church, was far from promoting its internal harmony, or the reformation of its leaders. The clergy, who had all this time been augmenting their power at the expence of the liberty of the people, now ſet no bounds to their ambition. The biſhop of Rome was the firſt in rank, and diſtinguiſhed by a ſort of pre-eminency above the reſt of the prelates. He ſurpaſſed all his brethren in the magnificence and ſplendor of the church over which he preſided; in the riches of his revenues and poſſeſſions; in the number and variety of his miniſters; in his credit with the people, and in his ſumptuous and ſplendid manner of living. Hence it happened that when a new pontiff was to be choſen by the preſbyters and people, the city of Rome was generally agitated with diſſenſions, tumults, and cabals, which often produced fatal conſequences. The intrigues and diſturbances which prevailed in that city in the year 366, when, upon the death of Liberius, another pontiff was to be choſen in his place, are a ſufficient proof of what we have advanced. Upon this occaſion, one faction elected Damaſus to that high dignity; while the oppoſite party choſe Urſicinus, a deacon of the vacant church, to ſucceed Liberius. This double election gave riſe to a dangerous ſchiſm, and to a ſort of civil war within the city of Rome; which was carried on with the utmoſt barbarity and fury, and produced the moſt cruel maſſacres and deſolations. The inhuman conteſt ended in the victory of Damaſus; but whether his cauſe was more juſt than that of Urſicinus, is not ſo eaſily determined.

Notwithſtanding the pomp and ſplendor which ſurrounded the Roman ſee, it is certain that the biſhops of Rome had not yet acquired that pre-eminence of power and juriſdiction which they afterwards enjoyed. In the eccleſiaſtical commonwealth, indeed, they were the moſt eminent order of citizens; but ſtill they were citizens as well as their brethren, and ſubject, like them, to the laws and edicts of the emperors. All religious cauſes of extraordinary importance were examined and determined, either by Judges appointed by the emperors, or in councils aſſembled for that purpoſe; while thoſe of inferior moment were decided in each diſtrict by its reſpective biſhop. The eccleſiaſtical laws were enacted either by the emperor or councils. None of the biſhops acknowledged that they derived their authority from the permiſſion and appointment of the biſhop of Rome, or that they were created biſhops by the favour of the *apoſtolic ſee*. On the contrary, they all maintained that they were the ambaſſadors and miniſters of Jeſus Chriſt, and that their authority was derived from above. It muſt, however, be obſerved, that even in this century, ſeveral of thoſe ſteps were laid, by which the biſhops of Rome mounted afterwards to the ſummit of eccleſiaſtical power and deſpotiſm. This happened partly by the imprudence of the emperors, partly by the dexterity of the Roman prelates themſelves, and partly by the inconſiderate zeal and precipitate judgment of certain biſhops.—The imprudence of the emperor, and precipitation of the biſhops, were remarkably diſcovered in the following event, which favoured extremely the ambition of the Roman pontiff. About the year 372, Valentinian enacted a law, empowering the biſhop of Rome to examine and judge other biſhops, that religious diſputes might not be decided by any profane or ſecular judges. The biſhops, aſſembled in council at Rome in 378, not conſidering the fatal conſequences that muſt ariſe from this imprudent law both to themſelves and to the church, declared their approbation in the ſtrongeſt terms, and recommended the execution of it in their addreſs to the emperor Gratian. Some think, indeed, that this law empowered the Roman biſhop to judge only the biſhops within the limits of his juriſdiction; others, that his power was given only for a certain time, and for a particular purpoſe. This laſt notion ſeems the moſt probable; but ſtill this privilege muſt have been an excellent inſtrument in the hands of ſacerdotal ambition.

63
Biſhops
Rome
Conſtant
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By the removal of the ſeat of empire to Conſtantinople, the emperor raiſed up, in the biſhop of this new metropolis, a formidable opponent to the biſhop of Rome, and a bulwark which threatened a vigorous oppoſition to his growing authority. For as the emperor, in order to render Conſtantinople a ſecond Rome, enriched it with all the rights and privileges, honours and ornaments, of the ancient capital of the world; ſo its biſhop, meaſuring his own dignity and rank by the magnificence of the new city, and its eminence as the reſidence of the emperor, aſſumed an equal degree of dignity with the biſhop of Rome, and claimed a ſuperiority over the reſt of the epiſcopal order. Nor did the emperors diſapprove of theſe high pretenſions, ſince they conſidered their own dignity as connected in a certain meaſure with that of the biſhop of their imperial city. Accordingly, in a council held at Conſtantinople, in the year 381, by the authority of Theodoſius the Great, the biſhop of that city was, during the abſence of the biſhop of Alexandria, and againſt the conſent of the Roman prelate, placed by the third canon of that council in the firſt rank after the biſhop of Rome, and conſequently above thoſe of Alexandria and Antioch. Nectarius was the firſt biſhop who enjoyed theſe new honours accumulated upon the ſee of Conſtantinople. His ſucceſſor, the celebrated John Chryſoſtom, extended ſtill farther the privileges of that ſee, and ſubmitted to its juriſdiction all Thrace, Aſia, and Pontus; nor were the ſucceeding biſhops of that imperial city deſtitute of a fervent zeal to augment their privileges, and extend their dominion. By this unexpected promotion, the moſt diſagreeable effects were produced. The biſhops of Alexandria were not only filled with the moſt inveterate hatred againſt thoſe of Conſtantinople, but a contention was excited between the biſhops of Rome and Conſtantinople; which, after being carried on for many ages, concluded at laſt in the ſeparation of the Greek and Latin churches.

69
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eſtabliſh
by Conſtantine.

Conſtantine the Great, in order to prevent civil commotions, and to fix his authority on a ſtable and ſolid foundation, made ſeveral changes not only in the laws of the empire, but alſo in the form of the Roman government. And as there were many important reaſons which induced him to ſuit the adminiſtration of the church to theſe changes in the civil conſtitution, this neceſſarily introduced among the biſhops new degrees of eminence and rank. The four biſhops, of Rome, Conſtantinople, Antioch, and Alexandria, were diſtinguiſhed by a certain degree of pre-eminence over the reſt. Theſe four prelates anſwered to the four prætorian prefects created by Conſtantine; and it is poſſible, that even in this century they were diſtinguiſhed by the Jewiſh title of *patriarchs*. After theſe followed the *exarchs*, who had the inſpection over ſeveral provinces, and anſwered to the appointment of certain civil officers who bore the ſame title. In a lower claſs were the *metropolitans*, who had only the government of one province; under whom were the *archbiſhops*, whoſe inſpection was confined to certain diſtricts. In this gradation the *biſhops* brought up the rear; but the ſphere of their authority was not in all places equally extenſive; being in ſome conſiderably ample, and in others confined

fined within narrow limits. To theſe various eccleſiaſtical orders we might add that of the *chorepiſcopi*, or ſuperintendants of the country-churches; but this laſt order was in moſt places ſuppreſſed by the biſhops, with a deſign to extend their own authority, and enlarge the ſphere of their power and juriſdiction. The adminiſtration of the church itſelf was divided by Conſtantine into an *external* and *internal* inſpection. The latter, which was committed to biſhops and councils, related to religious controverſies, the forms of divine worſhip, the offices of prieſts, the vices of the eccleſiaſtical orders, &c. The external adminiſtration of the church the emperor aſſumed to himſelf. This comprehended all thoſe things which related to the outward ſtate and diſcipline of the church; it likewiſe extended to all conteſts that ſhould ariſe between the miniſters of the church, ſuperior as well as inferior, concerning their poſſeſſions, their reputation, their rights and privileges, their offences againſt the laws, &c. but no controverſies that related to matters purely ſpiritual were cogniſable by this external inſpection. In conſequence of this artful diviſion of the eccleſiaſtical government, Conſtantine and his ſucceſſors called councils, preſided in them, appointed the judges of religious controverſies, terminated the differences which aroſe between the biſhops and the people, fixed the limits of the eccleſiaſtical provinces, took cognizance of the civil cauſes that ſubſiſted between the miniſters of the church, and puniſhed the crimes committed againſt the laws by the ordinary judges appointed for that purpoſe; giving over all cauſes purely eccleſiaſtical to the biſhops and councils. But this famous diviſion of the adminiſtration of the church was never explained with ſufficient accuracy; ſo that, both in the fourth and fifth centuries, there are frequent inſtances of the emperors determining matters purely eccleſiaſtical, and likewiſe of biſhops and councils determining matters which related merely to the external form and government of the church.

70 dalous of the y.

After the time of Conſtantine many additions were made by the emperors and others to the wealth and honours of the clergy; and theſe additions were followed by a proportionable increaſe of their vices and luxury, particularly among thoſe who lived in great and opulent cities. The biſhops, on the one hand, contended with each other in the moſt ſcandalous manner concerning the extent of their reſpective juriſdictions; while, on the other, they trampled on the rights of the people, violated the privileges of the inferior miniſters, and imitated in their conduct and in their manner of living the arrogance, voluptuouſneſs, and luxury of magiſtrates and princes. This pernicious example was ſoon followed by the ſeveral eccleſiaſtical orders. The preſbyters, in many places, aſſumed an equality with the biſhops in point of rank and authority. Many complaints are alſo made by the authors of this century about the vanity and effeminacy of the deacons. Thoſe more particularly of the preſbyters and deacons who filled the firſt ſtations of theſe orders, carried their pretenſions to an extravagant length, and were offended at the notion of being placed on an equality with their colleagues. For this reaſon they not only aſſumed the titles of *arch-preſbyters* and *arch-deacons*, but alſo claimed a degree of authority and power much ſuperior to that which was veſted in the other members of their reſpective orders.

71 Conteſts between the biſhops of Rome and Conſtantinople.

In the fifth century, the biſhops of Conſtantinople having already reduced under their juriſdiction all the Aſiatic provinces, began to graſp at ſtill further acceſſions of power. By the 28th canon of the council held at Chalcedon in 451, it was reſolved, that the ſame ſame rights and honours which had been conferred on the biſhop of Rome were due to the biſhop of Conſtantinople, on account of the equal dignity and luſtre of the two cities in which theſe prelates exerciſed their authority. The ſame council confirmed alſo, by a ſolemn act, the biſhop of Conſtantinople in the ſpiritual government of thoſe provinces over which he had uſurped the juriſdiction. Leo the Great, biſhop of Rome, oppoſed with vehemence the paſſing of theſe laws; and his oppoſition was ſeconded by that of ſeveral other prelates. But their efforts were vain, as the emperors threw in their weight into the balance, and thus ſupported the deciſions of the Grecian biſhops. In conſequence, then, of the deciſions of this famous council, the biſhop of Conſtantinople began to contend obſtinately for the ſupremacy with the Roman pontiff, and to cruſh the biſhops of Antioch and Alexandria. About the ſame time, Juvenal, biſhop of Jeruſalem, attempted to withdraw himſelf and his church from the juriſdiction of the biſhop of Cæſarea, and aſpired after a place among the firſt prelates of the Chriſtian world. The high degree of veneration and eſteem in which the church of Jeruſalem was held among all other Chriſtian ſocieties (on account of its rank among the apoſtolical churches, and its title to the appellation of *mother-church*, as having ſucceeded the firſt Chriſtian aſſembly formed by the Apoſtles), was extremely favourable to the ambition of Juvenal, and rendered his project much more practicable than it would otherwiſe have been. Encouraged by this, and likewiſe by the protection of Theodoſius the younger, this aſpiring prelate not only aſſumed the dignity of patriarch of all Paleſtine, a rank which rendered him independent of all ſpiritual authority; but alſo invaded the rights of the biſhop of Antioch, and uſurped his juriſdiction over the provinces of Phœnicia and Arabia. Hence aroſe a warm conteſt between Juvenal and Maximus biſhop of Antioch; which the council of Chalcedon decided, by reſtoring to the latter the provinces of Phœnicia and Arabia, and confirming the former in the ſpiritual poſſeſſion of all Paleſtine and in the high rank which he had aſſumed in the church.

In 588, John, biſhop of Conſtantinople, ſurnamed the *Faſter*, either by his own authority or that of the emperor Mauritius, ſummoned a council at Conſtantinople to inquire into an accuſation brought againſt Gregory, biſhop of Antioch; and upon this occaſion aſſumed the title of *oecumenical* or *univerſal biſhop*. This title had been formerly enjoyed by the biſhops of Conſtantinople without any offence; but now, Gregory the Great, at that time biſhop of Rome, ſuſpecting that John was aiming at the ſupremacy over all the churches, oppoſed his claim with the greateſt vigour. For this purpoſe he applied by letters to the emperor, and others, whom he thought capable of aſſiſting him in his oppoſition: but all his efforts were without effect; and the biſhops of Conſtantinople were allowed to enjoy the diſputed title, though not in the ſenſe which had alarmed the Roman pontiff.

Gregory, however, adhered tenaciouſly to his purpoſe, raiſed new tumults and diſſenſions among the clergy, and aimed at nothing leſs than an unlimited ſupremacy over the Chriſtian church. This ambitious deſign ſucceeded in the Weſt; while, in the Eaſtern provinces; his arrogant pretenſions were ſcarcely reſpected by any but thoſe who were at enmity with the biſhop of Conſtantinople. How much the people were at this time deluded by the Roman pontiffs, appears from the expreſſion of Ennodius, one of the flatterers of Symmachus, (who was a prelate of but ambiguous fame) that the Roman pontiff was conſtituted *judge in the place of God*, which he filled as the vicegerent of the moſt high. On the other hand it is certain, from a variety of the moſt authentic records, that both the emperors and the nations in general, were far from being diſpoſed to bear with patience the yoke of ſervitude which the ſee of Rome was arrogantly impoſing on the whole church.

72 Origin of the ſupremacy of the pope.

In the beginning of the ſeventh century, according to the moſt learned hiſtorians, Boniface III. engaged Phocas, emperor of Conſtantinople, to take from the biſhop of that metropolis, the title of *œcumenical* or *univerſal biſhop*, and to confer it upon the Roman pontiff; and thus was firſt introduced the ſupremacy of the pope. The Roman pontiffs uſed all methods to maintain and enlarge this authority and pre-eminence which they had acquired from one of the moſt odious tyrants that ever diſgraced the annals of hiſtory.

In the eighth century, the power of the biſhop of Rome, and of the clergy in general, increaſed prodigiouſly. The chief cauſe of this, beſides the ſuperſtition of the people, was the method at that time uſed by the European princes to ſecure themſelves on their thrones. All theſe princes being then employed either in uſurpation or in ſelf-defence, and the whole continent being in the moſt unſettled and barbarous condition, they endeavoured to attach warmly to their intereſts thoſe whom they conſidered as their friends and clients. For this purpoſe they diſtributed among them extenſive territories, cities, and fortreſſes, with the various rights and privileges belonging to them; reſerving only to themſelves the ſupreme dominion, and the military ſervice of theſe powerful vaſſals. For this reaſon it was by the European princes reckoned a high inſtance of political prudence to diſtribute among the biſhops and other Chriſtian doctors the ſame ſort of donations which had formerly been given to their generals and clients. By means of the clergy, they hoped to check the ſeditious and turbulent ſpirits of their vaſſals, and to maintain them in their obedience by the influence and authority of their biſhops, whoſe commands were highly reſpected, and whoſe ſpiritual thunderbolts, rendered formidable by ignorance, ſtruck terror into the boldeſt and moſt reſolute hearts.

This prodigious acceſſion to the opulence and authority of the clergy in the weſt, began at their head, viz. the Roman pontiff; from whence it ſpread gradually among the inferior ſacerdotal orders. The barbarous nations who had received the goſpel, looked upon the biſhop of Rome as the ſucceſſor of their chief druid or high prieſt: and as this tremendous druid had enjoyed, under the darkneſs of Paganiſm, a kind of boundleſs authority; ſo theſe barbarous nations thought proper to confer upon the chief biſhop, the ſame authority which had belonged to the chief druid. The Pope received theſe auguſt privileges with great pleaſure; and leſt, upon any change of affairs, attempts ſhould be made to deprive him of them, he ſtrengthened his title to theſe extraordinary honours by a variety of paſſages drawn from ancient hiſtory, and, what is ſtill more aſtoniſhing, by arguments of a religious nature. This ſwelled the Roman druid to an enormous ſize; and gave to the ſee of Rome that high pre-eminence and deſpotic authority in civil and political matters, that were unknown to former ages. Hence, among other unhappy circumſtances, aroſe that monſtrous and pernicious opinion, that ſuch perſons as were excluded from the communion of the church by the pontiff himſelf, or any of the biſhops, forfeited thereby, not only their civil rights and advantages as citizens, but even the common claims and privileges of humanity. This horrid opinion, which was a fatal ſource of wars, maſſacres, and rebellions, without number, and which contributed more than any thing elſe to confirm and augment the papal authority, was borrowed by the clergy from the Pagan ſuperſtitions.—Though excommunication, from the time of Conſtantine the Great, was in every part of the Chriſtian world attended with many diſagreeable effects; yet its higheſt terrors were confined to Europe, where its aſpect was truly formidable and hideous. It acquired alſo, in the eighth century, new acceſſions of terror; ſo that from that period the excommunication practiſed in Europe differed entirely from that which was in uſe in other parts of Chriſtendom. Excommunicated perſons were indeed conſidered in all places as objects of hatred both to God and man: but they were not, on that account, robbed of the privileges of citizens, nor of the rights of humanity; much leſs were thoſe kings and princes, whom an inſolent biſhop had thought proper to exclude from the communion of the church, ſuppoſed to forfeit on that account their crowns or their territories. But from this century it was quite otherwiſe in Europe. Excommunication received that infernal power which diſſolved all connections; ſo that thoſe whom the biſhops, or their chief, excluded from church communion, were degraded to a level with the beaſts. The origin of this unnatural and horrid power was as follows. On the converſion of the barbarous nations to Chriſtianity, theſe ignorant proſelytes confounded the excommunication in uſe among Chriſtians with that which had been practiſed in the times of Paganiſm, and which was attended with all the dreadful effects above-mentioned. The Roman pontiffs, on the other hand, were too artful not to encourage this error; and therefore employed all ſorts of means to gain credit to an opinion ſo well calculated to gratify their ambition, and to aggrandize in general the epiſcopal order.

The annals of the French nation furniſh us with the following inſtance of the enormous power which was at this time veſted in the Roman pontiff. Pepin, who was mayor of the palace to Childeric III. king of France, and who in the exerciſe of that high office was poſſeſſed in reality of the royal power and authority, aſpired to the titles and honours of majeſty alſo, and formed a ſcheme of dethroning his ſovereign. For this purpoſe he aſſembled the ſtates in 751; and though they were devoted to the intereſts of this ambitious uſurper, they gave it as their opinion that the biſhop Rome was previouſly to be conſulted whether the execution of ſuch a ſcheme was lawful or not. In conſequence of this, ambaſſadors were ſent by Pepin to Zachary, the reigning pontiff, with the following queſtion, "Whether the divine law did not permit a valiant and warlike people to dethrone a puſillanimous and indolent prince who was incapable of diſcharging any of the functions of royalty; and to ſubſtitute in his place one more worthy to rule, and who had already rendered moſt important ſervices to the ſtate?" The ſituation of Zachary, who ſtood much in need of the ſuccours of Pepin againſt the Greeks and Lombards, rendered his anſwer ſuch as the uſurper deſired: and when this favourable deciſion of the Roman oracle was publiſhed in France, the unhappy Childeric was ſtripped of his royalty without the leaſt oppoſition; and Pepin, without the ſmalleſt reſiſtance, ſtepped into the throne of his maſter and his ſovereign. This deciſion was ſolemnly confirmed by Stephen II. the ſucceſſor of Zachary; who undertook a journey into France in the year 754, in order to ſolicit aſſiſtance againſt the Lombards. The pontiff at the ſame time diſſolved the obligation of the oath of fidelity and allegiance which Pepin had ſworn to Childeric and violated by his uſurpation in the year 751; and to render his title to the crown as ſacred as poſſible, Stephen anointed and crowned him, with his wife and two ſons, for the ſecond time. This complaiſance of the Pope was rewarded with the exarchate of Ravenna and all its dependencies, as we have already related. See CIVIL HISTORY, n° 44.; and *Hiſtory of* ITALY.

74 power increa-

In the ſucceeding centuries, the Roman pontiffs continued to increaſe their power by every kind of artifice and fraud which can diſhonour the heart of man; and, by continually taking advantages of the civil diſſenſions which prevailed throughout Italy, France, and Germany, their influence in civil affairs aroſe to an enormous height. The increaſe of their authority in religious matters was not leſs rapid. The wiſeſt and moſt impartial among the Roman Catholic writers acknowledge, that, from the time of Lewis the Meek, the ancient rules of eccleſiaſtical government were gradually changed in Europe by the counſels and inſtigation of the church of Rome, and new laws ſubſtituted in their place. The European princes ſuffered themſelves to be diveſted of the ſupreme authority in religious matters which they had derived from Charlemagne; the power of the biſhops was greatly diminiſhed, and even the authority of both provincial and general councils began to decline. The popes, elated with their overgrown proſperity, and become arrogant beyond meaſure by the daily acceſſions that were made to their authority, were eagerly bent upon eſtabliſhing the maxim, That the biſhop of Rome was conſtituted and appointed by Jeſus Chriſt, ſupreme legiſlator and judge of the church univerſal; and that therefore the biſhops derived all their authority from him. This opinion, which they inculcated with the utmoſt zeal and ardour, was oppoſed in vain by ſuch as were acquainted with the ancient eccleſiaſtical conſtitutions, and the government of the church in the earlier ages. In order to gain credit to this new eccleſiaſtical code, and to ſupport the pretenſions of the popes to ſupremacy, it was neceſſary to produce the authority of ancient deeds, in order to ſtop the mouths of ſuch as were diſpoſed to ſet bounds to their uſurpations. The biſhops of Rome were aware of this; and as thoſe means were looked upon as the moſt lawful that tended beſt to the accompliſhment of their purpoſes, they employed ſome of their moſt ingenious and zealous partiſans in forging conventions, acts of councils, epiſtles, and ſuch-like records, by which it might appear, that, in the firſt ages of the church, the Roman pontiffs were clothed with the ſame ſpiritual majeſty and ſupreme authority which they now aſſumed. There were not, however, wanting among the biſhops ſome men of prudence and ſagacity, who ſaw through theſe impious frauds, and perceived the chains that were forging both for them and the church. The French biſhops diſtinguiſhed themſelves eminently in this reſpect: but their oppoſition was ſoon quaſhed; and as all Europe was ſunk in the groſſeſt ignorance and darkneſs, none remained who were capable of detecting theſe odious impoſtures, or diſpoſed to ſupport the expiring liberty of the church.

75 Extreme inſolence of the popes.

This may ſerve as a general ſpecimen of the characters and behaviour of the pretended vicegerents of Jeſus Chriſt, to the 16th century. In the 11th century indeed, their power ſeems to have riſen to its utmoſt height. They now received the pompous titles of *Maſters of the world*, and *Popes*, i. e. *Univerſal Fathers*. They preſided every where in the councils by their legates, aſſumed the authority of ſupreme arbiters in all controverſies that aroſe concerning religion or church-diſcipline, and maintained the pretended rights of the church againſt the encroachments and uſurpations of kings and princes. Their authority, however, was confined within certain limits: for, on the one hand, it was reſtrained by ſovereign princes, that it might not arrogantly aim at civil dominion; and on the other, it was oppoſed by the biſhops themſelves, that it might not ariſe to a ſpiritual deſpotiſm, and utterly deſtroy the privileges and liberty of ſynods and councils. From the time of Leo IX. the popes employed every method which the moſt artful ambition could ſuggeſt to remove thoſe limits, and to render their dominion both deſpotic and univerſal. They not only aſpired to the character of ſupreme legiſlators in the church, to an unlimited juriſdiction over all ſynods and councils whether general or provincial, to the ſole diſtribution of all eccleſiaſtical honours and benefices, as divinely authoriſed and appointed for that purpoſe; but they carried their inſolent pretenſions ſo far, as to give themſelves out for lords of the univerſe, arbiters of the fate of kingdoms and empires, and ſupreme rulers over the kings and princes of the earth. Hence we find inſtances of their giving away kingdoms, and looſing ſubjects from their allegiance to their ſovereigns, among which the hiſtory of John king of England is very remarkable. At laſt, they plainly aſſumed the whole earth as their property, as well where Chriſtianity was preached as where it was not; and therefore, on the diſcovery of America and the Eaſt Indies, the pope, by virtue of this ſpiritual property, granted to the Portugueſe a right to all the countries lying eaſtward, and to the Spaniards all thoſe lying to the weſtward of Cape Non in Africa, which they were able to conquer by force of arms; and that nothing might be wanting to complete their character, they pretended to be lords of the future world alſo, and to have a power of reſtraining even the Divine Juſtice itſelf, and remitting that puniſhment which the Deity hath denounced againſt the workers of iniquity.

76 Chriſtianity greatly corrupted. Invocations of ſaints, relics, purgatory, &c. introduced.

All this time, the powers of ſuperſtition reigned triumphant over thoſe remains of Chriſtianity which had eſcaped the corruptions of the firſt four centuries. In the fifth century began the invocation of the happy ſouls of departed ſaints. Their aſſiſtance was intreated by many fervent prayers, while none ſtood up to oppoſe this prepoſterous kind of worſhip. The images of thoſe who during their lives had acquired the reputation of uncommon ſanctity, were now honoured with a particular worſhip in ſeveral places; and many imagined that this drew into the images the propitious preſence of the ſaints or celeſtial beings which they were ſuppoſed to repreſent. A ſingular and irreſiſtible efficacy was attributed to the bones of martyrs, and to the figure of the croſs, in defeating all the attempts of Satan, removing all ſorts of calamities, and in healing not only the diſeaſes of the body, but alſo thoſe of the mind. The famous Pagan doctrine concerning the *purification of departed ſouls*, by means of a certain kind of fire, *i. e.* purgatory, was alſo confirmed and explained more fully than it had formerly been; and every one knows of how much conſequence this abſurd doctrine hath been to the wealth and power of the Romiſh clergy.

77 Introduction of the maſs.

In the ſixth century, Gregory the Great advanced an opinion, That all the *words* of the ſacred writings were *images* of inviſible and ſpiritual things; for which reaſon he loaded the churches with a multitude of ceremonies the moſt inſignificant and futile that can be imagined; and hence aroſe a new and moſt difficult ſcience, namely, the explication of theſe ceremonies, and the inveſtigation of the cauſes and circumſtances whence they derived their origin. A new method was contrived of adminiſtering the Lord's ſupper, with a magnificent aſſemblage of pompous ceremonies. This was called the *canon of the maſs*. Baptiſm, except in caſes of neceſſity, was adminiſtered only on the great feſtivals. An incredible number of temples were erected in honour of the ſaints. The places ſet apart for public worſhip were alſo very numerous: but now they were conſidered as the means of purchaſing the protection and favour of the ſaints; and the ignorant and barbarous multitude were perſuaded, that theſe departed ſpirits defended and guarded againſt evils and calamities of every kind, the provinces, lands, cities, and villages in which they were honoured with temples. The number of theſe temples was almoſt equalled by that of the feſtivals, which ſeem to have been invented in order to bring the Chriſtian religion as near the model of Paganiſm as poſſible.

78 Superſtition ſtill increaſes.

In the ſeventh century, religion ſeemed to be altogether buried under a heap of ſuperſtitious ceremonies; the worſhip of the true God and Saviour of the world was exchanged for the worſhip of bones, bits of wood (ſaid to be of the croſs), and the images of ſaints. The eternal ſtate of miſery threatened in Scripture to the wicked was exchanged for the temporary puniſhment of purgatory; and the expreſſions of faith in Chriſt by an upright and virtuous conduct, for the augmentation of the riches of the clergy by donations to the church, and the obſervance of a heap of idle ceremonies. New feſtivals were ſtill added; one in particular was inſtituted in honour of the *true croſs* on which our Saviour ſuffered; and churches were declared to be ſanctuaries to all ſuch as fled to them, whatever their crimes might have been.

Superſtition, it would ſeem, had now attained its higheſt pitch; nor is it eaſy to conceive a degree of ignorance and degeneracy beyond what we have already mentioned. If any thing can poſſibly be imagined more contrary to true religion, it is an opinion which prevailed in the eighth century, namely, That Chriſtians might appeaſe an offended Deity by voluntary acts of mortification, or by gifts and oblations laviſhed on the church, and that people ought to place their confidence in the works and merits of the ſaints. The piety in this and ſome ſucceeding ages conſiſted in building and embelliſhing churches and chapels; in endowing monaſteries and baſilics; hunting after the relics of ſaints and martyrs, and treating them with an abſurd and exceſſive veneration; in procuring the interceſſion of the ſaints by rich oblations, or ſuperſtitious rites; in worſhipping images; in pilgrimages to thoſe places which were eſteemed holy, particularly to Paleſtine, &c. The genuine religion of Jeſus was now utterly unknown, both to clergy and people, if we except a few of its general doctrines contained in the creed. In this century alſo, the ſuperſtitious cuſtom of *ſolitary maſſes* had its origin. Theſe were celebrated by the prieſt alone in behalf of ſouls detained in purgatory, as well as upon ſome other occaſions. They were prohibited by the laws of the church, but proved a ſource of immenſe wealth to the clergy. Under Charlemagne they were condemned by a ſynod aſſembled at Mentz, as criminal effects of avarice and ſloth. A new ſuperſtition, however, ſtill ſprung up in the tenth century. It was imagined, from Rev. xx. 1. that Antichriſt was to make his appearance on the earth, that ſoon after the world itſelf would be deſtroyed. An univerſal panic enſued; vaſt numbers of people, abandoning all their connections in ſociety, and giving over to the churches and monaſteries all their worldly effects, repaired to Paleſtine, where they imagined that Chriſt would deſcend from heaven to judge the world. Others devoted themſelves by a ſolemn and voluntary oath to the ſervice of the churches, convents, and prieſthood, whoſe ſlaves they became, in the moſt rigorous ſenſe of that word, performing daily their heavy taſks; and all this from a notion that the ſupreme Judge would diminiſh the ſeverity of their ſentence, and look upon them with a more favourable and propitious eye, on account of their having made themſelves the ſlaves of his miniſters. When an eclipſe of the ſun or moon happened to be viſible, the cities were deſerted, and their miſerable inhabitants fled for refuge to hollow caverns, and hid themſelves among the craggy rocks, and under the bending ſummits of ſteep mountains. The opulent attempted to bribe the ſaints and the Deity himſelf by rich donations conferred upon the ſacerdotal tribe, who were looked upon as the immediate vicegerents of heaven. In many places, temples, palaces, and noble edifices both public and private, were ſuffered to decay, nay, were deliberately pulled down, from a notion that they were no longer of any uſe, as the final diſſolution of all things was at hand. In a word, no language is ſufficient to expreſs the confuſion and deſpair that tormented the minds of miſerable mortals upon this occaſion. The general deluſion was indeed oppoſed and combated by the diſcerning few, who endeavoured to diſpel theſe terrors, and to efface the notion from which they aroſe in the minds of the people. But their attempts were ineffectual; nor could the dreadful apprehenſions of the ſuperſtitious multitude be removed before the end of the century, and this terror became one of the accidental cauſes of the CROISADES.

That nothing might now be wanting to complete that Antichriſtian ſyſtem of religion which had overſpread all Europe, it was in the 11th century determined that divine worſhip ſhould be celebrated in the Latin tongue, though now unknown throughout the whole continent. During the whole of this century alſo, Chriſtians were employed in the rebuilding and ornamenting their churches, which they had deſtroyed through the ſuperſtitious fear already taken notice of.

79 xtrava- t beha- ur of the uted ts.

In much the ſame way with what is above related, or worſe if poſſible, matters went on till the time of the reformation. The clergy were immerſed in crimes of the deepeſt dye; and the laity, imagining themſelves able to purchaſe pardon of their ſins for money, followed the examples of their paſtors without remorſe. The abſurd principle formerly mentioned, namely, that religion conſiſts in acts of auſterity, and an unknown mental correſpondence with God, produced the moſt extravagant and ridiculous behaviour in the devotees and reputed ſaints. They not only lived among the wild beaſts, but alſo after the manner of theſe ſavage animals: they ran naked through the lonely deſerts with a furious aſpect, and all the agitations of madneſs and frenzy; they prolonged their wretched life by graſs and wild herbs, avoided the ſight and converſation of men, remained motionleſs in certain places for ſeveral years expoſed to the rigour and inclemency of the ſeaſons, and towards the concluſion of their lives ſhut themſelves up in narrow and miſerable huts; and all this was conſidered as true piety, the only acceptable method of worſhipping the Deity and attaining a ſhare in his favour.—But of all the inſtances of ſuperſtitious frenzy which diſgraced the times we now ſpeak of, none was held in higher veneration, or excited more the wonder of the multitude, than that of a certain order of men who were called *Stilites* by the Greeks, and *Sancti Columnares*, or Pillar-Saints, by the Latins. Theſe were perſons of a moſt ſingular and extravagant turn of mind, who ſtood motionleſs on the tops of *pillars* expreſsly raiſed for this exerciſe of their patience, and remained there for ſeveral years amiſt the admiration and applauſe of the ſtupid populace. The inventor of this ſtrange diſcipline was one *Simeon* a Syrian, who began his follies by changing the agreeable employment of a ſhepherd for the auſterities of a monkiſh life. He began his devotions on the top of a pillar ſix cubits high; but as he increaſed in ſanctity, he alſo increaſed the height of his pillar, till, towards the concluſion of his life, he had got up on the top of a pillar 40 cubits in height. Many of the inhabitants of Syria and Paleſtine, ſeduced by a falſe ambition and an utter ignorance of true religion, followed the example of this fanatic, though not with the ſame degree of auſterity. This ſuperſtitious practice began in the fifth century, and continued in the eaſt for 600 years. The Latins, however, had too much wiſdom and prudence to imitate the Syrians and Orientals in this whimſical ſuperſtition; and when a certain fanatic, or impoſtor, named *Wulfilaicus*, erected one of theſe pillars in the country of Treves, and propoſed to live on it after the manner of Simeon, the neighbouring biſhops ordered it to be pulled down.

The practices of auſtere worſhip and diſcipline in other reſpects, however, gained ground throughout all parts of Chriſtendom. Monks of various kinds were to be found in every country in prodigious numbers. But though their diſcipline was at firſt exceedingly ſevere, it became gradually relaxed, and the monks gave into all the prevailing vices of the times. Other orders ſucceeded, who pretended to ſtill greater degrees of ſanctity, and to reform the abuſes of the preceding ones; but theſe in their turn became corrupted, and fell into the ſame vices they had blamed in others. The moſt violent animoſities, diſputes, and hatred, alſo reigned among the different orders of monks; and, indeed, between the clergy of all ranks and degrees, whether we conſider them as claſſed in different bodies, or as individuals of the ſame body. To enter into a detail of their wranglings and diſputes, the methods which each of them took to aggrandiſe themſelves at the expence of their neighbours, and to keep the reſt of mankind in ſubjection, would require many volumes. We ſhall only obſerve, therefore, that even the external profeſſion of the auſtere and abſurd piety which took place in the fourth and fifth centuries, continued gradually to decline. Some there were, indeed, who boldly oppoſed the torrent of ſuperſtition and wickedneſs, which threatened to overflow the whole world: but their oppoſition proved fruitleſs, and all of theſe towards the æra of the reformation had been either ſilenced or deſtroyed: ſo that, at that time, the pope and clergy reigned over mankind without controul, had made themſelves maſters of almoſt all the wealth in every country of Europe, and may truly be ſaid to have been the only *ſovereigns*; the reſt of the human race, even kings and princes, being only their vaſſals and ſlaves.

80 Riſe of Mahometaniſm.

While the Popiſh ſuperſtition reigned thus violently in the weſt, the abſurd doctrines of Mahomet overſpread all the eaſt. The riſe of this impoſtor is related under the article ARABIA. His ſucceſſors conquered in order to eſtabliſh the religion of their apoſtle; and thus the very name of Chriſtianity was extinguiſhed in many places where it had formerly flouriſhed. The conqueſts of the Tartars having intermingled them with the Mahometans, they greedily embraced the ſuperſtitions of that religion, which thus almoſt entirely overſpread the whole continents of Aſia and Africa; and, by the conqueſt of Conſtantinople by the Turks in 1453, was likewiſe eſtabliſhed throughout a conſiderable part of Europe.

81 State of religion in the beginning of the 16th century and ſince that time.

About the beginning of the 16th century, the Roman pontiffs lived in the utmoſt tranquillity; nor had they, according to the appearance of things at that time, any reaſon to fear an oppoſition to their authority in any reſpect, ſince the commotions which had been raiſed by the Waldenſes, Albigenſes, &c. were now entirely ſuppreſſed. We muſt not, however, conclude, from this apparent tranquillity and ſecurity of the pontiffs and their adherents, that their meaſures were univerſally applauded. Not only private perſons, but alſo the moſt powerful princes and ſovereign ſtates, exclaimed loudly againſt the tyranny of the popes, and the unbridled licentiouſneſs of the clergy of all denominations. They demanded, therefore, a reformation of the church in its head and members, and a general council to accompliſh that neceſſary purpoſe. But theſe complaints and demands were not carried to ſuch a length as to produce any good effect; ſince they came from perſons who never entertained the leaſt doubt about the ſupreme authority of the pope in religious matters, and who of conſequence, inſtead of attempting themſelves to bring about that reformation which was ſo ardently deſired, remained entirely inactive, or looked for redreſs to the court of Rome, or to a general council. But while the ſo much deſired reformation ſeemed to be at ſuch a great diſtance, it ſuddenly aroſe from a quarter whence it was not at all expected. A ſingle perſon, Martin Luther, a monk of the order of St Auguſtine, ventured to oppoſe himſelf to the whole torrent of papal power and deſpotiſm. This bold attempt was firſt made public on the 30th of September 1517; and notwithſtanding all the efforts of the Pope and his adherents, the doctrines of Luther continued daily to gain ground. Others, encouraged by his ſucceſs, lent their aſſiſtance in the work of Reformation; which at laſt produced new churches, founded upon principles quite different from that of Rome, and which ſtill continue. But for a particular account of the tranſactions of the firſt Reformers, the oppoſition they met with, and the final ſettlement of the reformed churches in different nations in Europe, ſee the articles LUTHER and REFORMATION.

The ſtate of religion in other parts of the world ſeems as yet to be but little altered. Aſia and Africa are ſunk in the groſſeſt ſuperſtitions either of the Mahommedan or Pagan kinds. The ſouthern continent of America belonging to the Spaniards, continues immerſed in the moſt abſurd ſuperſtitions of Popery. The northern continent, being moſtly peopled with colonies from Great Britain, profeſſes the reformed religion. At the ſame time it muſt be owned, that ſome kind of reformation hath taken place even in Popery and Mahommedaniſm themſelves. The Popes have no longer that authority over ſtates and princes, even thoſe moſt bigotted to Popery, which they formerly had. Neither are the lives either of the clergy or laity ſo corrupt as they were before. The increaſe of learning in all parts of the world hath contributed to cauſe men open their eyes to the light of reaſon, and this hath been attended with a proportional decreaſe of ſuperſtition. Even in Mahommedan countries, that furious enthuſiaſm which formerly emboldened the inhabitants to face the greateſt dangers, hath now almoſt vaniſhed; ſo that the credit of Mahomet himſelf ſeems to have ſunk much in the eſtimation of his followers. This is to be underſtood even of the moſt ignorant and bigotted multitude; and the ſenſible part of the Turks are ſaid to incline much towards Deiſm. With regard to thoſe nations which ſtill profeſs Paganiſm, the intercourſe of Europeans with them is ſo ſmall, that it is impoſſible to ſay any thing concerning them. As none of them are in a ſtate of civilization, however, it may be conjectured, that their religion is of the ſame unpoliſhed caſt with their manners, and that it conſiſts of a heap of barbarous ſuperſtitions which have been handed down among them from time immemorial, and which they continue to obſerve without knowing why or wherefore.

SECT. III. *Of the Compoſition of Hiſtory.*

CICERO has given us the whole art of compoſing hiſtory, in a very ſhort and comprehenſive manner. We ſhall firſt tranſcribe what he ſays, and then conſider the ſeveral parts of it in their proper order.

82 Cicero's rules.

"No one is ignorant (ſays he), that the firſt law in writing hiſtory is, Not to dare to ſay any thing that is falſe; and the next, Not to be afraid to ſpeak the truth: that on the one hand there be no ſuſpicion of affection, nor of prejudice on the other. Theſe foundations are what all are acquainted with. But the ſuperſtructure conſiſts partly in things, and partly in the ſtyle or language. The former require an order of times, and deſcriptions of places. And becauſe in great and memorable events, we are deſirous to know firſt their cauſes, then the actions themſelves, and laſtly their conſequences; the hiſtorian ſhould take notice of the ſprings or motives, that occaſioned them; and, in mentioning the facts themſelves, ſhould not only relate what was done or ſaid, but likewiſe in what manner; and, in treating upon their conſequences, ſhew if they were the effects of chance, wiſdom, or imprudence. Nor ſhould he only recite the actions of great and eminent perſons, but likewiſe deſcribe their characters. The ſtyle ought to be fluent, ſmooth, and even, free from that harſhneſs and poignancy which is uſual at the bar." Thus far Cicero. An hiſtory written in this manner, and furniſhed with all theſe properties, muſt needs be very entertaining, as well as inſtructive. And perhaps few have come nearer this plan than Tacitus; though his ſubject is attended with this unhappy circumſtance, or at leaſt unpleaſant one, that it affords us examples rather of what we ought to avoid, than what to imitate. But it is the buſineſs of the hiſtorian, as well as of the philoſopher, to repreſent both virtues and vices in their proper colours; the latter doing it by precepts, and the former by examples. Their manner is different; but the end and deſign of both is, or ſhould be, the ſame: And therefore hiſtory has not improperly been ſaid by ſome to be moral philoſophy, exemplified in the lives and actions of mankind.

De Or *Lib.* ii.

We ſhall reduce theſe ſeveral things mentioned by Cicero to three heads, Matter, Order, and Style; and treat upon each of them ſeparately. But as Truth is the baſis and foundation of all hiſtory, it will be neceſſary to conſider that in the firſt place.

ART. I. Of TRUTH in Hiſtory.

Of h truth

TRUTH is, as it were, the very life and ſoul of hiſtory, by which it is diſtinguiſhed from fable or romance. An hiſtorian therefore ought not only to be a man of probity, but void of all paſſion or bias. He muſt have the ſteadineſs of a philoſopher, joined with the vivacity of a poet or orator. Without the former, he will be inſenſibly ſwayed by ſome paſſion, to give a falſe colouring to the actions or characters he deſcribes, as favour or diſlike to parties or perſons affect his mind. Whereas he ought to be of no party, nor to have either friend or foe while writing; but to preſerve himſelf in a ſtate of the greateſt indifferency to all, that he may judge of things as they really are in their own nature, and not as connected with this or that perſon or party. And with this firm and ſedate temper, a lively imagination is requiſite; without which his deſcriptions will be flat and cold, nor will he be able to convey to his readers a juſt and adequate idea of great and generous actions. Nor is the aſſiſtance of a good judgment leſs neceſſary than any of the former qualities, to direct him what is proper to be ſaid and what to be omitted, and to treat every thing in a manner ſuitable to its importance. And ſince theſe are the qualifications neceſſary for an hiſtorian, it may perhaps ſeem the leſs ſtrange, that we have ſo few good hiſtories.

But hiſtorical truth conſiſts of two parts; one is, Not not to ſay any thing we know to be falſe: Tho' it is not ſufficient to excuſe an hiſtorian in relating a falſehood, that he did not know it was ſo when he wrote it; unleſs he firſt uſed all the means in his power to inform himſelf of the truth. For then undoubtedly, an invincible error is as pardonable in hiſtory as in morality. But the generality of writers in this kind content themſelves with taking their accounts from hearſays, or tranſcribing them from others; without duly weighing the evidence on which they are founded, or giving themſelves the trouble of a ſtrict inquiry. Few will uſe the dilligence neceſſary to inform themſelves of the certainty of what they undertake to relate. And as the want of this greatly abates the pleaſure of reading ſuch writers, while perſons read with diffidence; ſo nothing more recommends an hiſtorian, than ſuch induſtry. Thus we are informed of Thucydides, that when he wrote his hiſtory of the Peloponneſian war, he did not ſatisfy himſelf with the beſt accounts he could get from his countrymen the Athenians, fearing they might be partial in their own cauſe; but ſpared no expence to inform himſelf how the ſame facts were related by their enemies the Lacedemonians; that, by comparing the relations of both parties, he might better judge of the truth. And Polybius took greater pains than he, in order to write his hiſtory of the Roman affairs; for he travelled into Africa, Spain, Gaul, and other parts of the world, that by viewing the ſeveral ſcenes of action, and informing himſelf from the inhabitants, he might come at a greater certainty of the facts, and repreſent them in a juſter light. But as an hiſtorian ought not to aſſert what he knows to be falſe; ſo he ſhould likewiſe be cautious in relating things which are doubtful, and acquaint his readers with the evidence he goes upon in ſuch facts, from whence they may be able to judge how far it is proper to credit them. So Herodotus tells us what things he ſaw himſelf in his travels, and what he heard from the information of the Egyptian prieſts and others with whom he converſed. And Curtius, in the life of Alexander, ſpeaking of the affairs of India, ingenuouſly confeſſes, that he wrote more than he fully believed. "For (ſays he) I neither dare to affirm poſitively, what I doubt of; nor can I think it proper to omit what I have been told." By ſuch a conduct the author ſecures his credit, whether the things prove really true or falſe; and gives room for further inquiry, without impoſing on his readers.

The other branch of hiſtorical truth is, Not to omit any thing that is true, and neceſſary to ſet the matter treated of in a clear and full light. In the actions of paſt ages, or diſtant countries, wherein the writer has no perſonal concern, he can have no great inducement to break in upon this rule. But where intereſt or party is engaged, it requires no ſmall candour, as well as firmneſs of mind, conſtantly to adhere to it. Affection to ſome, averſion to others, fear of diſobliging friends or thoſe in power, will often interpoſe, and try his integrity. Beſides, an omiſſion is leſs obvious to cenſure, than a falſe aſſertion: for the one may be eaſily aſcribed to ignorance or forgetfulneſs; whereas the other will, if diſcovered, be commonly looked upon as deſign. He therefore, who in ſuch circumſtances, from a generous love to truth, is ſuperior to all motives to betray or ſtifle it, juſtly deſerves the character of a brave, as well as honeſt man. What Polybius ſays upon this head is very well worth remarking: "A good man ought to love his friends and his country, and to have a like diſpoſition with them, both towards their friends and enemies. But when he takes upon him the character of an hiſtorian, they muſt all be forgot. He muſt often ſpeak well of his enemies, and commend them when their actions deſerve it; and ſometimes blame, and even upbraid his greateſt friends, when their conduct makes it neceſſary. Nor muſt he forbear ſometimes to reprove, and at other times to commend, the ſame perſons; ſince all are liable to miſtake in their management, and there are ſcarce any perſons who are always in the wrong. Therefore, in hiſtory, all perſonal conſiderations ſhould be laid aſide, and regard had only to their actions."

What a different view of mankind and their actions ſhould we have, were theſe rules obſerved by all hiſtorians? Integrity is undoubtedly the principal qualification of an hiſtorian; when we can depend upon this, other imperfections are more eaſily paſſed over. Suetonius is ſaid to have written the lives of the firſt twelve Roman emperors with the ſame freedom wherewith they themſelves lived. What better character can be given of a writer? The ſame ingenuous temper appears in the two Grecian hiſtorians above mentioned, Thucydides and Polybius: The former of whom, though baniſhed by his countrymen the Athenians, yet expreſſes no marks of reſentment in his hiſtory, either againſt them in general, or even againſt the chief authors of it, when he has occaſion to mention them; and the latter does not forbear cenſuring, what he thought blameable in his neareſt relations and friends. But it is often no eaſy matter to know, whether an hiſtorian ſpeaks truth or not, and keeps up to the ſeveral characters here mentioned; tho' it ſeems reaſonable, upon the common principles of juſtice due to all mankind, to credit him where no marks of partiality or prejudice appear in his writings. Sometimes, indeed, a judgment may in a good meaſure be formed of the veracity of an author, from his manner of expreſſing himſelf. A certain candour and frankneſs, that is always uniform and conſiſtent with

Compoſition of Hiſtory.

itſelf runs through their writings, who have nothing in view but truth, which may be juſtly eſteemed as a very good evidence of their ſincerity. Whereas thoſe, who have partial deſigns to anſwer, are commonly more cloſe and covert; and if at other times they aſſume an air of openneſs and freedom, yet this is not conſtant and even, but ſoon followed again with the appearance of ſome bias and reſerve: for it is very difficult to act a part long together, without lying open to a diſcovery. And therefore though craft and deſign is exceeding various, and, Proteus like, aſſumes very different ſhapes; there are certain characters, by which it may often be perceived and detected. Thus, where things are uncertain by reaſon of their being reported various ways, it is partiality in an hiſtorian to give into the moſt unfavourable account, where others are as well known and equally credible. Again, it is a proof of the ſame bad temper, when the facts themſelves are certain and evident, but the deſign and motives of thoſe concerned in them are unknown and obſcure, to aſſign ſome ill principle, ſuch as avarice, ambition, malice, intereſt, or any other vitious habit, as the cauſe of them. This conduct is not only unjuſt to the perſons, whoſe actions they relate; but hurtful to mankind in general, by endeavouring to deſtroy the principal motive to virtue, which ſprings from example. Others, who affect to be more covert, content themſelves with ſuſpicions and ſly inſinuations; and then endeavour to come off, by intimating their unwillingneſs to believe them, tho' they would have their readers do ſo. And to mention no more, there are others, who, when they have loaded perſons with unjuſt calumnies and reflections, will allow them ſome ſlight commendations, to make what they have ſaid before look more credible, and themſelves leſs partial. But the honeſt and faithful hiſtorian contemns all ſuch low and mean arts; he conſiders things as they are in themſelves, and relates them as he finds them, without prejudice or affection.

ART. II. The SUBJECT or ARGUMENT of Hiſtory.

84 Subject of hiſtory.

THE *ſubject* in general is facts, together with ſuch things as are either connected with them, or may at leaſt be requiſite to ſet them in a juſt and proper light. But although the principal deſign of hiſtory be to acquaint us with facts, yet all facts do not merit the regard of an hiſtorian; but ſuch only as may be thought of uſe and ſervice for the conduct of human life. Nor is it allowable for him, like the poet, to form the plan and ſcheme of his work as he pleaſes. His buſineſs is to report things as he finds them, without any colouring or diſguiſe to make them more pleaſing and palatable to his reader, which would be to convert his hiſtory into a novel. Indeed, ſome hiſtories afford more pleaſure and entertainment than others, from the nature of the things of which they conſiſt; and it may be eſteemed the happineſs of an hiſtorian to meet with ſuch a ſubject, but it is not his fault if it be otherwiſe. Thus Herodotus begins his hiſtory with ſhewing, that the barbarians gave the firſt occaſion to the wars between them and the Greeks, and ends it with an account of the puniſhment which, after ſome ages, they ſuffered from the Greeks on that account. Such a relation muſt not only be very agreeable to his countrymen the Grecians, for whoſe ſakes it was written; but likewiſe very inſtructive, by informing them of the juſtice of Providence in puniſhing public injuries in this world, wherein ſocieties, as ſuch, are only capable of puniſhment. And therefore thoſe examples might be of uſe to caution them againſt the like practices. On the contrary, Thucydides begins his hiſtory with the unhappy ſtate of his countrymen the Athenians; and in the courſe of it plainly intimates, that they were the cauſe of the calamitous war between them and the Lacedemonians. Whereas, had he been more inclined to pleaſe and gratify his countrymen, than to write the truth, he might have ſet things in ſuch a light as to have made their enemies appear the aggreſſors. But he ſcorned to court applauſe at the expence of truth and juſtice, and has ſet a noble example of integrity to all future hiſtorians. But as all actions do not merit a place in hiſtory, it requires no ſmall judgment in an hiſtorian to ſelect ſuch only as are proper. Cicero obſerves very juſtly, that hiſtory "is converſant in great and memorable actions." For this reaſon, an hiſtorian ſhould always keep poſterity in view, and relate nothing which may not, upon ſome account or other, be worth the notice of after-ages. To deſcend to trivial and minute matters, ſuch as frequently occur in the common affairs of life, is below the dignity of hiſtory. Such writers ought rather to be deemed journaliſts than hiſtorians, who have no view or expectation that their works ſhould ſurvive them. But the ſkilful hiſtorian is fired with a more noble ambition. His deſign is to acquaint ſucceeding ages with what remarkable occurrences happened in the world before them; to do juſtice to the memory of great and virtuous men; and at the ſame time to perpetuate his own. Pliny the younger has ſome fine reflections upon this head, in a letter to a friend. "You adviſe me (ſays he) to write an hiſtory; and not you only, for many others have done the ſame, and I am myſelf inclined to it. Not that I believe myſelf qualified for it, which would be raſh to think, till I have tried; but becauſe I eſteem it a generous action not to ſuffer thoſe to be forgotten, whoſe memory ought to be eternized; and to perpetuate the names of others, together with one's own. For there is nothing I am ſo deſirous or ambitious of, as to be remembered hereafter; which is a thing worthy of a man, eſpecially of one who, conſcious of no guilt, has nothing to fear from poſterity. Therefore I am thinking day and night by what means, as Virgil ſays,

——My name
To raiſe aloft:

That would ſuffice me; for it is above my wiſh to add with him,

and wing my flight to fame.

But oh!

However, this is enough, and what hiſtory alone ſeems to promiſe." This was Pliny's opinion, with regard to the uſe and advantage of hiſtory; the ſubjects of which are generally matters of weight and importance. And therefore, when a prudent hiſtorian thinks it convenient to take notice of things in themſelves leſs conſiderable, he either does it with brevity, or for ſome apparent reaſon, or accounts for it by ſome juſt apology. So Dion Caſſius, when he has mentioned ſome things of leſſer moment in the life of Commodus (as indeed that emperor's life was chiefly filled up with

Lib. v.

cruelty and folly), makes this excuſe for himſelf: "I would not have it thought that I deſcend below the gravity of hiſtory in writing theſe things. For, as they were the actions of an emperor, and I was preſent and ſaw them all, and both heard and converſed with him, I did not think it proper to omit them." He ſeems to think thoſe actions, when performed by an emperor, might be worth recording, which, if done by a perſon of inferior rank, would ſcarce have deſerved notice. Nor does he appear to have judged amiſs, if we conſider what an influence the conduct and behaviour of princes, even in the common circumſtances of life, have upon all beneath them; which may ſometimes render them not unworthy the regard of an hiſtorian, as examples either for imitation, or caution.

85 Different kinds of hiſtory.

But, although facts in general are the proper ſubject of hiſtory, yet they may be differently conſidered with regard to the extent of them, as they relate either to particular perſons, or communities of men. And from this conſideration, hiſtory has been diſtinguiſhed into three ſorts, viz. *biography*, *particular*, and *general hiſtory*. The lives of ſingle perſons is called *biography*. By *particular hiſtory* is meant that of particular ſtates, whether for a ſhorter or longer ſpace of time. And *general hiſtory* contains an account of ſeveral ſtates exiſting together in the ſame period of time.

1. The ſubjects of *biography* are the lives either of public or private perſons; for many uſeful obſervations in the conduct of human life may be made from juſt accounts of thoſe who have been eminent and beneficial to the world in either ſtation. Nay, the lives of vitious perſons are not without their uſe, as warnings to others, by obſerving the fatal conſequences which ſooner or later generally follow ſuch practices. But, for thoſe who expoſed their lives, or otherwiſe employed their time and labour for the ſervice of their fellow-creatures, it ſeems but a juſt debt that their memories ſhould be perpetuated after them, and poſterity acquainted with their benefactors. The expectation of this was no ſmall incentive to virtue in the Pagan world. And perhaps every one, upon due reflection, will be convinced how natural this paſſion is to mankind in general. And it was for this reaſon, probably, that Virgil places not only his heroes, but alſo the inventors of uſeful arts and ſciences, and other perſons of diſtinguiſhed merit, in the Elyſian fields, where he thus deſcribes them:

> Here patriots live, who, for their country's good,
> In fighting fields were prodigal of blood:
> Prieſts of unblemiſh'd lives here make abode,
> And poets worthy their inſpiring god;
> And ſearching wits of more mechanic parts,
> Who grac'd their age with new-invented arts;
> Thoſe who to worth their bounty did extend,
> And thoſe who knew that bounty to commend:
> The heads of theſe with holy fillets bound,
> And all their temples were with garlands crown'd.
> ÆNEID, l. vi. v. 66.

In the lives of public perſons, their public characters are principally, but not ſolely, to be regarded. The world is inquiſitive to know the conduct of princes and other great men, as well in private as public. And both, as has been ſaid, may be of ſervice, conſidering the influence of their examples. But to be over-inquiſitive in ſearching into the weakneſſes and infirmities of the greateſt or beſt of men, is, to ſay no more of it, but a needleſs curioſity. In the writers of this kind, Plutarch is juſtly allowed to excel.

But it has been a matter of diſpute among the learned, whether any one ought to write his own hiſtory. It may be pleaded in favour of this, that no one can be ſo much maſter of the ſubject as the perſon himſelf: and beſides, there are many inſtances, both ancient and modern, to juſtify ſuch a conduct. But on the other hand it muſt be owned, that there are many inconveniencies which attend it, ſome of which are mentioned by Cicero. "If (ſays he) there is any thing commendable, perſons are obliged to ſpeak of themſelves with greater modeſty, and to omit what is blameable in others. Beſides, what is ſaid is not ſo ſoon credited, and has leſs authority; and after all, many will not ſtick to cenſure it." And Pliny ſays very well to the ſame purpoſe, "Thoſe who proclaim their own virtues, are thought not ſo much to proclaim them becauſe they did them, as to have done them that they might proclaim them. So that which would have appeared great if told by another, is loſt when related by the party himſelf. For when men cannot deny the fact. they reflect upon the vanity of its author. Wherefore, if you do things not worth mentioning, the actions themſelves are blamed; and if the things you do are commendable, you are blamed for mentioning them." Theſe reflections will be generally allowed to be very juſt; and yet conſidering how natural it is for men to love themſelves, and to be inclined in their own favour, it ſeems to be a very difficult taſk for any one to write an impartial hiſtory of his own actions. There is ſcarce any treatiſe of this kind that is more celebrated than Cæſar's Commentaries. And yet Suetonius tells us, that "Aſinius Pollio (who lived at that time,) thought they were neither written with due care nor integrity: that Cæſar was often too credulous in his accounts of what was done by other perſons; and miſrepreſented his own actions, either deſignedly, or through forgetfulneſs: and therefore he ſuppoſes he would have reviſed and corrected them." However, at ſome times it may doubtleſs be juſtifiable for a perſon to be his own hiſtorian. Plutarch mentions two caſes wherein it is allowable for a man to commend himſelf, and be the publiſher of his own merits. Theſe are, when the doing of it may be of conſiderable advantage, either to himſelf or others. It is indeed leſs invidious for other perſons to undertake the province. And eſpecially for a perſon to talk or write of his own virtues, at a time when vice and a general corruption of manners prevails, let what he ſays be ever ſo true, it will be apt at leaſt to be taken as a reflection upon others. "Anciently (ſays Tacitus), many wrote their own lives, rather as a teſtimony of their conduct, than from pride." Upon which he makes this judicious remark: "That the more virtue abounds, the ſooner the reports of it are credited." But the ancient writers had a way of taking off the reader's attention from themſelves, in recording their own actions, and ſo rendering what they ſaid leſs invidious: and that was, by ſpeaking of themſelves in the third perſon, and not in the firſt. Thus Cæſar never ſays,

Ad Fam. lib. v. *ep.* 12.

Lib. viii. *ep.* 1.

“ *I* did,” or “ *I* ſaid, this or that;” but always, “ *Cæſar* did, or ſaid, ſo and ſo.” Why the moderns have not more choſen to follow them in this, we know not, ſince it ſeems leſs exceptionable.

2. In a continued hiſtory of *particular* ſtates, ſome account may be given of their original, and founders; the nature of their ſoil, and ſituation; what advantages they have for their ſupport or improvement, either within themſelves, by foreign traffic, or conqueſts; with the form of their government. Then notice ſhould be taken of the methods by which they increaſed in wealth or power, till they gradually advanced to their higheſt pitch of grandeur; whether by their virtue, the goodneſs of their conſtitution, trade, induſtry, wars, or whatever cauſe. After this the reaſons of their declenſion ſhould be ſhewn, what were the vices that principally occaſioned it, (for that is generally the caſe), whether avarice, ambition, luxury, diſcord, cruelty, or ſeveral of theſe in conjunction. And laſtly, where that has been their unhappy fate, how they received their final ruin and ſubverſion. Moſt of theſe things Livy had in view, when he wrote his hiſtory of the Roman ſtate, as he acquaints his readers in the preface. “ The accounts (ſays he) of what happened either before, or while the city was building, conſiſting rather of poetical fables than any certain records of facts, I ſhall neither aſſert nor confute them. Let antiquity be allowed to make the origin of their cities more venerable, by uniting things human and divine. But if any nation may be ſuffered to fetch their origin from the gods, ſuch is the military glory of the Romans, that when they repreſent Mars as the father of their founder, other nations may as eaſily acquieſce in this, as they do in their government. But I lay no great ſtreſs upon theſe things, and others of the like nature, whatever may be thought of them. What I am deſirous every one ſhould carefully attend to, are our lives and manners; by what men, and what arts, civil and military, the empire was both acquired and enlarged: then let him obſerve, how our manners gradually declined with our diſcipline; afterwards grew worſe and worſe; and at length ſo far degenerated, that at preſent we can neither bear with our vices, nor ſuffer them to be remedied. This is the chief benefit and advantage to be reaped from hiſtory, to fetch inſtructions from eminent examples of both kinds; in order to imitate the one, which will be of uſe both to yourſelf and your country, and avoid the other, which are equally baſe in their riſe and ever ” Thus far Livy. And how well he has executed this deſign, muſt be acknowledged by all who will be at the pains to peruſe his work.

3. But as a particular hiſtory conſiſts in a number of facts relating to the ſame ſtate, ſuitably connected and laid together in a proper ſeries; ſo a *general* hiſtory is made up of ſeveral particular hiſtories, whoſe ſeparate tranſactions within the ſame period of time, or part of it, ſhould be ſo diſtinctly related as to cauſe no confuſion. Such was the hiſtory of Diodorus Siculus, which contained an account of moſt of the eminent ſtates and kingdoms in the world, though far the greateſt part of it is now unhappily loſt. Of the ſame nature is the hiſtory of Herodotus, though not ſo extenſive; to whom we are eſpecially indebted for the Perſian affairs. And to this kind may likewiſe be referred Juſtin's hiſtory, though it be only the epitome of a larger work, written by another hand. The rules proper for conducting ſuch hiſtories are much the ſame as thoſe above mentioned concerning particular hiſtories; excepting what relates to the *order*, of which we ſhall have occaſion to ſpeak hereafter.

But the hiſtories, both of particular ſtates and thoſe which are more general, frequently contain only the affairs of ſome ſhort period of time. Thus the hiſtory of the Peloponneſian war, written by Thucydides, compriſes only what was done in the firſt twenty years of that war, which laſted ſeven years longer than his account reaches; though indeed the reaſon of that might be, becauſe Thucydides died before the war was finiſhed, otherwiſe he would very probably have continued his hiſtory to the concluſion of it. But the hiſtory of the war between the Romans and king Jugurtha in Africa, given us by Salluſt, as alſo Cæſar's hiſtories of the Gallic and civil wars, are all confined within a much leſs number of years than that of Thucydides. Nay, ſometimes one ſingle tranſaction is thought ſufficient to furniſh out an hiſtory. Such was the conſpiracy of Catiline to ſubvert the Roman ſtate, written likewiſe by Salluſt. As to more general hiſtories, Xenophon's hiſtory of Greece may be eſteemed as ſuch, which in order of time ſucceeds that of Thucydides, and contains the affairs of forty-eight years. And Polybius called his a *general hiſtory*; which, though it principally contained the Roman affairs, yet took in the moſt remarkable tranſactions of ſeveral other ſtates, for the ſpace of fifty-three years: though it has met with the ſame hard fate as that of Diodorus Siculus, ſo that only the firſt five books out of forty, of which it conſiſted at firſt, now remain entire. And to mention no more, the celebrated hiſtory of Thuanus is another inſtance of this ſort, in which the principal tranſactions of Europe for about ſixty years, chiefly in the ſixteenth century, are deſcribed with that judgment and fidelity, and in a manner ſo accurate and beautiful, that he has been thought ſcarcely inferior to any of the ancient hiſtorians. Now, in ſuch hiſtories as theſe, to go farther back than is requiſite to ſet the ſubject in a juſt light, ſeems as improper as it is unneceſſary.

The general ſubject or argument of hiſtory, in its ſeveral branches, may be reduced to theſe four heads; *narration*, *reflections*, *ſpeeches*, and *digreſſions*.

85 Of narration.

I. By *narration* is meant a deſcription of facts or actions, with ſuch things as are neceſſarily connected with them, namely, perſons, time, place, deſign, and event.

As to *actions* themſelves, it is the buſineſs of the hiſtorian to acquaint his readers with the manner in which they were performed; what meaſures were concerted on all ſides, and how they were conducted, whether with vigilance, courage, prudence, and caution, or the contrary, according to the nature of the action; as likewiſe, if any unforeſeen accidents fell out, by which the deſigned meaſures were either promoted or broken. All actions may be referred to two ſorts, military and civil. And as war ariſes from injuſtice, and injuries received, on one ſide or the other, it is fit the reader ſhould be informed who were the

the aggreſſors. For though war is never to be deſired, yet it is ſometimes neceſſary. In the deſcription of battles, regard ſhould be had equally to both parties, the number of forces, conduct of the generals, in what manner they engaged, what turns and changes happened in the engagement, either from accidents, courage, or ſtratagem, and how it iſſued. The like circumſtances ſhould all be obſerved in ſieges and other actions. But the moſt agreeable ſcene of hiſtory ariſes from a ſtate of peace. Here the writer acquaints us with the conſtitution of ſtates, the nature of their laws, the manners and cuſtoms of the inhabitants, the advantages of concord and unanimity, with the diſadvantages of contention and diſcord; the invention of arts and ſciences, in what manner they were improved and cultivated, and by whom; with many other things, both pleaſant and profitable in the conduct of life.

As to *perſons*, the characters of all thoſe ſhould be deſcribed who act any conſiderable part in an hiſtory. This excites the curioſity of the reader, and makes him more attentive to what is ſaid of them; as every one is more inquiſitive to hear what relates to others, in proportion to his knowledge of them. And it will likewiſe be of uſe to obſerve, how their actions agree with their characters, and what were the effects of their different qualifications and abilities.

The circumſtances of *time* and *place* are carefully to be regarded by an hiſtorian, without which his accounts of facts will be frequently very lame and imperfect. And therefore chronology and geography ſeem not improperly to have been called *the two eyes of hiſtory*. Beſides, they very much aſſiſt the memory. For it is much eaſier to remember any thing ſaid to be done at ſuch a time, and in ſuch a place, than if only related in general. Nay, the remembrance of theſe often recalls thoſe things to mind, which otherwiſe had been obliterated. By time is meant not only the year of any particular æra or period; but likewiſe the ſeaſon, as ſummer or winter; and the age of particular perſons. For it is oftentimes from hence that we are principally enabled to make a juſt eſtimate of facts. Thus Cicero commends Pompey for undertaking and finiſhing the Piratic war at a ſeaſon of the year when other generals would not have thought it ſafe to venture out at ſea. This double danger, as well from the weather as the enemy, conſidering the *Leg. c. 12.* neceſſity of the caſe, heightens the glory of the action; ſince to have done the ſame thing in ſummer, would not have been an equal proof of the courage and intrepidity of the general. And there is nothing more ſurpriſing in the conqueſts of Alexander, than that he ſhould ſubdue ſo large a part of the world by that time he was little more than thirty years old; an age at which few other generals have been much diſtinguiſhed. Had we not known this, a conſiderable part of his character had been loſt.

The like advantages ariſe from the other circumſtances of place. And therefore, in marches, battles, and other military actions, the hiſtorian ſhould take notice of the nature of the country, the paſſes, rivers, diſtances of places, ſituation of the armies, and ſtrength of the towns, either by nature or art; from which the reader may the better form a judgment of the difficulties and greatneſs of any enterpriſe. Cæſar is generally very particular in theſe things, and ſeems to have thought it highly requiſite in order to give his readers a juſt idea of his actions. The deſcriptions of countries, cities, and rivers, are likewiſe both uſeful and pleaſant; and help us to judge of the probability of what is related concerning the temper and genius of the inhabitants, their arts, traffic, wealth, power, or whatever elſe is remarkable among them.

But an accurate hiſtorian goes yet further, and conſiders the *cauſes* of actions, and what were the *deſigns* and views of thoſe perſons who were principally concerned in them. Some, as Polybius has well obſerved, are apt to confound the beginnings of actions with their ſprings and cauſes, which ought to be carefully ſeparated. For the cauſes are often very remote, and to be looked for at a conſiderable diſtance from the actions themſelves. Thus, as he tells us, ſome have repreſented Hannibal's beſieging Saguntum in Spain, and paſſing the Ebro, contrary to a former agreement between the Romans and Carthaginians, as cauſes of the ſecond Punic war. But theſe were only the beginnings of it. The true cauſes were the jealouſies and fears of the Carthaginians from the growing power of the Romans; and Hannibal's inveterate hatred to them, with which he had been impreſſed from his infancy. For his father, whom he ſucceeded in the command of the Carthaginian army, had obliged him, when but nine years old, to take a moſt ſolemn oath upon an altar never to be reconciled to the Romans: and therefore he was no ſooner at the head of the army, than he took the firſt opportunity to break with them. Again, the true ſprings and cauſes of action are to be diſtinguiſhed from ſuch as are only feigned and pretended. For generally the worſe deſigns men have in view, the more ſolicitous they are to cover them with ſpecious pretences. It is the hiſtorian's buſineſs, therefore, to lay open, and expoſe to view, theſe arts of politicians. So, as the ſame judicious hiſtorian remarks, we are not to imagine Alexander's carrying over his army into Aſia to have been the cauſe of the war between him and the Perſians. That had its being long before. The Grecians had formerly two armies in Aſia, one under Xenophon, and the other commanded by Ageſilaus. Now the Aſiatics did not venture to oppoſe or moleſt either of theſe armies in their march. This made king Philip, Alexander's father, who was an ambitious prince, and aſpired after univerſal monarchy, think it might be a practicable thing to make a conqueſt of Aſia. Accordingly, he kept it in his view, and made preparations for it; but did not live to execute it. That was left for his ſon. But as king Philip could not have done this, without firſt bringing the other ſtates of Greece into it, his pretence to them was only to avenge the injuries they had all ſuffered from the Perſians; though the real deſign was an univerſal government, both over them and the Perſians, as appeared afterwards by the event. But in order to our being well aſſured of a perſon's real deſigns, and to make the accounts of them more credible, it is proper we ſhould be acquainted with his diſpoſition, manners, way of life, virtues, or vices; that by comparing his actions with theſe, we may ſee how far they agree and ſuit each other. For this reaſon Salluſt is ſo particular in his deſcription of Catiline, and Livy of Hannibal; by which it appears credible, that the one was capable of entering into ſuch a conſpiracy againſt his country, and the other of performing ſuch great things as are related concerning him. But if the cauſes of actions lie in the dark and unknown, a prudent hiſtorian will not trouble himſelf, or his readers, with vain and trifling conjectures, unleſs ſomething very probable offers itſelf.

Laſtly, an hiſtorian ſhould relate the *iſſue* and *event* of the actions he deſcribes. This is undoubtedly the moſt uſeful part of hiſtory; ſince the greateſt advantage ariſing from it is to teach us experience, from what has happened in the world before us. When we learn from the examples of others the happy effects of wiſdom, prudence, integrity, and other virtues, it naturally excites us to an imitation of them, and to purſue the ſame meaſures in our own conduct. And, on the contrary, by perceiving the unhappy conſequences which have followed from violence, deceit, raſhneſs, or the like vices, we are deterred from ſuch practices. But ſince the wiſeſt and moſt prudent meaſures do not always meet with the deſired ſucceſs, and many croſs accidents may happen to fruſtrate the beſt concerted deſigns; when we meet with inſtances of this nature, it prepares us for the like events, and keeps us from too great a confidence in our own ſchemes. However, as this is not commonly the caſe, but in the ordinary courſe of human affairs like cauſes uſually produce like effects; the numerous examples of the happy conſequences of virtue and wiſdom, recorded in hiſtory, are ſufficient to determine us in the choice of our meaſures, and to encourage us to hope for an anſwerable ſucceſs, though we cannot be certain we ſhall in no inſtance meet with a diſappointment. And therefore Polybius very juſtly obſerves, that "he who takes from hiſtory the cauſes, manner, and end of actions, and omits to take notice whether the event was anſwerable to the means made uſe of, leaves nothing in it but a bare amuſement, without any benefit or inſtruction." Theſe then are the ſeveral things neceſſary to be attended to in hiſtorical narrations, but the proper diſpoſition of them muſt be left to the ſkill and prudence of the writer.

86
Of reflections.

II. *Reflections* made by the writer. Some have condemned theſe, as having a tendency to bias the reader; who ſhould be left to draw ſuch concluſions from the accounts of facts, as he ſees proper. But ſince all readers are not capable of doing this for themſelves, what diſadvantage is it for the author to ſuggeſt to them ſuch obſervations as may aſſiſt them to make the beſt uſe of what they read? And if the philoſopher is allowed to draw ſuch inferences from his precepts, as he thinks juſt and proper; why has not the hiſtorian an equal right to make reflections upon the facts he relates? The reader is equally at liberty to judge for himſelf in both caſes, without danger of being prejudiced. And therefore we find, that the beſt hiſtorians have allowed themſelves this liberty. It would be eaſy to prove this by a large number of inſtances, but one or two may here ſuffice. When Salluſt has given a very diſtinct account of the deſigns of Catiline, and of the whole ſcheme of the conſpiracy, he concludes it with this reflection: "All that time the empire of the Romans ſeems to me to have been in a very unhappy ſtate. For when they had extended their conqueſts through the whole world from eaſt to weſt, and enjoyed both peace and plenty, which mankind eſteem their greateſt happineſs; ſome perſons were obſtinately bent upon their own ruin, and that of their country. For notwithſtanding two decrees were publiſhed by the ſenate, not one out of ſo great a multitude was prevailed with, by the rewards that were offered, either to diſcover the conſpiracy, or to leave the army of Catiline. So deſperate a diſeaſe, and as it were infection, had ſeized the minds of moſt people!" And it is a very handſome obſervation that Livy makes upon the ill conduct of Hannibal in quartering his army in Capua after the battle of Cannæ; by which means they loſt their martial vigour through luxury and eaſe. "Thoſe (ſays he), who are ſkilled in military affairs reckon this a greater fault in the general, than his not marching his army immediately to Rome after his victory at Cannæ; for ſuch a delay might have ſeemed only to defer the victory, but this ill ſtep deprived him of the power to gain it." The modeſty of the hiſtorian in this paſſage is worth remarking, in that he does not repreſent this as his own private opinion, and by that means undertake to cenſure the conduct of ſo great a general as Hannibal was; but as the ſenſe of thoſe who were ſkilled in ſuch affairs. However, an hiſtorian ſhould be brief in his remarks; and conſider, that altho' he does not exceed his province, by applauding virtue, expreſſing a juſt indignation againſt vice, and interpoſing his judgment upon the nature and conſequences of the facts he relates; yet there ought to be a difference between his reflections, and the encomiums or declamations of an orator.

Bell. Ca c. 37.

Lib. xxi c. 18.

8
Of ſpe

III. *Speeches* inſerted by hiſtorians. Theſe are of two ſorts, oblique and direct. The former are ſuch, as the hiſtorian recites in his own perſon, and not in that of the ſpeaker. Of this kind is that of Hannibal in Juſtin; by which he endeavours to perſuade king Antiochus to carry the ſeat of the war againſt the Romans into Italy. It runs thus: "Having deſired liberty to ſpeak, (he ſaid,) none of the preſent counſels and deſigns pleaſed him; nor did he approve of Greece for the ſeat of the war, which might be managed in Italy to greater advantage: becauſe it was impoſſible to conquer the Romans but by their own arms, or to ſubdue Italy but by its own forces; ſince both the nature of thoſe men, and of that war, was different from all others. In other wars, it was of great importance to gain an advantage of place or time, to ravage the countries and plunder the towns; but tho' you gain ſome advantage over the Romans, or defeat them, you muſt ſtill fight with them when beaten. Wherefore, ſhould any one engage with them in Italy, it was poſſible for him to conquer them by their own power, ſtrength, and arms, as he himſelf had done. But ſhould he attempt it out of Italy, the ſource of their power, he would be as much deceived, as if he endeavoured to alter the courſe of a river, not at the fountain-head, but where its ſtreams were largeſt and deepeſt. This was his judgment in private, and what he had offered as his advice, and now repeated in the preſence of his friends; that all might know, in what manner a war ought to be carried on againſt the Romans, who were invincible abroad, but might be conquered at home. For they might ſooner be driven out of their city than their empire, and from Italy than their provinces; having been taken by the Gauls, and almoſt ſubdued by himſelf. That he was never defeated, till he withdrew out of their country; but upon his return to Carthage, the fortune of the war was changed with the place." He ſeems to intimate by this ſpeech, that the Romans were like ſome fierce and impetuous animals, which are no otherwiſe to be ſubdued than by wounding them in ſome vital part. In ſpeeches related after this manner, we are not neceſſarily to ſuppoſe the hiſtorian gives us the very words in which they were at firſt delivered, but only the ſenſe. But, in direct ſpeeches, the perſon himſelf is introduced as addreſſing his audience; and therefore, the words, as well as the ſenſe, are to be ſuited to his character. Such is the ſpeech of Eumenes, one of Alexander's captains and ſucceſſors, made to his ſoldiers when they had traiterouſly bound him in chains, in order to deliver him up to his enemy Antigonus, as we have it in the ſame writer. "You ſee, ſoldiers, (ſays he), the habit and ornaments of your general, which have not been put upon me by mine enemies; that would afford me ſome comfort: it is by you, that of a conqueror I am become conquered, and of a general a captive; though you have ſworn to be faithful to me four times within the ſpace of a year. But I omit that, ſince reflections do not become perſons in calamity. One thing I intreat, that, if Antigonus muſt have my life, you would let me die among you. For it no way concerns him, how, or where I ſuffer, and I ſhall eſcape an ignominious death. If you grant me this, I free you from your oath, with which you have been ſo often engaged to me. Or, if ſhame reſtrains you from offering violence to me at my requeſt, give me a ſword, and ſuffer your general to do that for you without the obligation of an oath, which you have ſworn to do for your general."

But this likewiſe is a matter in which critics have been divided in their ſentiments; whether any, or what kind, of ſpeeches ought to be allowed in hiſtory. Some have thought all ſpeeches ſhould be excluded. And the reaſon given for that opinion is this; that it breaks the thread of the diſcourſe, and interrupts the reader, when he is deſirous to come to the end of an action, and know how it iſſued. This is true indeed, when ſpeeches are either very long, or too frequent; but otherwiſe they are not only entertaining, but likewiſe inſtructive. For it is of ſervice to know the ſprings and reaſons of actions; and theſe are frequently opened and explained in the ſpeeches of thoſe by whom they were performed. Others therefore have not been againſt all ſpeeches in general, but only direct ones. And this was the opinion of Trogus Pompeius, as Juſtin informs us; though he did not think fit to follow him in that opinion, when he abridged him, as we have ſeen already by the ſpeech of king Eumenes. The reaſon offered againſt direct ſpeeches is, becauſe they are not true, and truth is the foundation of all hiſtory, from which it never ought to depart. Such ſpeeches, therefore, are ſaid to weaken the credit of the writer; ſince he, who will tell us, that another perſon ſpoke ſuch things, which he does not know that he ever did ſpeak, and in ſuch language as he could not uſe, may take the ſame liberty in repreſenting his actions. Thus, for example, when Livy gives us the ſpeeches of Romulus, the Sabine women, Brutus, and others, in the firſt ages of the Roman ſtate, both the things themſelves are imaginary, and the language wholly diſagreeable to the times in which thoſe perſons lived. Accordingly we find, that when ſeveral hiſtorians relate ſome particular ſpeech of the ſame perſon, they widely differ both in the ſubject-matter and expreſſions. So the ſpeech of Veturia, by which ſhe diſſuaded her ſon Coriolanus from beſieging Rome when he came againſt it with an army of Volſcians to avenge the injuries he had received, is very differently related by Livy, Dionyſius of Halicarnaſſus, and Plutarch. Such fictitious ſpeeches therefore are judged more fit for poets, who are allowed a greater liberty to indulge their fancy than hiſtorians. And if any direct ſpeeches are to be inſerted, they ſhould be ſuch only as were really ſpoken by the perſons to whom they are aſcribed, where any ſuch have been preſerved. Theſe have been the ſentiments of ſome critics, both ancient and modern. However, there is ſcarce an ancient hiſtorian now extant, either Greek or Latin, who has not ſome ſpeeches, more or leſs, in his works; and thoſe not only oblique, but alſo direct. They ſeem to have thought it a neceſſary ornament to their writings; and even where the true ſpeeches might be come at, have choſen rather to give them in their own words, in order, probably, to preſerve an equality in the ſtyle. Since therefore the beſt and moſt faithful hiſtorians have generally taken this liberty, we are to diſtinguiſh between their accounts of facts, and their ſpeeches. In the former, where nothing appears to the contrary, we are to ſuppoſe they adhere to truth, according to the beſt information they could get; but in the latter, that their view is only to acquaint us with the cauſes and ſprings of actions, which they choſe to do in the form of ſpeeches, as a method moſt ornamental to the work, and entertaining to the reader: Though the beſt hiſtorians are cautious of inſerting ſpeeches, but where they are very proper, and upon ſome ſolemn and weighty occaſions. Thucydides is ſaid to have been the firſt who brought complete and finiſhed ſpeeches into hiſtory, thoſe of Herodotus being but ſhort and imperfect. And tho' Dionyſius of Halicarnaſſus, in his cenſure upon Thucydides, ſeems then to have diſliked that part of his conduct; yet he afterwards thought fit to imitate it in his *Antiquities of Rome*, where we find many, not only oblique, but alſo direct, ſpeeches.

Lib. ii. *c.* 40.
Ant. Rom. lib. viii. *c.* 46.
In Corio-lano.

See Voſſ. *Ars Hiſt. c.* 20.

What has been ſaid of ſpeeches, may likewiſe be underſtood of letters, which we ſometimes meet with in hiſtories; as that of Alexander to Darius in Q. Curtius, thoſe of Tiberius and Druſus in Tacitus, and many others. Some letters are wholly fictitious; and in others perhaps the hiſtorian repreſents the ſubſtance of what was really ſaid, but gives it his own dreſs. Thus we find, that ſhort letter of Lentulus to Catiline, at the time of his conſpiracy, differently related by Cicero and Salluſt. The reaſon of which ſeems to be this: That as Cicero recited it publicly to the people of Rome, in his third oration againſt Catiline, it is reaſonable to imagine, he did it in the very words of the letter, which he had by him; whereas Salluſt, as an hiſtorian, might think it ſufficient to give the ſenſe of it in his own words.

Lib. iv. *c.* 1.
Ann. lib. i. 73. iii. 53, 59.

IV. *Digreſſions.* Theſe, if rightly managed, afford the reader both delight and profit. Like ſpeeches, they ſhould neither be too long nor frequent; leſt they interterrupt the courſe of the hiſtory, and divert the reader from the main deſign of the work. But now and then to introduce a beautiful deſcription, or ſome remarkable incident, which may give light to the ſubject, is ſo far from an interruption, that it is rather a relief to the reader, and excites him to go on with greater pleaſure and attention. See further on this head, ORATORY, n° 37.

ART. III. Of ORDER.

88 Of order.

SINCE moſt hiſtories conſiſt of an introduction and the body of the work, in each of which ſome order is requiſite, we ſhall ſpeak to them ſeparately.

1. The deſign of the introduction is the ſame here as in orations. For the hiſtorian propoſes three things by his introduction, which may be called its parts; to give his reader ſome general view of the ſubject, to engage his attention, and to poſſeſs him with a candid opinion of himſelf and his performance. Some have thought this laſt unneceſſary for an hiſtorian. But if we conſider how differently mankind are apt to judge of the ſame perſons and actions, it ſeems as requiſite for an hiſtorian to be well eſteemed as an orator. And therefore we find ſome of the beſt hiſtorians have not omitted this part. Livy's introduction has been very much applauded by the learned, as a maſter-piece in its kind. It begins with an account of his deſign. "Whether (ſays he) it may anſwer any valuable end for me to write the hiſtory of the Roman affairs from the beginning of the city, I neither am certain, nor, if I was, ſhould I venture to declare it." Soon after he endeavours to prepare the reader's attention, by repreſenting the grandeur and uſefulneſs of the ſubject in the following words: "Either I am prejudiced in favour of my ſubject, or there never was any ſtate greater, more virtuous, and fruitful of good examples, or in which avarice and luxury had a later admittance, or poverty and thriftineſs were either more highly or longer eſteemed, they always coveting leſs, the leſs they enjoyed." And then he preſently proceeds to ingratiate himſelf with his readers, and gain their favourable opinion: "Although my name is obſcure in ſo great a number of writers, yet it is a comfort, that they cloud it by their fame and character. But I ſhall gain this advantage by my labour, that I ſhall be diverted for a time from the proſpect of thoſe evils which the age has ſeen for ſo many years; while my mind is wholly intent upon former times, free from all that care which gives the writer an uneaſineſs, though it cannot bias him againſt the truth." In this paſſage we ſee he endeavours to gain the good eſteem of his readers from two very powerful motives, modeſty, and a ſtrict regard to truth. It may ſcarce ſeem neceſſary to obſerve, that thoſe introductions are eſteemed the beſt which are moſt natural; that is, ſuch as are taken from the ſubject-matter of the hiſtory itſelf, and cloſely connected with it. Such are thoſe of Herodotus, Thucydides, Livy, Tacitus, and others. And therefore Salluſt is greatly blamed by Quintilian on the account of his introductions, which are ſo general, that they might ſuit other hiſtories as well as thoſe to which they are prefixed. Introductions ſhould likewiſe be proportioned to the length of the work. We meet with ſome few hiſtories, in which the writers immediately enter upon their ſubject, without any introduction; as Xenophon in his Expedition of the younger Cyrus, and Cæſar in his Commentaries of the Gallic and Civil Wars. But the latter does not profeſs to write a juſt hiſtory; and therefore left himſelf more at liberty, as well in this reſpect as in ſome others.

2. But order is principally to be regarded in the body of the work. And this may be managed two ways; either by attending to the time in a chronological ſeries, or the different nature and circumſtances of the things contained in the hiſtory. However, as theſe two methods do not equally ſuit all ſubjects, we ſhall a little conſider to what kind of hiſtories each of them ſeems more properly adapted. All hiſtory then, as we have obſerved already, may be reduced to three ſorts; *biography*, the *hiſtory of particular ſtates*, and the *general hiſtory of ſeveral ſtates* exiſting at the ſame time.

In biography, or the lives of particular perſons, moſt writers follow the order of time; though ſome reduce them to certain general heads, as their virtues and vices, or their public and private character. Plutarch and Cornelius Nepos have taken the former method, and Suetonius the latter.

As to the hiſtory of particular ſtates, the order of time is generally beſt, as being moſt natural and eaſy. And therefore it has uſually been obſerved by the beſt hiſtorians, as Thucydides, Livy, and others. Tacitus, indeed, wrote two diſtinct works; one of which he called *Annals*, and the other *Hiſtories*. And, as in both he has kept to the order of time, critics have been at a loſs to aſſign any other reaſon for theſe different titles, unleſs that in the former work he confines himſelf more cloſely to the facts themſelves, and does not treat ſo largely upon the cauſes, manner, or event of them, as he has done in the latter. And even in the circumſtances of facts, there is a certain order proper to be obſerved, for rendering the account more plain and intelligible. Thus, for inſtance, in the deſcription of a battle or ſiege, the time ſhould firſt be known, then the chief perſon or perſons who conducted it, then the number of forces and other requiſites, afterwards the nature of the place, then the action itſelf, and laſtly the event. But ſometimes it is neceſſary to add the time in which ſeveral of the other circumſtances happened, eſpecially in actions of any conſiderable length. Where the order of theſe circumſtances is confuſed, it perplexes the account, and renders it both leſs entertaining to the reader, and more difficult to remember.

In a general hiſtory, the order of time cannot always be preſerved; though, where the actions of different communities have reſpect to one as the principal, they ſhould all, as far as poſſible, be referred to the tranſactions of that ſtate. But even here the ſeveral affairs of thoſe different ſtates ought to be related ſeparately, which will neceſſarily occaſion the anticipating ſome things, and poſtponing others, ſo that they cannot all ſtand in the order of time in which they were performed. However, Velleius Paterculus ſays very juſtly with regard to this ſubject, That "every entire action, placed together in one view, is much better apprehended than if divided by different times." In this caſe, therefore, for better preſerving the chronology, it is uſual with hiſtorians, when they have finiſhed any particular narrative, in paſſing to the next, to expreſs the time by ſome ſhort and plain tranſition; and ſometimes to apologize for themſelves, by aſſigning the reaſons of their conduct. So Polybius, whoſe hiſtory is of this kind, ſays concerning himſelf: "As in writing the actions of each year, in the order of time, I endeavour to repreſent the affairs of the ſame nation together in one ſummary view, it is plain that inconvenience muſt of courſe attend this way of writing." Curtius profeſſes only to write the actions of Alexander king of Macedon; but his hiſtory contains in it the principal affairs of the greateſt ſtates in the world during that period. Now although, in the courſe of thoſe tranſactions, the war between Archelaus governor of Macedonia, and Agis king of Sparta, happened before the battle of Alexander at Arbela; yet the hiſtorian not only relates that battle firſt, but carries on the account of Alexander's affairs in Aſia to the death of Darius without interruption; for which he gives this reaſon: "If I ſhould relate the affairs of Alexander, which happened in the mean time, either in Greece, or Illyrium and Thrace, each in their proper order and time, I muſt interrupt the affairs of Aſia; which it is much better to repreſent together in one continued ſeries as they fell out, to the flight and death of Darius." Such anachroniſms, therefore, are nothing more than what neceſſarily ariſe ſometimes from the nature of the ſubject: As every thing, the more complex it is, and contains under it a greater number of parts, is more difficult to be digeſted in a regular order. But in an hiſtory compoſed of ſeveral ſtates, whoſe affairs are independent of one another, the actions of each nation muſt neceſſarily be ſeparated, in order to repreſent them in a juſt view, and prevent confuſion. This is the method which Herodotus has taken, as likewiſe Diodorus Siculus and Juſtin. Now both the pleaſure and benefit which ſuch hiſtories afford, ariſe from obſerving the conduct of each ſtate ſeparately in the courſe of their affairs, and then comparing one with the other. And as the order of time muſt frequently be interrupted, it is not unuſual to continue the chronology at proper diſtances in relating the affairs of each nation; which preſerves an unity in the whole, and connects it in one conſiſtent body.

The diviſion of hiſtories into books was deſigned only for the better diſtinction of the ſubject and eaſe of the reader. And the dividing theſe books again into chapters, is rather a practice of later editors, (founded, as they have thought, on the ſame reaſons), than countenanced by the example of ancient writers.

Art. IV. Of Style.

An hiſtorical ſtyle is ſaid to be of a middle nature, between that of a poet and an orator, differing from both not only in the ornamental parts, but likewiſe in the common idioms and forms of expreſſion.

Cicero obſerves, that "nothing is more agreeable in hiſtory than brevity of expreſſion, joined with purity and perſpicuity." Purity indeed is not peculiar to hiſtory, but yet it is abſolutely neceſſary. For no one will ever think him fit to write an hiſtory who is not maſter of the language in which he writes. And therefore, when Albinus had written an hiſtory of the Roman affairs in Greek, and apologized for any ſlips or improprieties that might be found in the language upon the account of his being a Roman, Cato called him a trifler, for chooſing to do that which, after he had done it, he was obliged to aſk pardon for doing. Nor is perſpicuity leſs requiſite in an hiſtorical ſtyle. The nature of the ſubject plainly directs to this. For as hiſtory conſiſts principally in narration, clearneſs and perſpicuity is nowhere more neceſſary than in a relation of facts. But theſe two properties are to be accompanied with brevity, ſince nothing is more diſagreeable than a long and tedious narrative. And in this reſpect an hiſtorical ſtyle differs both from that of poetry and oratory. For the poet frequently heightens and enlarges his deſcriptions of facts, by dwelling upon every circumſtance, placing it in different views, and embelliſhing it with the fineſt ornaments of wit and language, to render his images more agreeable. And the orator often does the like, with a deſign to ſtrike the paſſions. But ſuch colouring is not the buſineſs of an hiſtorian, who aims at nothing more than a juſt and faithful repreſentation of what he relates, in a way beſt ſuited to its nature, and in ſuch language as is moſt proper to ſet it in a plain and eaſy light.

Gell. Lib. xi. *c.* 8.

Again, Cicero, treating of an hiſtorical ſtyle, ſays: "It ought to be fluent, ſmooth, and even, free from that harſhneſs and poignancy which is uſual at the bar." The properties here mentioned diſtinguiſh this ſtyle from that of judicial diſcourſes, in which the orator often finds it neceſſary to vary his manner of ſpeaking, in order to anſwer different views, either of purſuing an argument, preſſing an adverſary, addreſſing a judge, or recommending the merits of his cauſe. This occaſions an inequality in his ſtyle, while he ſpeaks ſometimes directly, at other times by way of queſtion, and intermixes ſhort and conciſe expreſſions with round and flowing periods. But the hiſtorian has no neceſſity for ſuch variations in his ſtyle. It is his province to eſpouſe no party, to have neither friend nor foe, but to appear wholly diſintereſted and indifferent to all; and therefore his language ſhould be ſmooth and equal in his relations of perſons and their actions.

De Orat. lib. ii. *c.* 15, 20.

But further: Dionyſius makes "decency a principal virtue in an hiſtorian;" which he explains by ſaying, that "he ought to preſerve the characters of the perſons, and dignity of the actions of which he treats." And to do this it ſeems neceſſary that an hiſtorical ſtyle ſhould be animated with a good degree of life and vigour; without which neither the characters of eminent perſons, nor their remarkable actions, which make up the main buſineſs of hiſtory, can be duly repreſented. For even things in themſelves great and excellent, if related in a cold and lifeleſs manner, often do not affect us in a degree ſuitable to their dignity and importance. And this ſeems particularly neceſſary in ſpeeches, in order to repreſent what every one ſays, according to his different country, age, temper, and ſtation of life, in the ſame manner we may ſuppoſe he either really did, or would have ſpoken himſelf on that occaſion. Beſides, there are ſome ſcenes of action which require very pathetic and moving language, to repreſent them agreeably to their nature. And, in deſcriptions, the moſt beautiful tropes and lively figures are often neceſſary to ſet the ideas of things in a proper light. From whence it appears, that

Epiſt. ad Cn. Pompeium.

that painting and imagery make up no ſmall part of the hiſtorian's province, though his colours are not ſo ſtrong and glittering as thoſe either of the poet or orator. He ought, therefore, to be well acquainted with the manners of men and the nature of the paſſions, ſince he is often obliged to deſcribe both; in the former of which Herodotus excels, and Thucydides in the latter, as Dionyſius has obſerved.

Now from theſe ſeveral properties laid down by ancient writers, as requiſite for an hiſtorical ſtyle, it ſeems upon the whole to agree beſt with the middle character. And this will further appear, by what they ſay relating to the ornamental parts of ſtyle; namely, compoſition and dignity. As to the former of theſe, which reſpects the ſtructure of ſentences, and the ſeveral parts of them, Demetrius remarks, that, "An hiſtorical period ought neither to riſe very high, nor ſink very low, but to preſerve a medium." This ſimplicity, (he ſays,) "becomes the gravity and credit of hiſtory; and diſtinguiſhes it from oratory on the one hand, and dialogue on the other." His meaning is, that hiſtorical periods ſhould neither be ſo full and ſonorous, as is frequent in oratory; nor yet ſo ſhort and flat, as in dialogue. the former of which, as he ſays, require a ſtrong voice to pronounce them; and the latter have ſcarce the appearance of periods. So that, according to this judicious writer, the periods beſt ſuited for hiſtory are thoſe which, being of a moderate length, will admit of a juſt riſe and cadency, and may be pronounced with eaſe. And Dionyſius tells us, that "Hiſtory ſhould flow ſmooth and even, every where conſiſtent with itſelf, without roughneſs or chaſms in the ſound." This relates to the harmony of periods, which ariſes from ſuch a poſition of the words as renders the ſound pleaſant and agreeable, and, as he thinks, ought to be attended to in hiſtory. And as to dignity, which reſpects the uſe of tropes and figures, the ſame author ſays, that "Hiſtory ſhould be embelliſhed with ſuch figures, as are neither vehement, nor carry in them the appearance of art." This is agreeable to what Cicero obſerves, in comparing Xenophon and Caliſthenes, two Greek hiſtorians. "Xenophon the Socratic, (ſays he), was the firſt philoſopher, and after him Caliſthenes the ſcholar of Ariſtotle, who wrote an hiſtory; the latter almoſt like a rhetorician; but the ſtyle of the former is more moderate, and has not the force of an orator, leſs vehement perhaps, but in my opinion more ſweet and pleaſant." The difference between theſe two writers, with regard to their ſtyle, conſiſted chiefly in the choice of their figures, which in Xenophon were more gentle and moderate, and therefore in the judgment of Cicero more agreeable to hiſtory. Now theſe ſeveral properties relating to the ornaments of language, as well as thoſe before mentioned, which by ancient writers have been thought requiſite for hiſtory, are all ſuited to the middle ſtyle, as we have elſewhere ſhewn at large. See ORATORY, n° 99—21.

De Orat. lib. ii. c. 14.

But notwithſtanding this general account of the ſeveral properties which conſtitute an hiſtorical ſtyle, it admits of conſiderable varieties from the different nature and dignity of the ſubject. The lives of particular perſons do not require that ſtrength and majeſty of expreſſion, nor all thoſe ornaments of language, as an hiſtory of the Roman empire. And accordingly we find the ſtyle of Nepos and Suetonius very different from that of Livy. The former is ſmooth and eaſy, ſcarce riſing above the low character; but the latter often approaches near to the ſublime. And other hiſtorians again have kept a medium between theſe. Upon the whole, therefore, we may conclude, that the middle ſtyle is the proper character for hiſtory, tho' hiſtorians may ſometimes ſink into the low character, and at other times riſe to the grandeur and magnificence of the ſublime, from the different nature of their ſubject, or ſome particular parts of it. For that is to be eſteemed the proper character of any writing, which in the general beſt ſuits it. And this diſtinction may help us in ſome meaſure to reconcile the ſentiments of writers upon this head who ſeem to attribute different characters to an hiſtorical ſtyle, or at leaſt to judge where the truth lies; ſince a variety of ſtyle is not only requiſite in different ſubjects, but likewiſe in different parts of the ſame work.

HISTORY *of Nature*, or NATURAL HISTORY. See NATURE.

HISTRIO, in the ancient drama, ſignified an actor or comedian; but more eſpecially a pantomime, who exhibited his part by geſtures and dancing.

HITCHING, a large and populous town of Hartfordſhire in England, ſituated near a large wood called *Hitchwood*. The inhabitants make large quantities of malt; and the market is one of the greateſt in England is one of the greateſt in England for wheat. W. Long. 0. 20. N. Lat. 51. 55.

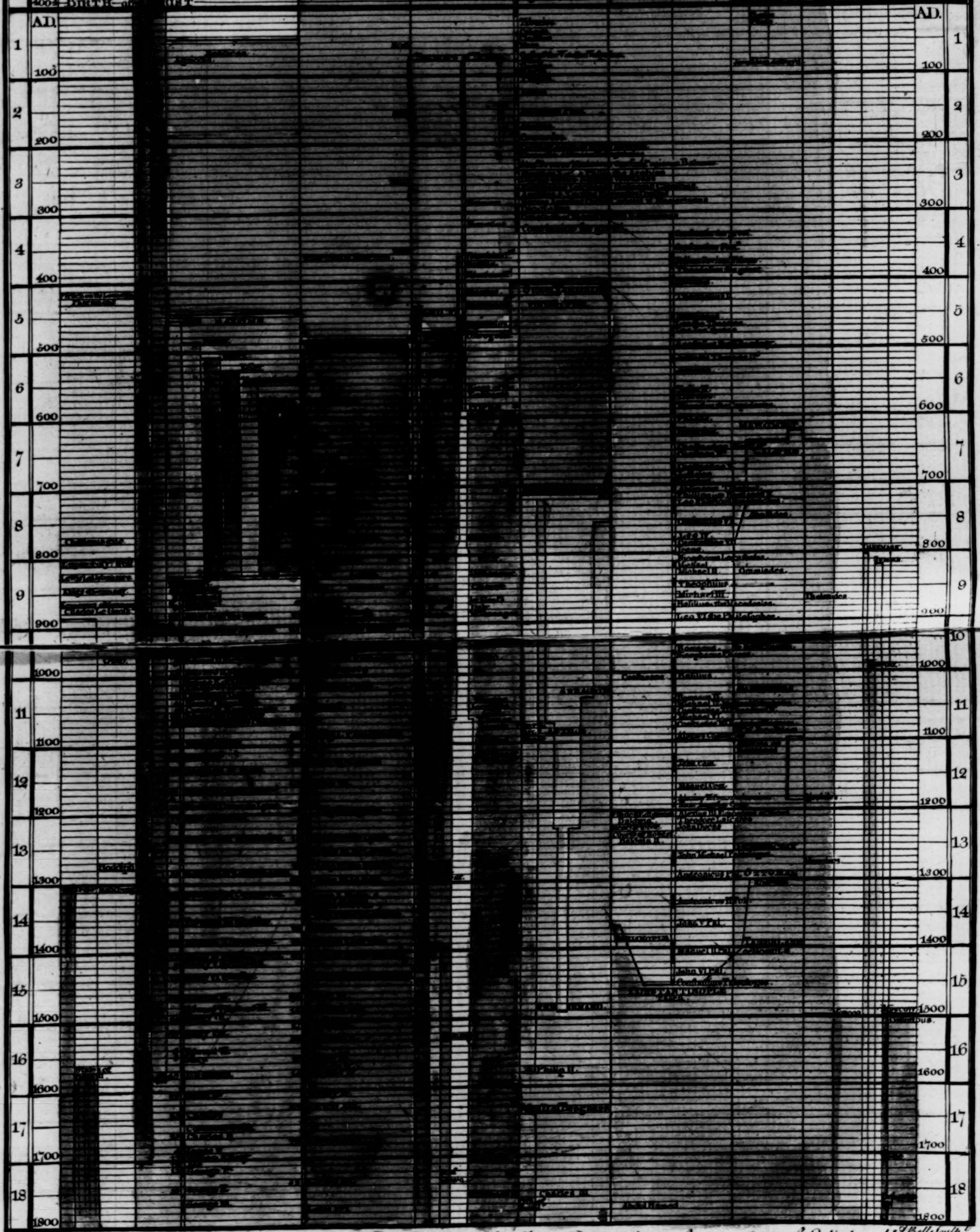
HITHE, a town of Kent in England, which had formerly four pariſhes; but, by the choaking up of its harbour and other accidents, it is now reduced to one. It is a cinque port, and is governed by a juſtice of the peace and conſtables. It conſiſts of one ſtreet, which is paved; and contains about 150 low houſes, moſtly built with wood and ſtone. The chief ſupport of the inhabitants is fiſhing. It is remarkable for a great pile of dry bones in the town, 28 feet long, ſix broad, and eight high. E. Long. 1. 7. N. Lat. 51. 6.

HIVE, in country affairs, a convenient receptacle for bees. See APIS.

HIVING *of Bees*. See APIS.

HOACHE, in natural hiſtory, a kind of earth approaching to the nature of chalk, but harder, and feeling like ſoap; whence ſome think that it is either the ſame with the ſoap-rock of Cornwall, or very like it. The Chineſe diſſolve it in water, till the liquor is of the conſiſtence of cream, and then varniſh their China-ware with it.

HOADLEY (Benjamin), ſucceſſively biſhop of Bangor, Hereford, Saliſbury, and Wincheſter, was born in 1676. His firſt preferment in the church was the rectory of St Peter le Poor, and the lectureſhip of St Mildred's in the Poultry. In the year 1706, he publiſhed ſome *Remarks* on the late biſhop Atterbury's ſermon



Deſigned by Adam Ferguson LL.D. Profeſſor of Moral Philoſophy, in the Univerſity of Edinburgh.

A. Bell Sculp.

EXPLANATION.

By this plan events may be referred to the year of the world; and, within the proper periods, to the aeras of the Olympiads, of Nabonaſſar, and of Rome : but the principal reference is to the birth of Chriſt, marked as above by a deep black line.

The plan extends only to the Flood; the preceding period of 1656 years is left blank as above.

There being 2348 years from the Flood to the birth of Chriſt, the ſpace between them is divided into 23 parts, each repreſenting an hundred years or century, and a fraction repreſenting the remaining 48 years.

As we are now in the 18th century, the ſpace from the birth of Chriſt downwards is divided into eighteen parts or centuries; and all theſe parts, together with ſome centuries preceding the birth of Chriſt, are ſubdivided into tens.

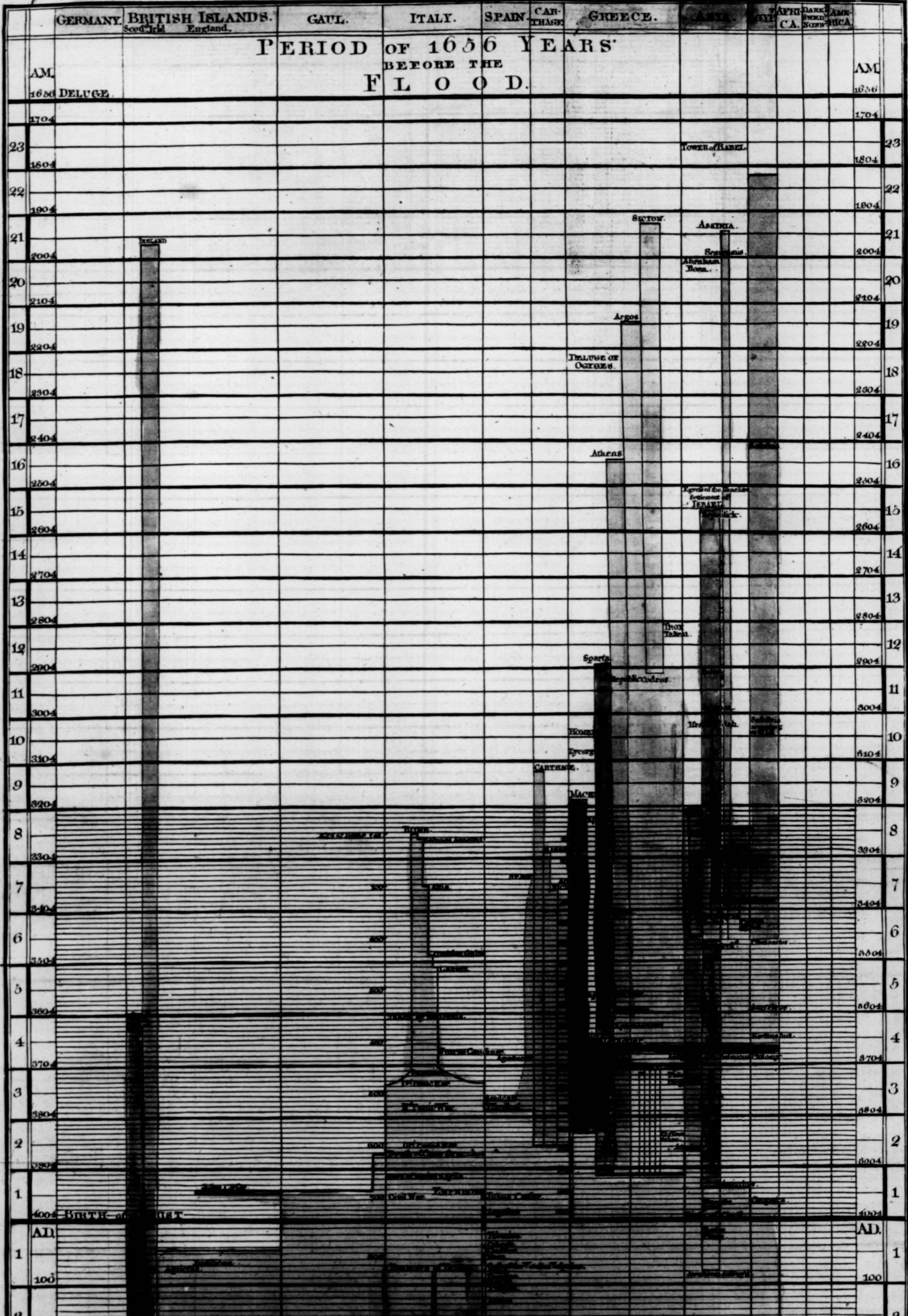
The vertical columns, titled as above, are geographical diviſions; and events are marked in their proper centuries and proper columns. Thus the riſe of any ſtate, as that of Aſſyria, is marked in its proper geographical column, and in that place of the 21ſt century before Chriſt at which the beginning of its hiſtory is dated; from thence we trace its continuance to the end of the 7th century before Chriſt, when it became extinct. The building of Rome is marked about the middle of the 8th century before Chriſt. Its territory extends by degrees to the conqueſt of all Italy; next to Spain, Macedonia, &c. until it comes to extend from Britain to Egypt. It continues of this greatneſs until about the middle of the 5th century after Chriſt, when it begins to loſe thoſe provinces out of which the modern kingdoms of Europe have been formed in the order here ſet down.—As the order in which ſtates have riſen or fallen, relatively to one another, appears on mere inſpection, it will be more eaſily remembered than when it is conveyed in numbers alone.

The dates are taken chiefly from that comprehenſive and uſeful work, Blair's Chronological Tables. Uſe has likewiſe been made of the Chart of Univerſal Hiſtory, formed on a deſign like this, but differently executed.—Compared to that chart the preſent may be thought incomplete. Nor would it have been difficult for the gentleman who ſketched it, to have filled it up with remarkable events, ſucceſſions of kings, and lives of men; but he preferred clearneſs and ſimplicity, leaving to every perſon the filling up of his own plan with ſuch articles as are moſt in the way of his curioſity and ſtudy. He has contented himſelf with a few ſpecimens of this ſort, in the ſucceſſion of the Roman emperors, of the kings of England and France; and in the lives of one or two remarkable men, as in thoſe of Tacitus the hiſtorian, and Attila. One perſon may chooſe to fill his plan with the names of ſtateſmen and warriors, another with ſcholars and men of letters. To attempt inſerting all that deſerve being recorded, would crowd and embarraſs the whole.

As ſpace is here employed to repreſent time, it is material that equal periods ſhould be repreſented by equal ſpaces; and, if poſſible, that the parts of the ſame empire ſhould be placed together. Both theſe circumſtances are neglected in the Chart of Univerſal Hiſtory.

HISTORICAL CHART,

Representing at one View the rise and progress of the Principal States & Empires of the known World.



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ſermon at the funeral of Mr Bennet, in which Dr Atterbury had, in the opinion of Mr Hoadley, laid down ſome dangerous propoſitions. Two years after, Mr Hoadley again entered the liſts againſt this formidable antagoniſt; and in his *exceptions* againſt a ſermon publiſhed by Dr Atterbury, intitled "The Power of Charity to cover Sin," he attacked the doctor with his uſual ſtrength of reaſoning, and diſpaſſionate inquiry.—In 1709, another diſpute aroſe between theſe two learned combatants, concerning the doctrine of non-reſiſtance, occaſioned by a performance of Mr Hoadley's, intitled "The Meaſures of Obedience;" ſome poſitions in which, Dr Atterbury endeavoured to confute in his elegant Latin ſermon, preached that year before the London clergy. In this debate Mr Hoadley ſignalized himſelf in ſo eminent a degree, that the honourable houſe of commons gave him a particular mark of their regard, by repreſenting, in an addreſs to the queen, the ſignal ſervices he had done to the cauſe of civil and religious liberty.—The principles, however, which he eſpouſed being repugnant to the general temper of thoſe times, drew on him the virulence of a party; yet it was at this period (1710, when, as he himſelf expreſſed it, *fury ſeemed to be let looſe upon him*), that the late Mrs Howland preſented him to the rectory of Streatham in Surry, unaſked, unapplied to, and without his either having ſeen her or been ſeen by her. Soon after the acceſſion of king George I. Mr. Hoadley was conſecrated to the ſee of Bangor; and 1717 having broached ſome opinions concerning the nature of Chriſt's kingdom, *&c.* he again became the object of popular clamour. At this juncture he was diſtinguiſhed by another particular mark of the royal regard, by means of which the convocation was ſucceſſively prorogued, and it was not permitted to ſit, nor do any buſineſs, till that reſentment was entirely ſubſided. In 1721, he was tranſlated to Hereford; and from thence, in 1723, to Saliſbury. In 1734, he was tranſlated to Wincheſter (on the demiſe of Dr Willis), and publiſhed his *Plain Account of the Sacrament:* a performance which ſerved as a butt for his adverſaries to ſhoot at, yet impartially owns it to be clear, rational, and manly, wrote with great candour and judgment, and ſuited to the capacity of every ſerious and conſiderate inquirer after truth.—His latter days were embittered by a moſt vile inſtance of fraud and ingratitude. The biſhop took a French prieſt, who pretended to abjure his religion, under his protection, with no other recommendation than that of his neceſſities; in return for which act of humanity, the prieſt found an opportunity of getting the biſhop's name wrote by his own hand, and cauſing a note of ſome thouſand pounds to be placed before it, offered it in payment. But the biſhop denying it to be his, it was brought before a court of juſtice, and was there found to be a groſs impoſition. The ungrateful villain had now recourſe to a pamphlet, in which he charged the biſhop with being a drunkard, and alleged that he had the note of him when he was in liquor. To this calumny the biſhop made a full and nervous anſwer; in which he expoſed the man's falſehood, and ſolemnly averred that he was never drunk in his whole life. The world with becoming ardour embraced his defence, and he had the happineſs to find himſelf perfectly acquitted even of any ſuſpicion of ſuch a charge. As a writer, he poſſeſſed uncommon abilities. His ſermons (publiſhed in 1754 and 1755) are eſteemed inferior to few writings in the Engliſh language, for plainneſs and perſpicuity, energy and ſtrength of reaſoning, and a free and maſterly manner. In private life, he was naturally facetious, eaſy, and complying, fond of company, yet would frequently leave it for the purpoſes of ſtudy or devotion. He was every where happy; and particularly in his own family, where he took all opportunities of inſtructing by his influence and example. He died in 1761, aged 83. Beſides the works already mentioned, he wrote, 1. Terms of Acceptance, 8vo. 2. Reaſonableneſs of Conformity. 3. On the Sacrament.—His tracts and pamphlets are extremely numerous; and the reader may ſee a complete catalogue of them in his life inſerted in the ſupplement to the Biographia Britannica.

Hoadley (Benjamin), M. D. ſon of the former, was born in 1706, and ſtudied at Bennet college Cambridge, under the tuition of Dr Herring afterwards archbiſhop of Canterbury. He took his degree in phyſic; and particularly applying himſelf to mathematical and philoſophical ſtudies, was, when very young, admitted a member of the royal ſociety. He was made regiſter of Hereford, while his father filled that ſee, and was early appointed phyſician to his majeſty's houſehold, but died at his houſe in Chelſea in 1757. He wrote, 1. Three Letters on the organs of reſpiration, 4to. 2. The Suſpicious Huſband, a comedy. 3. Obſervations on a ſeries of electrical experiments; and, 4. *Oratio anniverſaria, in Theatro Col. Med. Londin. ex Harvei inſtituto habita die,* Octob. 1742.

HOAR-HOUND, in botany. See MARUBIUM.

HOARSENESS, in medicine, a diminution of the voice, commonly attended with a preternatural aſperity and roughneſs thereof. The parts affected are the aſpera arteria and larynx. For its cauſes and cure, ſee (the *Index* ſubjoined to) MEDICINE.

HOBBES (Thomas), a famous writer, born at Malmſbury in 1588, was the ſon of a clergyman. He completed his ſtudies at Oxford, and was afterwards governor to the eldeſt ſon of William Cavendiſh earl of Devonſhire. He travelled through France and Italy with that young nobleman, and at length applied himſelf entirely to the ſtudy of polite literature. He tranſlated Thucydides into Engliſh; and publiſhed his tranſlation in 1628, in order to ſhew his countrymen, from the Athenian hiſtory, the diſorders and confuſions of a democratical government. In 1626, his patron the earl of Devonſhire died; and in 1628, his ſon died alſo: which loſs affected Mr Hobbes to ſuch a degree, that he very willingly accepted an offer made him of going abroad a ſecond time with the ſon of Sir Gervaſe Clifton; whom he accordingly accompanied into France, and ſtaid there ſome time. But, while he continued there, he was ſolicited to return to England, and to reſume his concern for the hopes of that family to which he had attached himſelf ſo early, and to which he owed ſo many and ſo great obligations.

In 1631, the counteſs dowager of Devonſhire deſired to put the young earl under his care, who was then about the age of 13. This was very ſuitable to

Mr Hobbes's inclinations, who diſcharged that truſt with great fidelity and diligence. In 1634, he republiſhed his tranſlation of Thucydides, and prefixed to it a dedication to that young nobleman, in which he gives a large character of his father, and repreſents in the ſtrongeſt terms the obligations he was under to that illuſtrious family. The ſame year he accompanied his noble pupil to Paris, where he applied his vacant hours to the ſtudy of natural philoſophy, and more eſpecially to the perfect underſtanding of mechaniſm, and the cauſes of animal motion. He had frequent converſations upon theſe ſubjects with father Marin Merſenne; a man deſervedly famous, and who kept up a correſpondence with almoſt all the learned in Europe. From Paris he attended his pupil into Italy, where at Piſa he became known to that great aſtronomer Galileo Galilei, who communicated to him his notions very freely; and after having ſeen all that was remarkable in that country, he returned with the earl of Devonſhire into England; afterwards, foreſeeing the civil wars, he went to ſeek a retreat at Paris, where, by the good offices of his friend father Merſenne, he became known to the famous Renatus des Cartes, and afterwards held a correſpondence with him upon ſeveral mathematical ſubjects, as appears from the letters of Mr Hobbes publiſhed in the works of Des Cartes. But when this philoſopher printed afterwards his Meditations, wherein he attempted to eſtabliſh points of the higheſt conſequence from innate ideas, Mr Hobbes took the liberty of diſſenting from him; as did alſo the French king's mathematical profeſſor, the illuſtrious Peter Gaſſendi, with whom Mr Hobbes contracted a very cloſe friendſhip, which was not interrupted till the death of the former. In 1642, Mr Hobbes printed a few copies of his famous book *De Cive*, which, in proportion as it became known, raiſed him many adverſaries, who charged him with inſtilling principles which had a dangerous tendency.

Among many illuſtrious perſons who, upon ſhipwreck of the royal cauſe, retired to France for ſafety, was Sir Charles Cavendiſh, brother to the duke of Newcaſtle: and this gentleman, being ſkilled in every branch of the mathematics, proved a conſtant friend and patron to Mr Hobbes; who, by embarking in 1645 in a controverſy about ſquaring the circle, was grown ſo famous for it, that in 1647 he was recommended to inſtruct Charles prince of Wales, afterwards king Char. II. in that kind of learning. His care in the diſcharge of this office gained him the eſteem of that prince in a very high degree: and though he afterwards withdrew his public favour to Mr Hobbes on account of his writings, yet he always retained a ſenſe of the ſervices he had done him; ſhewed him various marks of his favour after he was reſtored to his dominions; and, as ſome ſay, had his picture hanging in his cloſet. This year alſo was printed in Holland, by the care of M. Sorbiere, a ſecond and more complete edition of his book *De Cive*; to which are prefixed two Latin letters to the editor, the one by Mr Gaſſendi, the other by father Merſenne, in commendation of it: and in 1650 was publiſhed at London a ſmall treatiſe of Mr Hobbes's, intitled, "Human Nature;" and another, "*De corpore politico*, or of the elements of the law."

All this time Mr Hobbes had been digeſting with great care and pains his religious, political, and moral principles, into a complete ſyſtem, which he called the *Leviathan*, and which was printed in Engliſh at London in 1650 and 1651. After the publication of his Leviathan he returned to England, and paſſed the ſummer commonly at his patron the earl of Devonſhire's ſeat in Derbyſhire, and ſome of his winters in town, where he had for his intimate friends ſome of the greateſt men of the age.

In 1660, upon the reſtoration, he quitted the country, and came up to London, where he obtained from the king aſſurance of protection, and had an annual penſion of L. 100 ſettled upon him out of the privy purſe. Yet this did not render him entirely ſafe: for, in 1666, his *Leviathan* and his treatiſe *De Cive* were cenſured by parliament, which alarmed him very much; as did alſo the bringing in of a bill into the houſe of commons to puniſh atheiſm and profaneneſs. When this ſtorm was a little blown over, he began to think of procuring a beautiful edition of his pieces, that were in Latin; but finding this impracticable in England, he cauſed it to be undertaken abroad, where they were publiſhed in quarto in 1668, from the preſs of John Bleau. In 1669, he was viſited by Coſmo de Medicis, then prince, afterwards duke of Tuſcany, who gave him ample marks of his eſteem and reſpect; and having received his picture, and a complete collection of his writings, cauſed them to be repoſited, the former among his curioſities, the latter in his noble library at Florence. The like viſits he received from foreign ambaſſadors and other ſtrangers of diſtinction; who were curious to ſee a perſon whoſe ſingular opinions and numerous writings had made ſo much noiſe all over Europe. In 1672, he wrote his own life in Latin verſe, when, as he obſerves, he had completed his 84th year: and, in 1674, he publiſhed in Engliſh verſe four books of Homer's Odyſſey, which was ſo well received, that it encouraged him to undertake the whole Iliad and Odyſſey, which he likewiſe performed and publiſhed in 1675. About this time, he took his leave of London, and went to ſpend the remainder of his days in Derbyſhire; where, however, he did not remain inactive, notwithſtanding his advanced age; but publiſhed from time to time ſeveral pieces, to be found in the collection of his work. He died in 1679, aged 92.

As to his character and manners, they are thus deſcribed by Dr White Kennet, in his Memoirs of the Cavendiſh family. "The earl of Devonſhire (ſays he) for his whole life entertained Mr Hobbes in his family, as his old tutor, rather than as his friend or confident. He let him live under his roof in eaſe and plenty, and in his own way, without making uſe of him in any public, or ſo much as domeſtic affairs. He would often expreſs an abhorrence of ſome of his principles in policy and religion; and both he and his lady would frequently put off the mention of his name, and ſay, 'He was a humouriſt, and nobody could account for him.' There is a tradition in the family, of the manners and cuſtoms of Mr Hobbes, ſomewhat obſervable. His profeſſed rule of health was to dedicate the morning to his exerciſe, and the afternoon to his ſtudies. And therefore, at his firſt riſing, he walked out, and climbed any hill within his reach; or if the weather was not dry, he fatigued himſelf within doors by ſome exerciſe or other, to be in a ſweat: recommending that practice upon this opinion, that an old man had more moiſture than heat, and therefore by ſuch motion heat was to be acquired and moiſture expelled. After this, he took a comfortable breakfaſt; and then went round the lodgings to wait upon the earl, the counteſs, and the children, and any conſiderable ſtrangers, paying ſome ſhort addreſſes to all of them. He kept theſe rounds till about 12 o'clock, when he had a little dinner provided for him, which he eat always by himſelf without ceremony. Soon after dinner he retired to his ſtudy, and had his candle with 10 or 12 pipes of tobacco laid by him; then ſhutting his door, he fell to ſmoking, thinking, and writing, for ſeveral hours. He retained a friend or two at court, and eſpecially the lord Arlington, to protect him if occaſion ſhould require. He uſed to ſay, that it was lawful to make uſe of ill inſtruments to do ourſelves good: 'If I were caſt (ſays he) into a deep pit, and the devil ſhould put down his cloven foot, I would take hold of it to be drawn out by it.' After the reſtoration, he watched all opportunities to ingratiate himſelf with the king and his prime miniſters; and looked upon his penſion to be more valuable, as an earneſt of favour and protection, than upon any other account. His future courſe of life was to be free from danger. He could not endure to be left in an empty houſe. Whenever the earl removed, he would go along with him, even to his laſt ſtage, from Chatſworth to Hardwick. When he was in a very weak condition, he dared not be left behind, but made his way upon a feather-bed in a coach, though he ſurvived the journey but a few days. He could not bear any diſcourſe of death, and ſeemed to caſt off all thoughts of it: he delighted to reckon upon longer life. The winter before he died, he made a warm coat, which he ſaid muſt laſt him three years, and then he would have ſuch another. In his laſt ſickneſs his frequent queſtions were, Whether his diſeaſe was curable? and when intimations were given, that he might have eaſe, but no remedy, he uſed this expreſſion, 'I ſhall be glad to find a hole to creep out of the world at;' which are reported to have been his laſt ſenſible words; and his lying ſome days following in a ſilent ſtupefaction, did ſeem owing to his mind more than to his body."

The reverend Mr Granger obſerves, that Hobbes's ſtyle is incomparably better than that of any other writer in the reign of Charles I. and was for its uncommon ſtrength and purity ſcarcely equalled in the ſucceeding reign. "He has in tranſlation (ſays he) done Thucydides as much juſtice as he has done injury to Homer; but he looked upon himſelf as born for much greater things than treading in the ſteps of his predeceſſors. He was for ſtriking out new paths in ſcience, government, and religion; and for removing the land-marks of former ages. His ethics have a ſtrong tendency to corrupt our morals, and his politics to deſtroy that liberty which is the birthright of every human creature. He is commonly repreſented as a ſceptic in religion, and a dogmatiſt in philoſophy; but he was a dogmatiſt in both. The main principles of his Leviathan are as little founded in moral or evangelical truths, as the rules he has laid down for ſquaring the circle are in mathematieal demonſtration. His book on human nature is eſteemed the beſt of his works.

HOBBY, the name of a hawk called by ſome authors *ſubbuteo*. See Falco.

It is a hawk of the lure, and not of the fiſt; and is very like the ſaker, only much leſs. It makes excellent ſport with net and ſpaniels; for when the birds ſee the hobby, they dare not commit themſelves to the wing, but lie cloſe to the ground, and ſo are taken in nets.

HODY (Humphry), a learned Engliſh divine, was born in 1659. At 21 years of age, he publiſhed his celebrated *Diſſertation againſt Ariſtæus's hiſtory of the 70 interpreters;* which was received with great applauſe by all the learned, Iſaac Voſſius excepted, who could not bear to have his opinions oppoſed by ſuch a youth. Twenty years after, he treated the ſubject more fully in his *De Bibliorum textibus originalibus, verſionibus Græcis & Latina vulgata, libri IV.* In 1689, he wrote the *Prologomena* to John Melala's Chronicle, printed at Oxford; and the year after was made chaplain to Dr Stillingfleet, biſhop of Worceſter. The deprivation of the nonjuring biſhops engaged him in a controverſy with Mr Dodwell; which recommended him to archbiſhop Tillotſon, to whom, and his ſucceſſor Dr Teniſon, he was domeſtic chaplain. In 1698, he was made regius profeſſor of the Greek tongue at Oxford, and archdeacon of Oxford in 1704. On occaſion of the controverſy about the convocation, he in 1701 publiſhed *A hiſtory of Engliſh councils and convocations, and of the clergy's ſitting in parliament, &c.* He died in 1706, leaving in MS. *An account of thoſe learned Grecians who retired to Italy on the taking of Conſtantinople, &c.* which was publiſhed in 1742 by Dr Jebb.

HOE, in country affairs, a tool made like a cooper's adze, to cut up weeds in gardens, &c. This tool is commonly called the *hand-hoe*.

Hoeing, according to Tull, is the breaking and dividing the ſoil by tillage, whilſt the corn and other plants are growing thereon.—It differs from common tillage (which is always performed before the corn or plants are ſown or planted), in the time of performing it, and it is much more beneficial to the crops than any other tillage. See Agriculture, n° 171—175.

HOEMATOPUS, in ornithology, a genus of birds, of the order of grallæ. It has a long compreſſed bill, with the end cuneated; the noſtrils are linear, and the feet have only three toes. There is but one ſpecies, the oſtralegus, ſea-pie, or oyſter-catcher. They are very common on moſt of our coaſts, feeding on marine inſects, oyſters, limpets, &c. Their bills, which are compreſſed ſideways, and end obtuſely, are very fit inſtruments to inſinuate between the limpet and the rock to which theſe ſhells adhere; which they do with great dexterity, to get at the fiſh. On the coaſt of France, where the tides recede ſo far as to leave the beds of oyſters bare, theſe birds feed on them, forcing the ſhells open with their bills. They keep in ſummer-time in pairs, laying their eggs on the bare ground: they lay four of a whitiſh-brown hue, thinly ſpotted and ſtripped with black; and when any one approaches their young, they make a loud and ſhrill noiſe. In winter, they aſſemble in vaſt flocks, and are very wild. The head, neck, ſcapulars, and coverts of the wings, of this bird are of a fine black;

in ſome the neck is marked with white; the wings duſky, with a broad tranſverſe band of white; the bill three inches long, and of a rich orange colour.

HOFFMAN, the name of ſeveral eminent phyſicians; of whom Maurice Hoffman, and John Maurice Hoffman his ſon, practiſed at Altorf. Maurice died in 1698, leaving behind him many works; and was ſucceeded by his ſon John Maurice, who wrote as well as his father, and died in 1727, highly eſteemed by the faculty.—Frederic Hoffman, probably of the ſame family, was born at Magdeburg in 1660. The principal known circumſtances of his life are, his journey into Holland and England, where he became intimately acquainted with Paul Herman, and Robert Boyle; never taking any fees, being ſupported by his annual ſtipend; his curing the emperor Charles VI. and Frederic I. king of Pruſſia of inveterate diſeaſes; to which may be added, his accurate knowledge of the nature and virtues of mineral waters. He ſurvived his 80th year; and his works, which are in great eſteem, were printed in ſix volumes folio at Geneva, in 1740.

HOG, in zoology. See Sus.

Hog's *Dung* is, by Mortimer, reckoned one of the richeſt manures we are acquainted with, and the next in value to ſheep's dung, and is found to be equal in virtue to twice the quantity of any other dung except this. The ancients ſeem to have been diſpleaſed with it, on account of its breeding weeds; but this is only accuſing it of being too rich, for any dung will do this when laid too thick. It is an excellent manure for paſture-grounds, and excels all other kinds of dung for trees. The farmers who uſe this dung for their lands, generally take care to ſave it, by well-paving the ſtyes; and increaſe the quantity by throwing in bean-ſtalks, ſtubble, and many other things of a like nature: and, by good management of this kind, many farmers have procured 50 or 60 loads of excellent manure a-year out of a ſmall ſtye. The very beſt way of uſing this dung is, by mixing it with horſe-dung; and for this reaſon, it is beſt to have the ſtye near the ſtable, that the two cleanſings may be mixed in one heap, and uſed together.

They have in many parts of Staffordſhire a poor, light, ſhallow land, on which they ſow a kind of white pea: the land is neither able to bear this nor any thing elſe to advantage for their reaping; but, when the peas are ripe, they turn in as many hogs as the quantity of peaſe will fatten, ſuffering them to live at large, and to remain there day and night: in conſequence of this, the land will produce good crops of hay for ſeveral years afterwards; or, if too poor for that, it will at worſt raiſe graſs enough to make it good paſture-ground.

HOGARTH (William), an excellent moral painter, was born in London, in the pariſh of St Bartholomew. His father, being poor, put him apprentice to an engraver of pewter-pots; and in this humble ſituation he paſſed through his time, without ſeeming to have any higher views. His apprenticeſhip was however no ſooner expired, than he purſued every method of improving himſelf in the art of drawing, of which his former maſter had given him but a rude idea. This ambition was productive of diſtreſs; and while he ſpent his time in preparing for his future excellence, he felt all the contempt that indigence could produce. Being one day arreſted by his landlady for the trifling ſum of 20 ſhillings, and being bailed by one of his friends; in order to be revenged on her, he drew her picture in caricatura, and in that ſingle figure gave marks of the dawn of a ſuperior genius. The firſt piece in which he diſtinguiſhed himſelf as a painter, was in the figures of the Wandſworth aſſembly; which are drawn from the life, without any circumſtances of his burleſque manner. His next piece was his Pool of Betheſda, which he preſented to St Bartholomew's hoſpital. His being afterwards employed to draw deſigns for a new edition of Hudibras, proved the firſt opportunity of ſignalizing himſelf in that ſtyle. The Harlot's Progreſs was the firſt of his burleſque pictures, or rather life-pictures; for it is unjuſt to give them the character either of burleſque or groteſque pieces, ſince both the one and the other convey to us a departure from nature, to which Hogarth almoſt always ſtrictly adhered. The ingenious Abbé du Bos has often complained, that no hiſtory-painter of his time went through a ſeries of actions, and thus, like an hiſtorian, painted the ſucceſſive fortunes of an hero from the cradle to the grave. What du Bos wiſhed to ſee done, Hogarth performed. In the above piece, he lanches out his young adventurer a ſimple girl upon the town, and conducts her through all the viciſſitudes of wretchedneſs, to a premature death. This was painting to the reaſon and to the heart; none had ever before made the art ſubſervient to the purpoſes of morality and inſtruction: a book like this is fitted to every ſoil and every obſerver, and he that runs may read. The Rake's Progreſs ſucceeded the former; which, though not equal to it, came ſhort only of that ſingle excellence, in which no other could come near him in that way. It conſiſts of eight prints; and, like the former, it exhibits a complete hiſtory adapted to anſwer the moſt moral purpoſes: as is alſo his marriage A-la-mode, in ſix prints; and The Effects of Idleneſs and Induſtry, exemplified in the conduct of two fellow-apprentices, in 12 prints, &c.—Mr Hogarth travelled with ſeveral of his companions to Paris; but had no ſooner landed at Calais, than, attempting to draw the gate of that city, he was taken into cuſtody, on ſuſpicion of his being a ſpy. He was ſoon ſet at liberty: but the reſentment he felt on this occaſion, induced him to deſign the ſatyrical print called *the Gate of Calais;* and he never after drew a Frenchman but in caricatura. The laſt remarkable circumſtance of his life was his conteſt with Mr Churchill. It is ſaid that both met at Weſtminſter-hall; Hogarth to take by his eye a ridiculous likeneſs of the poet, and Churchill to furniſh a deſcription of the painter. But Hogarth's print of the poet was not much eſteemed, and the poet's letter to him was but little admired. Some pretend, indeed, to ſay that it broke the painter's heart; but this we can from good authority ſay is not true. Indeed the report falls of itſelf; for we may as well ſay, that Hogarth's pencil was as efficacious as the poet's pen, ſince neither long ſurvived the conteſt.

The following character of this artiſt is given by Mr Gilpin in his *Eſſay on Prints.* “The works of this maſter abound in true humour; and ſatire, which is generally well-directed: they are admirable moral leſſons, and a fund of entertainment ſuited to every taſte; a circumſtance, which ſhews them to be juſt copies of nature. We may conſider them too as valuable repoſitories of the manners, cuſtoms, and dreſſes of the preſent age. What a fund of entertainment would a collection of this kind afford, drawn from every period of the hiſtory of Britain?—How far the works of Hogarth will bear a *critical examination*, may be the ſubject of a little more inquiry.

“ In *deſign*, Hogarth was ſeldom at a loſs. His invention was fertile; and his judgment accurate. An improper incident is rarely introduced; a proper one rarely omitted. No one could tell a ſtory better; or make it, in all its circumſtances, more intelligible. His genius, however, it muſt be owned, was ſuited only to *low* or *familiar* ſubjects. It never ſoared above *common* life: to ſubjects naturally ſublime, or which, from antiquity or other accidents, borrowed dignity, he could not riſe.

“ In *compoſition* we ſee little in him to admire. In many of his prints the deficiency is ſo great, as plainly to imply a want of all principle; which makes us ready to believe, that when we do meet with a beautiful group, it is the effect of chance. In one of his minor works, the Idle Prentice, we ſeldom ſee a crowd more beautifully managed than in the laſt print. If the ſheriff's officers had not been placed in a line, and had been brought a little lower in the picture, ſo as to have formed a pyramid with the cart, the compoſition had been unexceptionable; and yet the firſt print of this work is ſuch a ſtriking inſtance of diſagreeable compoſition, that it is amazing how an artiſt who had any idea of beautiful forms, could ſuffer ſo unmaſterly a performance to leave his hands.

“ Of the *diſtribution of light* Hogarth had as little knowledge as of *compoſition*. In ſome of his pieces we ſee a good effect; as in the *Execution* juſt mentioned: in which, if the figures at the right and left corners had been *kept down* a little, the light would have been beautifully diſtributed on the fore-ground, and a fine ſecondary light ſpread over part of the crowd. But at the ſame time there is ſo obvious a deficiency in point of effect, in moſt of his prints, that it is very evident he had no principles.

“ Neither was Hogarth a maſter in *drawing*. Of the muſcles and anatomy of the head and hands he had perfect knowledge; but his trunks are often badly moulded, and his limbs ill ſet on: yet his figures, upon the whole, are inſpired with ſo much life and meaning, that the eye is kept in good-humour, in ſpite of its inclination to find fault.

“ The author of the *Analyſis of beauty*, it might be ſuppoſed, would have given us more inſtances of *grace* than we find in the works of Hogarth; which ſhews ſtrongly, that theory and practice are not always united. Many opportunities his ſubjects naturally afford of introducing graceful attitudes; and yet we have very few examples of them. With inſtances of pictureſque grace his works abound.

“ Of his *expreſſion*, in which the force of his genius lay, we cannot ſpeak in terms too high. In every mode of it he was truly excellent. The paſſions he thoroughly underſtood; and all the effects which they produce in every part of the human frame: he had the happy art alſo of conveying his ideas with the ſame preciſion with which he conceived them.—He was excellent too in expreſſing any humorous oddity which we often ſee ſtamped upon the human face. All his heads are caſt in the very mould of nature. Hence that endleſs variety, which is diſplayed through his works; and hence it is, that the difference ariſes between *his* heads, and the affected caricaturas of thoſe maſters who have ſometimes amuſed themſelves with patching together an aſſemblage of features from their own ideas. Such are Spaniolet's; which, though admirably executed, appear plainly to have no archetypes in nature. Hogarth's, on the other hand, are collections of natural curioſities. The *Oxford-heads*, the *Phyſician's-arms*, and ſome of his other pieces, are expreſsly of this humorous kind. They are truly comic, though ill-natured effuſions of mirth: more entertaining than Spaniolet's, as they are pure nature; but leſs innocent, as they contain ill-directed ridicule.—But the ſpecies of expreſſion in which this maſter perhaps moſt excels, is that happy art of catching thoſe peculiarities of art and geſture which the ridiculous part of every profeſſion contract, and which for that reaſon become characteriſtic of the whole. His counſellors, his undertakers, his lawyers, his uſurers, are all conſpicuous at ſight. In a word, almoſt every profeſſion may ſee in his works, that particular ſpecies of affectation which they ſhould moſt endeavour to avoid.

“ The *execution* of this maſter is well ſuited to his ſubjects, and manner of treating them. He etches with great ſpirit, and never gives one unneceſſary ſtroke.”

HOGSHEAD, in commerce, a meaſure of capacity containing 63 gallons.

HOGUE, a town and cape on the north-weſt point of Normandy in France; near which admiral Rook burnt the French admiral's ſhip called the *Riſing Sun*, with 12 more large men of war, the day after the victory obtained by admiral Ruſſell near Cherburgh, in May 1692. W. Long. 2. 0. N. Lat. 49. 50.

HOKE-TIDE, a ſolemn feſtival celebrated for many ages in England, in memory of the great ſlaughter of the Danes in the time of king Ethelred, they having been in that reign almoſt all deſtroyed in one day in the different parts of the kingdom, and that principally by the women. This is ſtill kept up in ſome counties, and the women bear the principal ſway in it, ſtopping all paſſengers with ropes and chains, and exacting ſome ſmall matter to make merry with.

HOLBEIN (Hans), a celebrated painter, born at Baſil in Switzerland in 1498, learned the rudiments of his art from his father, who was a painter; but ſoon ſhewed his ſuperior genius. In the town-houſe of Baſil he painted our Saviour's Paſſion; and in the fiſh-market of the ſame city, Death's dance, and a dance of peaſants, which were extremely admired; and Eraſmus was ſo pleaſed with them, that he deſired him to draw his picture, and was ever after his friend. He ſtaid ſome years longer at Baſil, till his neceſſities, occaſioned by his own extravagance and an increaſing family, made him comply with Eraſmus's perſuaſions to go to England. In his journey he ſtaid ſome days at Straſburg, where it is ſaid he applied to a very great painter for work, who took him in, and ordered him to give a ſpecimen of his ſkill. On which Holbein finiſhed a piece with great care, and painted a fly on the moſt eminent part of it; after which he privately withdrew in the abſence of his maſter, and purſued his journey, without ſaying any thing to any body. When the painter returned home, he was aſtoniſhed at the beauty and elegance of the drawing; and eſpecially at the fly, which he at firſt took for a real one, and endeavoured to remove it with his hand. He now ſent all over the city for his journeyman; but after many inquiries, diſcovered that he had been thus deceived by the famous Holbein.

Holbein having in a manner begged his way to England, preſented a letter of recommendation from Eraſmus to Sir Thomas More, and alſo ſhewed him Eraſmus's picture. Sir Thomas, who was then lord-chancellor, received him with all the joy imaginable, and kept him in his houſe between two and three years, in which time he drew Sir Thomas's picture, and thoſe of many of his relations and friends. Holbein one day happening to mention a nobleman who had ſome years before invited him to England, Sir Thomas was very ſolicitous to know who it was. Holbein ſaid that he had forgot his title, but remembered his face ſo well, that he believed he could draw his likeneſs; which he did ſo perfectly, that the nobleman it is ſaid was immediately known by it. The chancellor having now adorned his apartments with the productions of this great painter, reſolved to introduce him to Henry VIII. For this purpoſe, he invited that prince to an entertainment; having, before he came, hung up all Holbein's pieces in the great hall, in the beſt order, and placed in the beſt light. The king, on his firſt entrance into this room, was ſo charmed with the ſight, that he aſked whether ſuch an artiſt was now alive, and to be had for money? Upon this, Sir Thomas preſented Holbein to his majeſty; who immediately took him into his ſervice, and brought him into great eſteem with the nobility and gentry; by which means he drew a vaſt number of portraits.

But while he was here, there happened an affair which might have proved fatal to him, had he not been protected by the king. On the report of this painter's character, a lord of the firſt quality came to ſee him, when he was drawing a figure after the life. Holbein ſent to deſire his lordſhip to defer the honour of his viſit to another day; which the nobleman taking for an affront, broke open the door, and very rudely went up ſtairs. Holbein hearing a noiſe, came out of his chamber, and meeting the lord at his door, fell into a violent paſſion, and puſhed him backwards from the top of the ſtairs to the bottom. However, immediately reflecting on what he had done, he eſcaped from the tumult he had raiſed, and made the beſt of his way to the king. The nobleman, much hurt, though not ſo much as he pretended, was there ſoon after him; and upon opening his grievance, the king ordered Holbein to aſk his pardon. But this only irritated the nobleman the more, who would not be ſatisfied with leſs than his life; upon which the king ſternly replied, "My lord, you have not now to do with Holbein, but with me; whatever puniſhment you may contrive by way of revenge againſt him, ſhall certainly be inflicted on yourſelf. Remember, pray, my lord, that I can, whenever I pleaſe, make ſeven lords of ſeven ploughmen, but I cannot make one Holbein of even ſeven lords." Holbein died of the plague at his lodgings at Whitehall, in 1554. "It is amazing (ſays De Piles), that a man born in Switzerland, and who had never been in Italy, ſhould have ſo good a *guſto*, and ſo fine a genius for painting." He painted alike in every manner; in freſco, in water-colours, in oil, and in miniature. His genius was ſufficiently ſhewn in the hiſtorical ſtyle, by two celebrated compoſitions which he painted in the hall of the Stillyard company. He was alſo eminent for a rich vein of invention, which he ſhewed in a multitude of deſigns which he drew for engravers, ſtatuaries, jewellers, &c. and he had this ſingularity, that he painted with his left-hand.

HOLCUS, INDIAN MILLET OR CORN; a genus of the monœcia order, belonging to the polygamia claſs of plants.

Species. Of this genus there are ten ſpecies, two of which are natives of Britain. The moſt remarkable of theſe is the lanatus, or creeping ſoft-graſs of Hudſon; for the deſcription and properties of which, ſee AGRICULTURE, nº 57. The moſt remarkable of the foreign ſpecies is the ſorghum, or Guinea-corn. The ſtalks are large, compact, and full eight feet high. In Senegal the fields are entirely covered with it. The negroes, who call it *guiarnot*, cover the ears when ripe with its own leaves to ſhelter it from the ſparrows, which are very miſchievous in that country. The grain made into bread, or otherwiſe uſed, is eſteemed very wholeſome. With this the ſlaves in the Weſt Indies are generally fed, each being allowed from a pint to a quart every day. The juice of the ſtalks is ſo agreeably luſcious, that, if prepared as the ſugar-canes, they would afford an excellent ſugar. The negroes on the coaſt of Guinea make of two kinds of millet a thick-grained pap called *couſcous*, which is their common food.

HOLD, the whole interior cavity or belly of a ſhip, or all that part of her inſide which is comprehended between the floor and the lower-deck thoughout her whole length.—This capacious apartment uſually contains the ballaſt, proviſions, and ſtores of a ſhip of war, and the principal part of the cargo in a merchantman. The diſpoſition of theſe articles with regard to each other, naturally falls under conſideration in the article STOWAGE; it ſuffices in this place to ſay, that the places where the ballaſt, water, proviſions, and liquors are ſtowed, are known by the general name of the *hold*. The ſeveral ſtore-rooms are ſeparated from each other by *bulk-heads*, and are denominated according to the articles which they contain, the *ſail-room*, the *bread-room*, the *fiſh-room*, the *ſpirit-room*, &c.

HOLDERNESS, a peninſula in the eaſt-riding of Yorkſhire, having the German ſea on the eaſt, and the Humber on the ſouth. It has the title of an earldom.

HOLERACEÆ (from *holus*, "pot-herbs"). The name of the 12th order in Linnæus's fragments of a natural method, conſiſting of plants which are uſed for the table, and enter into the œconomy of domeſtic affairs. See BOTANY, p. 1307.

HOLIBUT, in ichthyology. See PLEURONECTES.

HOLIDAY (Dr Barten), a learned divine and poet, was the ſon of a taylor in Oxford, and born there about the year 1593. He ſtudied at Chriſt-church college, and in 1615 took orders. He was before admired for his ſkill in poetry and oratory; and now diſtinguiſhing himſelf by his eloquence and popularity as a preacher, he had two benefices conferred on him in the dioceſe of Oxford. In 1618, he went as chaplain to Sir Francis Stewart, when he accompanied count Gondamore to Spain. Afterwards he became chaplain to the king, and before the year 1626 was promoted to the archdeaconry of Oxford. In 1642 he was made doctor of divinity at Oxford; near which place he ſheltered himſelf during the time of the rebellion; but after the reſtoration returned to his archdeaconry, where he died in 1661. His works are, 1. Twenty ſermons, publiſhed at different times. 2. *Philoſophiæ polito-barbaræ ſpecimen*, quarto. 3. Survey of the world, a poem in ten books, octavo. 4. A tranſlation of the ſatires of Juvenal and Perſius. 5. Technogamia, or the marriage of the arts, a comedy.

HOLINESS, or SANCTITY; the quality which conſtitutes or denominates a perſon or thing *holy*; i. e. pure, or exempt from ſin. The word is alſo uſed in reſpect of perſons and things that are ſacred, *i. e.* ſet apart to the ſervice of God, and the uſes of religion.

HOLINESS, is alſo a title or quality attributed to the pope; as that of *majeſty* is to kings. Even kings, when writing to the pope, addreſs him under the venerable appellation of *Your Holineſs*, or, *Holy Father*; in Latin, *Sanctiſſime* or *Beatiſſime Pater*. Anciently the ſame title was given to all biſhops. The Greek emperors alſo were addreſſed under the title of *Holineſs*, in regard of their being anointed with holy oil at their coronation. De Cange adds, that ſome of the kings of England have had the ſame attribute; and that the orientals have frequently refuſed it to the pope.

HOLINSHED (Raphael), an Engliſh hiſtorian famous for the *Chronicles* under his name, was deſcended from a family that lived at Boſely in Cheſhire; but neither the time of his birth, nor ſcarcely any circumſtances of his life are known. However, he appears to have been a man of conſiderable learning, and to have had a genius particularly adapted for hiſtory. His chronicles of *England*, *Scotland*, and *Ireland*, were firſt publiſhed at London in 1570, in 2 vols folio; and then in 1587, in 3 vols. In this ſecond edition ſeveral ſheets in the 2d and 3d vols were caſtrated for containing ſome paſſages diſagreeable to queen Elizabeth and her miniſters; but the caſtrations have ſince been printed apart. Holinſhed was not the ſole compiler of this work, being aſſiſted in it by ſeveral other hands. The time of his death is unknown; but from his will, which is prefixed to Hearne's edition of *Cambden's Annals*, it appears to have happened between 1578 and 1582.

HOLLAND (Philemond), M. D. commonly called the *Tranſlator general of his age*, was educated in the univerſity of Cambridge. He was for many years a ſchoolmaſter at Coventry, where he alſo practiſed phyſic. He tranſlated Livy, Pliny's Natural Hiſtory, Plutarch's Morals, Suetonius, Ammianus Marcellinus. Xenophon's Cyropædia, and Cambden's Britannia, into Engliſh; and the geographical part of Speed's Theatre of Great Britain, into Latin. The Britannia, to which he made many uſeful additions, was the moſt valuable of his works. It is ſurpriſing, that a man of two profeſſions could find time to tranſlate ſo much; but it appears from the date of the Cyropædia, that he continued to tranſlate till he was 80 years of age. He died in 1636, aged 85. He made the following epigram upon writing a large folio with a ſingle pen:

> With one ſole pen I wrote this book,
> Made of a grey gooſe quill;
> A pen it was when it I took,
> And a pen I leave it ſtill.

HOLLAND, the largeſt of the ſeven United Provinces, divided into South and North Holland, the latter of which is alſo called *Weſt Frieſland*, is bounded on the weſt by the German ocean, or north ſea; to the eaſt by the Zuyder-ſee, the province of Utrecht, and part of Gelderland; to the ſouth by Dutch Brabant and Zealand; and to the north by the Zuyder-ſee. Its greateſt extent from north to ſouth, including the iſland of Texel, is about 90 Engliſh miles; but from eaſt to weſt its extent varies from 40 to 25. To defend it againſt the ſea, dykes have been erected at an immenſe expence, and innumerable canals cut to drain it, as being naturally very low and marſhy. Some parts of the province are very fruitful in corn; but the greater part conſiſts of rich paſtures, wherein are kept large herds of kine, which ſupply them with incredible quantities of butter and cheeſe. Of the latter, that of Edam, in North Holland, is highly eſteemed. The many rivers and canals that interſect the province are of great advantage to its commerce, but contribute to render the air foggy and unwholeſome. There is a communication by water betwixt almoſt every town and village. Towards the middle alſo of the province are great numbers of turf pits. It is ſo populous, that the number of the inhabitants is computed at 1,200,000. In point of cleanlineſs, no country ſurpaſſes, and few come up to it, eſpecially in North Holland, and that even in the villages. From the counts of Holland this province devolved, in 1436, to the dukes of Burgundy, and from them to the houſe of Auſtria, along with the other provinces. The States of Holland and Weſt Frieſland are compoſed of the nobility and deputies of the towns: of the latter there are 18 that ſend deputies to the aſſembly of the ſtates, which is held at the Hague. The grand penſionary is a perſon of great dignity and weight in this aſſembly, and his office requires extraordinary abilities. There are alſo two councils compoſed of deputies, one for South, and another for North Holland, who have the cognizance of the revenue and military affairs. The whole province ſends one deputy from among the nobleſſe to the ſtates-general, who takes precedence of all others, together with three or four more. There are two ſupreme courts of judicature for Holland and Zealand; viz. the great council of Holland and Zealand, and the hof or court of Holland. To theſe appeals lie from the towns; but the cauſes of noblemen come before them in the firſt inſtance. With reſpect to the eccleſiaſtical government, there is a ſynod held annually both in South and North Holland, of which the former contains eleven claſſes, and the latter ſix; and the miniſters of both together amount to 331. In the whole province are 37 towns, 8 boroughs, and 400 villages.

HOLLAND, one of the diviſions of Lincolnſhire in

England. It ſo much reſembles the province of that name upon the continent, in moſt reſpects, being low and marſhy, with the ſea on one ſide, and canals running through it, that it muſt either have had its name from thence, or on the ſame account. On the eaſt it has what the ancient geographers call *Æſtuarium Metaris*, now the Waſhes, which are overflowed at high water, and part of Cambridgeſhire on the ſouth. The lower part of it is full of bogs and marſhes, and has huge banks to defend it againſt the ſea and land floods. The whole diviſion ſeems to have been gained from the ſea. The ground is ſo ſoft, that horſes are worked unſhod; and it produces plenty of graſs, but little corn. Though there are no ſtones to be found in or upon the ground, yet the churches are all of ſtone. They have no freſh water but from the clouds, which is preſerved in pits: but if theſe are deep, it ſoon turns brackiſh; and if they are ſhallow, they ſoon become dry.

New HOLLAND, the largeſt iſland in the world, reaching from 10 to 44 deg. S. lat. and between 110 and 154 of E. long. eaſt from London. It received its name from having been chiefly explored by Dutch navigators. The land firſt diſcovered in thoſe parts was called *Eendraght* (Concord) *Land*, from the name of the ſhip on board which the diſcovery was made, in 1616; 24 deg. and 25 deg. ſouth. In 1618, another part of this coaſt, nearly in 15 deg. ſouth, was was diſcovered by Zeachen, who gave it the name of *Arnheim* and *Diemen;* though a different part from what afterwards received the name of Diemen's Land from Taſman, which is the ſouthern extremity, in latitude 43 deg. In 1619, Jan Van Edels gave his name to a ſouthern part of New-Holland. Another part, ſituated between 30 and 33 deg. received the name of *Leuwen*. Peter Van Nuitz gave his name, in 1627, to a coaſt which communicates to Leuwen's Land towards the weſtward; and a part of the weſtern coaſt, near the tropic of Capricorn, bore the name of *De Wits*. In 1628, Peter Carpenter, a Dutchman, diſcovered the great gulph of Carpentaria, between 10 and 20 deg. ſouth. In 1687, Dampier, an Engliſhman, ſailed from Timor, and coaſted the weſtern parts of New-Holland. In 1699, he left England, with a deſign to explore this country, as the Dutch ſuppreſſed whatever diſcoveries had been made by them. He ſailed along the weſtern coaſt of it, from 28 to 15 deg. He ſaw the land of Eendraght and of De Wit. He then returned to Timor: from whence he went out again, examined the iſles of Papua, coaſted New-Guinea, diſcovered the paſſage that bears his name; called a great iſland which forms this paſſage, or ſtrait, on the eaſt ſide, *New-Britain;* and ſailed back to Timor along New-Guinea. This is the ſame Dampier who, between 1683 and 1891, ſailed round the world by changing his ſhips. This immenſe iſland, which many late writers have ſtyled a continent from its extent, which is more than equal to the habitable parts of the continent of Europe, has been explored on the eaſtern coaſt with great perſeverance and peril by captain Cook, in the Endeavour bark, 1770, to which he gave the name of *New South-Wales*. Captain Furneaux, in the Adventure, attempted to diſcover the connection which Van Diemen's land bears to New-Holland; but the tempeſtuous weather which he had to conflict with baffled all his attempts, and he was forced (not poſſeſſing the ſame ardour as his leader) to leave that point in the ſame indeterminate ſtate as Taſman had before tranſmitted it. As this coaſt was explored to a very great extent, without much time being ſpent on any part of the country, or any friendly intercourſe being eſtabliſhed with the inhabitants, we ſhall follow the ſhip in its progreſs along the eaſtern coaſt, after deſcribing the country and its inhabitants as fully as the lights which are thrown upon them will enable us.

This country is not mountainous; but chiefly conſiſts of valleys and plains, rather barren than fruitful. The face of the country is much the beſt to the ſouthward, the trees being taller, and the herbage richer; but no underwood was ſeen any where. The whole eaſtern coaſt is well watered by brooks and ſprings, but there are no great rivers. There are but two ſorts of timber-trees, the gum-tree, and a kind of pine. Here is the palm-tree of three ſorts. Though this country affords very few eſculent plants, yet it abounds with ſuch as gratify the curioſity of the naturaliſt. Here is an animal reſembling a polecat, which the natives call *quoll;* the back is brown, ſpotted with white, and the belly unmixed white. Here are many kinds of bats; alſo gulls, ſhags, ſoland geeſe or gannets of two ſorts, boobies, noddies, curlieus, ducks, pelicans of an enormous ſize, among the water-fowl; crows, parrots, paroquets, cockatoos, and other birds of the ſame kind, of exquiſite beauty, pigeons, droves, quails, buſtards, herons, cranes, hawks, and eagles, among the land-birds. Here are ſerpents, ſome of which are venomous, others harmleſs; ſcorpions, centipedes, and lizards. The moſt remarkable inſect found in this country is the ant, of which there are ſeveral ſorts. One is green, and builds its neſt upon trees: Theſe wonderful inſects form their neſts by bending down ſeveral leaves, each of which is as broad as a man's hands, and gluing the points of them together, ſo as to form a purſe. The viſcus uſed for this purpoſe is an animal-juice which nature has enabled them to elaborate. Thouſands of theſe buſy inſects were ſeen uniting all their ſtrength to hold the leaves in this poſition, while other buſy multitudes were employed within, in applying the gluten that was to prevent their returning back. "To ſatisfy ourſelves, (ſays captain Cook), that the leaves were bent and held down by the effort of theſe diminutive artificers, we diſturbed them in their work; and as ſoon as they were driven from their ſtation, the leaves on which they were employed ſprung up with a force much greater than we could have thought them able to conquer by any combination of their ſtrength. But tho' we gratified our curioſity at their expence, the injury did not go unrevenged; for thouſands immediately threw themſelves upon us, and gave us intolerable pain with their ſtings, eſpecially thoſe which took poſſeſſion of our necks and our hair, from whence they were not eaſily driven. The ſting was ſcarcely leſs painful than that of a bee; but except it was repeated, the pain did not laſt more than a minute." Another kind burrows in the root of a plant which grows on the bark of trees, in the manner of miſletoe. This root is commonly as big as a large turnip; when cut, it appears interſected by innumerable winding paſſages,

ges, all filled with theſe animals; but notwithſtanding, the vegetation of the plant ſuffers no injury. The inſects are very ſmall, not more than half as big as the common red ant in England. Their ſtings give no pain; but, by running about on the hands, and ſuch parts of the body where they light, produce a titillation more intolerable than pain, if not excruciating. There is ſtill another ſort, poſſeſſing no power of tormenting; they reſemble the white ants of the Eaſt-Indies. Theſe conſtruct neſts on the branches of trees, three or four times as big as a man's head: the materials of theſe houſes ſeem to be formed of ſmall parts of vegetables kneaded together with a glutinous matter, with which nature has probably furniſhed them. Upon breaking the outſide cruſt of this dwelling, innumerable cells, ſwarming with inhabitants, appear in a great variety of winding directions, all communicating with each other, and with ſeveral apertures that lead to other neſts upon the ſame tree. They have alſo another houſe built upon the ground, generally at the root of a tree: it is formed like an irregularly ſided cone; and ſometimes is more than ſix feet high, and nearly as much in diameter. The outſide of theſe is of well-tempered clay, about two inches thick; and within are the cells, which have no opening outward. Between theſe two dwellings, one of which is their ſummer and the other their winter reſidence, there is a communication by a large avenue, or covered way, leading to the ground, and by a ſubterranean paſſage. The ſtructures on the ground are proof againſt any wet that can fall, which thoſe on the trees are not, from the nature and thinneſs of their cruſt or wall.—The fiſh here are of kinds unknown to Europe, except the mullet, and ſome of the ſhell-fiſh. Upon the ſhoals and reef are great quantities of the fineſt green turtle in the world, and oyſters of various kinds, particularly the rock-oyſter and the pearl-oyſter. In the rivers and ſalt creeks are aligators.

This extenſive country appears to be very thinly inhabited: the natives never appeared in larger companies than thirty together. The inland parts are moſt probably quite uninhabited, as no part of the coaſt which was viſited had any appearance of cultivation, and the miſerable natives drew their ſubſiſtence from the ſea. The only tribe with which any intercourſe was eſtabliſhed, conſiſted of twenty-one perſons; twelve men, ſeven women, a boy and a girl. The women were never ſeen but at a diſtance; for when the men croſſed the river to the ſhip, they left them behind. The men are of a middle ſize, and in general well made, clean-limbed, and remarkably vigorous, active, and nimble: their countenances were not altogether without expreſſion, and their voices are remarkably ſoft and effeminate. They encruſt their bodies with dirt, which makes them appear as black as negroes; their hair, which naturally grows long and black, they crop ſhort; their beards grow buſhy and thick, but they keep them ſhort by ſinging them. Neither ſex have any ſenſe of indecency in diſcovering their whole body. Here they perforate the cartilage that divides the noſtrils from each other, through which they thruſt a bone, which is as thick as a man's finger, and between five and ſix inches long; it reaches quite acroſs the face, and ſo effectually ſtops up both the noſtrils, that they are forced to keep their mouths wide open for breath, and ſnuffle ſo when they attempt to ſpeak, that they are ſcarcely intelligible even to each other. Beſides this noſe-jewel, they have necklaces made of ſhells, very neatly cut and ſtrung together; bracelets of ſmall cord, wound two or three times round the upper part of their arm, and a ſtring of plaited human hair, about as thick as a thread of yarn, tied round the waiſt. Beſides theſe, ſome of them had gorgets of ſhells hanging round the neck, ſo as to reach croſs the breaſt. They paint their bodies both white and red, and draw a circle of white round each eye. They have holes in their ears, but were not ſeen to wear any thing in them. They were ſo attached to their own ornaments, that they preferred them to any beads and ribbons that were offered them, though more ſhowy, and regularly made. They received the things that were given them, but were inſenſible to all the ſigns which were made them that ſomething was expected in return. Many of the trinkets that had been given them were afterwards found thrown negligently away in the woods, like the playthings of children, which pleaſe only while they are new. The bodies of many were marked with large ſcars, which appeared to be the remains of wounds that they had inflicted on themſelves with ſome blunt inſtrument, and which they ſignified by ſigns to have been memorials of grief for the dead. There was no appearance of a town or village in the whole country. Their houſes are formed without art or induſtry; ſome of them were juſt high enough for a man to ſtand upright in, but not large enough for him to extend his whole length in any direction: they are built with pliable rods, about as thick as a man's finger, in the form of an oven, by ſticking the two ends into the ground, and covering them with palm-leaves and broad pieces of bark: the door is nothing but a large hole at one end. Under theſe houſes or ſheds they ſleep, coiled up with their heels to their heads; in which poſition one ſhed will hold three or four perſons: towards the northward, as the climate becomes hotter, theſe ſheds were conſtructed much ſlighter: one ſide was entirely open, and none of them were more than four feet deep. Theſe hovels were ſet up occaſionally by a wandering hord, in any place that would furniſh them for a time with ſubſiſtence, and left behind them when they removed to another ſpot. When they mean to continue only a night or two at one place, they ſleep without any ſhelter except the buſhes and graſs, the latter of which is near two feet high. They have a veſſel to hold the water they fetch from ſprings, made of bark, only by tying up the two ends with a withy, which not being cut off, ſerves for a handle. They have a ſmall bag, about the ſize of a moderate cabbage-net, which the men carry upon their back by a ſtring which paſſes over their heads. It generally contains a lump or two of paint and reſin, ſome fiſh-hooks and lines, a ſhell or two, out of which their hooks are made, a few points of darts, and their uſual ornaments; which is an inventory of the whole worldly treaſure of the richeſt man among them. Their fiſhhooks are very neatly made, and ſome of them are extremely ſmall. For ſtriking turtle, they have a peg of wood, which is about a foot long, and very well bearded; this fits into a ſocket at the end of a ſtaff of light wood, about as thick as a man's wriſt, and about ſeven or eight feet long. To the ſtaff is tied one end of a looſe line, about three or four fathoms long, the other end of which is faſtened to the peg. To ſtrike the turtle, the peg is fixed into the ſocket; and when it has entered his body, and is retained there by the barb, the ſtaff flies off, and ſerves for a float to trace their victim in the water. It aſſiſts alſo to tire him, till they can overtake him with their canoes, and haul him aſhore. One of theſe pegs was found buried in the body of a turtle, which had healed up over it. Their lines are made of the fibres of a vegetable, and are from the thickneſs of a half-inch rope to the fineneſs of a hair. They are unacquainted with the uſe of nets in fiſhing; and can only catch fiſh by ſtriking them, or with a hook and line, or groping for them in the hollows of the rocks and ſhoals, which are dry at half-ebb. They bake their proviſions by the help of hot ſtones, like the inhabitants of the South-ſea iſlands. They produce fire with great facility, and ſpread it in a wonderful manner. To produce it, they take two pieces of dry, ſoft wood; one is a ſtick about eight or nine inches long, the other piece is flat. The ſtick they ſhape into an obtuſe point at one end; and preſſing it upon the other, turn it nimbly, by holding it between both their hands, as we do a chocolate-mill; often ſhifting their hands up, and then moving them down upon it, to increaſe the preſſure as much as poſſible. By this method they get fire in leſs than two minutes, and from the ſmalleſt ſpark they increaſe it with great ſpeed and dexterity. "We have often ſeen (ſays captain Cook) one of them run along the ſhore, to all appearance with nothing in his hand, who ſtooping down for a moment, at the diſtance of every fifty or an hundred yards, left fire behind him, as we could ſee, firſt by the ſmoke, and then by the flame along the drift of wood and other litter which was ſcattered along the place. We had the curioſity to examine one of theſe planters of fire when he ſet off, and we ſaw him wrap up a ſmall ſpark in dry graſs, which, when he had run a little way, having been fanned by the air that his motion produced, began to blaze; he then laid it down in a place convenient for his purpoſe, incloſing a ſpark of it in another quantity of graſs, and ſo continued his courſe." Their weapons are ſpears or lances; ſome have four prongs pointed with bone, and barbed. To the northward, the lance has but one point; the ſhaft is made of cane, very ſtraight and light, and from eight to fourteen feet long, conſiſting of ſeveral joints, where the pieces are let into each other and bound together. The points of theſe darts are either of hard heavy wood, or bones of fiſh: thoſe points that are of wood, are alſo ſometimes armed with ſharp pieces of broken ſhells, which were ſtuck in, and at the junctures covered with reſin. The lances which are thus barbed, are indeed dreadful weapons, as they cannot be drawn out of a wound without tearing away the fleſh, or leaving the ſharp ragged ſplinters of the bone or ſhell which forms the barb behind them in the wound. The canoes to the northward are not made of bark, but of the trunk of a tree, hollowed probably by fire: none of theſe boats will carry more than four people. The only tools ſeen among them were, an adze wretchedly made of ſtone, ſome ſmall pieces of the ſame ſubſtance in form of a wedge, a wooden mallet, and ſome ſhells and fragments of coral. It is difficult to account for the ſmall number of the human ſpecies which are found diſperſed over this country; whether they are thinned by civil broils, excited by the horrid appetite for devouring each other that prevails in New Zeeland, or that their population is prevented by any other cauſes, cannot be aſcertained. Their total ignorance of every method to procure the comforts of life, both from the cultivation of the ground, and furniſhing materials for clothing and fiſhing, place them among the loweſt of the human ſpecies.

Holland in commerce, a fine and cloſe kind of linen, ſo called from its being firſt manufactured in Holland.

HOLLAR (Wenceſlaus), a celebrated engraver, born at Prague, in 1607. He employed himſelf chiefly in copying portraits; and his delicate little views of many of the cities in Germany, got him ſuch reputation, that the earl of Arundel our ambaſſador at the Imperial court brought him over to England. Here he executed ſeveral plates from the fine Arundelian collection of paintings, engraved many landſcapes and views about London, and of London itſelf, as well before as after the great fire: but it being his fate to work chiefly for printſellers and bookſellers, in a ſtate of ſubordination, more for the profit of his employers than for himſelf; ſo he could not even in his old age keep clear of the encumbrances of debt. About the year 1672, he travelled northward, and took views of towns, caſtles, churches and tombs, that would prove almoſt endleſs to enumerate. Few artiſts have been able to imitate his works, and the lovers of art are always zealous to collect them. It is melancholy to add, that on the verge of his 70th year, he was attached with an execution at his lodgings in Gardener's lane, Weſtminiſter; when he deſired only the liberty of dying in his bed, and that he might not be removed to any other priſon than the grave: a favour which it is uncertain whether he obtained or not. He died, however, in 1677.—The merits of this artiſt are thus characteriſed in the *Eſſay on Prints*: "Hollar gives us views of particular places, which he copies with great truth, unornamented, as he found them. If we are ſatisfied with exact repreſentations, we have them no where better than in Hollar's works: but if we expect pictures, we muſt ſeek them elſewhere. Hollar was an antiquarian, and a draughtſman; but ſeems to have been little acquainted with the principles of painting. Stiffneſs is his characteriſtic, and a painful exactneſs void of taſte. His larger views are mere plans. In ſome of his ſmaller, at the expence of infinite pains, ſomething of an effect is ſometimes produced. But in general, we conſider him as a repoſitory of curioſities, a record of antiquated dreſſes, aboliſhed ceremonies, and edifices now in ruins."

HOLLES (Thomas Pelham), duke of Newcaſtle, was born in 1693, and ſucceeded his father as baron Pelham of Loughton: by the laſt will of his uncle John Holles duke of Newcaſtle, who died in 1711, he was adopted heir to his great eſtate, and empowered to bear the arms and name of *Holles*, together with the title of *duke of Newcaſtle upon Tyne*. His power and intereſt were now very great, and he exerted both in ſupporting George I. againſt the Tory party that oppoſed him. The whole weight of authority had for ſome time been in the hands of the tories at the acceſſion of this king, while the whigs remained without credit or influence: but this ſtate of affairs was now reverſed; and the duke of Newcaſtle, among the reſt, was diſtinguiſhed by the royal favour. He was created duke of Newcaſtle-under-Line, with remainder to the female iſſue of his brother the honourable Henry Pelham; was made lord chamberlain of the king's houſehold, and a knight of the garter; and was one of the peers commiſſioned to ſign the quadruple alliance in 1718. In 1724, he reſigned the place of lord chamberlain, and was appointed ſecretary of ſtate. It would be tedious to trace him farther through his places and honours: it need therefore only be added, that after his long ſervices to the crown, he gave way to lord Bute, who ſucceeded him in 1762 as firſt lord of the treaſury. Quitting now the fatigues of buſineſs, he lived in retirement to his death in 1768, leaving the character of a moſt diſintereſted patriot; having greatly impoveriſhed his private eſtate during his public ſervices, and retiring without accepting any penſion.

HOLLOA, in the ſea-language, an exclamation of anſwer, to any perſon who calls to another to aſk ſome queſtion, or to give a particular order. Thus, if the maſter intends to give any order to the people in the main-top, he previouſly calls, *Main-top, hoay!* to which they anſwer, *Holloa!* to ſhew that they hear him, and are ready. It is alſo the firſt anſwer in hailing a ſhip at a diſtance. See HAILING.

HOLLY, in botany. See ILEX.

Sea-HOLLY. See ERYNGIUM.

HOLM (Sax. *hulmus, inſula amnica*), an iſle or fenny ground, according to Bede; or a river iſland. And where any place is called by that name, and this ſyllable is joined with any other in the names of places, it ſignifies a place ſurrounded with water; as the *Flatholmes* and *Stepholmes* in the Severn near Briſtol: but if the ſituation of the place is not near the water, it may then ſignify a hilly place; *holm*, in Saxon, ſignifying alſo a hill or cliff.

HOLOCAUST, a burnt-offering, or ſacrifice, wholly conſumed by fire: of this kind was the daily ſacrifice in the Jewiſh church. This was done by way of acknowledgment, that the perſon offering and all that belonged to him were the effects of the divine bounty.

HOLOGRAPH, among civilians, a will wholly written by the hand of the teſtator.

HOLSTEIN, a duchy of Germany, bounded by the German ocean on the weſt; the Baltic, or the gulph of Lubeck, on the eaſt; the duchy of Mecklenburg, on the ſouth-eaſt; that of Bremen, with the river Elbe, on the ſouth-weſt; and Lauenburg, with the territory of Hamburg, on the ſouth. Its greateſt length is about 80 miles, and its breadth 60. The dioceſe of Eutin, and the county of Ranzau, though they make a part of the duchy of Holſtein, yet being lands belonging to the empire and circle, ſhall be deſcribed ſeparately.

A great part of this country conſiſts of rich marſhland, which being much expoſed to inundations both from the ſea and rivers, dykes have been raiſed at a great expence, to guard and defend them. The paſtures in the marſhes are ſo rich, that cattle are bred in vaſt numbers and fattened in them, and great quantities of excellent butter and cheeſe made of their milk. They are alſo very fruitful in wheat, barley, peaſe, beans, and rape-ſeed. In the more barren, ſandy, and heathy parts of the country, large flocks of ſheep are bred and fed: nor are orchards wanting, or woods, eſpecially of oak and beech; nor turf, poultry, game, and wild-fowl. Here is a variety both of ſea and river fiſh; and the beef, veal, mutton, and lamb, are very fat and palatable. Holſtein is alſo noted for beautiful horſes. The gentry uſually farm the cows upon their eſtates to a Hollander, as he is called, who for every cow pays from ſix to ten rix-dollars; the owner providing paſture for them in ſummer, and ſtraw and hay in winter. It is no uncommon thing here, to drain the ponds and lakes once in three or four years, and ſell the carp, lampreys, pikes, and perch, found in them; then ſow them for ſeveral years after with oats, or uſe them for paſture; and after that, lay them under water again, and breed fiſh in them. There are hardly any hills in the country; but ſeveral rivers, of which the principal are the Eyder, the Stor, and the Trave. The duchy contains about 30 towns great and ſmall: moſt part of the peaſants are under villenage, being obliged to work daily for their lords, and not even at liberty to quit their eſtates. The nobility and the proprietors of manors are poſſeſſed of the civil and criminal juriſdiction, with other privileges and exemptions. Formerly there were diets, but now they ſeem to be entirely laid aſide: meetings, however, of the nobility are ſtill held at Kiel. The predominant religion here is Lutheraniſm, with ſuperintendencies as in other Lutheran countries. In ſeveral places the Jews are allowed the exerciſe of their religion. At Gluckſtadt, and Altena, are both Calviniſt and Popiſh churches; and at Kiel, a Greek Ruſſian chapel. Beſides the Latin ſchools in the towns, at Altena is a gymnaſium, and at Kiel an univerſity. Notwithſtanding this country's advantageous ſituation for commerce there are few manufactures and little trade in it. Hamburg and Lubec ſupply the inhabitants with what they want from abroad; from whence and Altena, they export ſome grain, malt, grots, ſtarch, buck-wheat, peaſe, beans, rapeſeed, butter, cheeſe, ſheep, ſwine, horned cattle, horſes, and fiſh. The manufactures of the duchy are chiefly carried on at Altena, Kiel, and Gluckſtadt. The duchy of Holſtein, conſiſts of the ancient provinces of Holſtein, Stormar, Ditmarſh, and Wagria. It belongs partly to the king of Denmark, and partly to the dukes of Holſtein Gottorf and Ploen. Anciently the counts of Holſtein were vaſſals of the dukes of Saxony; but afterwards they received the inveſtiture of their territories from the emperor, or the biſhops of Lubec in the emperor's name, though now the inveſtiture is given by the emperor in perſon. The king of Denmark appoints a regency over his part of Holſtein and the duchy of Sleſwick, which has its office at Gluckſtadt. The ſeat of the great duke's privy council, and regency-court, together with the chief conſiſtory, which is united to it, is at Kiel: there are many inferior courts and conſiſtories, from which an appeal lies to the higher. In the duchy of Holſtein, the government of the convents and nobility is alternately in the king and duke, for a year, from Michaelmas to Michaelmas. The perſon in whom the government is lodged, adminiſters it by his regency. In ſome caſes an appeal lies from this court to the Aulic council or chamber at Wetzlar: the convents, the nobility, and the proprietors of manors in the country, have a civil and criminal juriſdiction over their eſtates. The revenues of the ſovereigns ariſe principally from their demeſnes and regalia; beſides which, there is a land and ſeveral other taxes and impoſts. The duke's income, ſetting aſide his ducal patrimony, has been eſtimated at 70,000 or 80,000 pounds. The king uſually keeps here ſome regiments of foot and one of horſe. With reſpect to the duke's military force, it amounts to about 800 men. The king, on account of his ſhare in this country, ſtyles himſelf *duke of Holſtein, Stormar*, and *Ditmarſh*. The dukes, both of the royal and princely houſe, ſtyle themſelves *heirs of Norway, dukes of Sleſwick, Holſtein, Stormar*, and *Ditmarſh*, and counts of *Oldenburg* and *Delmenhorſt*. On account of Holſtein, both the king of Denmark and the grand duke have a ſeat and voice in the college of the princes of the empire, and in that of the circle. Together with Mecklenburg they alſo nominate an aſſeſſor for this circle in the Aulic chamber. The matricular aſſeſſment of the whole duchy is 40 horſe and 80 foot, or 800 florins; to the chamber of Wetzlar both princes pay 189 rix-dollars, 31 kruitzers. In 1735, duke Charles Frederic, of Holſtein Gottorf, founded an order of knighthood here, viz. that of St Anne, the enſign of which is a red croſs, enamelled, and worn pendant at a red ribbon edged with yellow.—The principal places of that part of the duchy belonging to the king of Denmark and the duke of Ploen are Gluckſtadt, Itzhoe, Rendſburg, and Ploen; and that part belonging to the great duke are Kiel, Oldenburgh, Preetz, and Altena.

HOLSTENIUS (Lucas), an ingenious and learned German, born at Hamburg in 1596, was bred a Lutheran; but being converted to popery by father Sirmond the Jeſuit, he went to Rome, and attached himſelf to cardinal Francis Barberini, who took him under his protection. He was honoured by three popes; Urban VIII. gave him a canonry of St Peter's; Innocent X. made him librarian of the Vatican; and Alexander VII. ſent him in 1655 to queen Chriſtina of Sweden, whoſe formal profeſſion of the Catholic faith he received at Inſpruck. He ſpent his life in ſtudy, and was very learned both in ſacred and profane antiquity. He died in 1661; and though he was not the author of any great works, his notes and diſſertations on the works of others have been highly eſteemed for the judgment and preciſion with which they are drawn up.

HOLT (Sir John), knight, eldeſt ſon of Sir Thomas Holt, ſerjeant at law, was born in 1642. He entered himſelf of Gray's Inn in 1658; and applied to the common law with ſo much induſtry, that he ſoon became a very eminent barriſter. In the reign of James II. he was made recorder of London, which office he diſcharged with much applauſe for about a year and a half; but loſt his place for refuſing to expound the law ſuitably to the king's deſigns. On the arrival of the prince of Orange, he was choſen a member of the convention parliament, which afforded him a good opportunity of diſplaying his abilities; ſo that as ſoon as the government was ſettled, he was made lord chief juſtice of the court of king's bench, and a privy counſellor. He continued chief juſtice for 22 years, with great repute for ſteadineſs, integrity, and thorough knowledge in his profeſſion. Upon great occaſions he aſſerted the law with intrepidity, though he thereby ventured to incur by turns the indignation of both the houſes of parliament. He died in 1709, and publiſhed ſome reports.

Holt (Sax.) "a wood;" wherefore the names of towns beginning or ending with *holt*, as *buck-holt*, &c. denote that formerly there was great plenty of wood in thoſe places.

HOLY-GHOST, one of the perſons of the holy Trinity. See God and Trinity.

Order of the Holy-ghost, the principal military order in France, inſtituted by Henry III. in 1569. It conſiſts of 100 knights, who are to make proof of their nobility for three deſcents. The king is the grand-maſter, or ſovereign; and as ſuch, takes an oath, on his coronation-day, to maintain the dignity of the order.

The knights wear a golden-croſs, hung about their necks by a blue ſilk ribbon, or collar. But before they receive the order of the Holy-ghoſt, that of St Michael is conferred as a neceſſary degree; and for this reaſon their arms are ſurrounded with a double collar.

Holyhead, a town and cape of the iſle of Angleſea in Wales, and in the Iriſh channel, where people uſually embark for Dublin, there being three packet-boats that ſail for that city every Monday, Wedneſday, and Friday, wind and weather permitting. It has a very convenient harbour for the northern trade, when taken ſhort by contrary winds. If this was properly repaired, and warehouſes built, it would be very convenient for the Iriſh, to import ſuch of their goods as pay Engliſh duty, it being but a few hours ſail from Dublin. Beſides, the Dublin merchants might come over with the packets, to ſee their goods landed. The commodities are, butter, cheeſe, bacon, wild-fowl, lobſters, crabs, oyſters, razor-fiſh, ſhrimps, herrings, cod-fiſh, whitings, whiting-pollacks, cole-fiſh, ſea-tenches, turbots, ſoles, flounders, rays, and plenty of other fiſh. On the rocks the herb grows of which they make kelp, a fixed ſalt uſed in making glaſs, and in alum works. In the neighbourhood there is a large vein of white fullers earth, and another of yellow which might be uſeful to fullers. On the iſle of Skerries, nine miles to the north, is a light-houſe, which may be ſeen 24 miles off. Large flocks of puffins are often ſeen here; they all come in one night, and depart in the ſame manner. W. Long. 4. 40. N. Lat. 53. 20.

Holy-*Iſland*, a ſmall iſland lying on the coaſt of England, ſix miles ſouth of Berwick, in Northumberland. It is not above two miles and a quarter in length, nor much above a mile in breadth. The ſoil is rocky and full of ſtones, for which reaſon it is thinly peopled: it has but one town, with a church, and a caſtle, under which there is a commodious harbour, defended by a block-houſe.

Holywell, a town of North Wales, in the county of Flint. It is a place of great note, for the well of St Winnifrid, who is reputed a virgin martyr; and it is much frequented by people that come to bathe in it, as well as by popiſh pilgrims out of devotion. The ſpring guſhes forth with ſuch impetuoſity, that at a ſmall diſtance it turns ſeveral mills. Over the ſpring is a chapel built upon pillars, and on the windows are painted the hiſtory of St Winnifrid's life. There is a moſs about the well, which ſome fooliſhly imagine to be St Winnifrid's hair. W. Long. 3. 15. N. Lat. 54. 23.

HOLYOAK (Francis), author of the Latin dictionary, became rector of South-ham in Warwickſhire in 1604; and being greatly eſteemed, was choſen member of the convocation in the firſt year of Charles I.'s reign. He ſuffered much for the king; and died in 1653, aged 87. His ſon Thomas made enlargements to the ſaid Dictionary.

HOLYWOOD (John), or **Halifax**, or *Sacrobosco*, was, according to Leland, Bale, and Pits, born at Halifax in Yorkſhire; according to Stainhurſt, at Holywood near Dublin; and, according to Dempſter and Mackenzie, in Nithſdale in Scotland. The laſt-mentioned author informs us, that, having finiſhed his ſtudies, he entered into orders, and was made a canon regular of the order of St Auguſtin in the famous monaſtery of Holywood in Nithſdale. The Engliſh biographers, on the contrary, tell us, that he was educated at Oxford. They all agree, however, in aſſerting that he ſpent moſt of his life at Paris; where, ſays Mackenzie, he was admitted a member of the univerſity on the fifth of June in the year 1221, under the ſyndics of the Scotch nation; and ſoon after, elected profeſſor of mathematics, which he taught for many years with applauſe. We are told by the ſame author, that he died in 1256, as appears from the inſcription on his monument in the cloiſters of the convent of St Maturine at Paris. Holywood was certainly the firſt mathematician of his time. He was cotemporary with Roger Bacon, but probably older by about 20 years. He wrote, 1. *De ſphæra mundi;* often reprinted, and illuſtrated by various commentators. 2. *De anni ratione, ſeu de computo eccleſiaſtico.* 3. *De algoriſmo*, printed with *Comm. Petri Cirvilli Hiſp.* Paris 1498.

HOMAGE, in law, is the ſubmiſſion, loyalty, and ſervice, which a tenant promiſed to his lord, when he was firſt admitted to the land which he held of the lord in fee: alſo that owing to a king, or to any ſuperior.

HOMBERG (William), a celebrated phyſician, chemiſt, and philoſopher, was the ſon of a Saxon gentleman, and born in Batavia, in the Eaſt Indies, in 1652. His father afterwards ſettling at Amſterdam, William there proſecuted his ſtudies; and from thence removed to Jena, and afterwards to Leipſic, where he ſtudied the law. In 1642, he was made advocate at Magdeburg, and there applied himſelf to the ſtudy of experimental philoſophy. Some time after, he travelled into Italy; and applied himſelf to the ſtudy of medicine, anatomy, and botany, at Padua. He afterwards ſtudied at Bologna; and at Rome learned optics, painting, ſculpture, and muſic. He at length travelled into France, England, and Holland; obtained the degree of doctor of phyſic at Wittemberg; travelled into Germany and the North; viſited the mines of Saxony, Bohemia, Hungary, and Sweden; and returned to France, where he acquired the eſteem of the learned. He was on the point of returning into Germany, when M. Colbert being informed of his merit, made him ſuch advantageous offers, as induced him to fix his reſidence at Paris. M. Homberg, who was already well known for his phoſphorus, for a pneumatic machine of his own invention more perfect than that of Guericke, for his microſcopes, for his diſcoveries in chemiſtry, and for the great number and variety of his curious obſervations, was received into the academy of ſciences in 1691, and had the laboratory of that academy, of which he was one of its principal ornaments. The duke of Orleans, afterwards regent of the kingdom, at length made him his chemiſt, ſettled upon him a penſion, gave him the moſt ſuperb laboratory that was ever in the poſſeſſion of a chemiſt, and in 1704 made him his firſt phyſician. He had abjured the Proteſtant religion in 1682, and died in 1715. There are a great number of learned and curious pieces of his writing, in the memoirs of the academy of ſciences, and in ſeveral journals. He had begun to give the elements of chemiſtry in the memoirs of the academy, and the reſt were found among his papers fit for printing.

Homberg, a town of Germany, in the circle of the Upper Rhine, and landgravate of Heſſe, ſeated ten miles north of Francfort, and gives title to one of the branches of the houſe of Heſſe, who is its ſovereign. E. Long. 8. 24. N. Lat. 50. 20.

Homberg, a town of Germany, in the palatinate of the Rhine, and duchy of Deuxponts. E. Long. 7. 6. N. Lat. 49. 20.

HOMER, the prince of the Greek poets, flouriſhed, according to Dr Blair, about 900 B. C. according to Dr Prieſtley 850, according to the Arundelian marbles 300, after the taking of Troy; and agreeable to them all, above 400 years before Plato and Ariſtotle. Seven cities diſputed the glory of having given him birth, viz. Smyrna, Rhodes, Colophon, Salamis, Chios, Argos, and Athens; which has been expreſſed by the following diſtich:

> *Smyrna, Rhodes, Colophon, Salamis, Chios, Argos, Athenæ;*
> *Orbis de patria certat, Homere, tua.*

We have nothing that is very certain in relation to the particulars of his life. The moſt regular account is that which goes under the name of Herodotus, and is uſually printed with his hiſtory: and though it is generally ſuppoſed to be a ſpurious piece, yet as it is ancient, was made uſe of by Strabo, and exhibits that idea which the later Greeks, and the Romans in the age of Auguſtus, entertained of Homer, we muſt content ourſelves with giving an abſtract of it.

A man of Magneſia, whoſe name was *Menalippus*, went to ſettle at Cumæ, where he married the daughter of a citizen called *Homyres*, and had by her a daughter called *Critheis*. The father and mother dying, the young woman was left under the tuition of Cleonax her father's friend, and ſuffering herſelf to be deluded was got with child. The guardian, though his care had not prevented the misfortune, was however willing to conceal it; and therefore ſent Critheis to Smyrna, which was then building, 18 years after the founding of Cumæ, and about 168 after the taking of Troy. Critheis being near her time, went one day to a feſtival, which the town of Smyrna was celebrating

Homer.

ting on the banks of the river Meles; where her pains coming upon her, ſhe was delivered of Homer, whom ſhe called *Meleſigenes*, becauſe he was born on the banks of that river. Having nothing to maintain her, ſhe was forced to ſpin: and a man of Smyrna called *Phemius*, who taught literature and muſic, having often ſeen Critheis, who lodged near him, and being pleaſed with her houſewifery, took her into his houſe to ſpin the wool he received from his ſcholars for their ſchooling. Here ſhe behaved herſelf ſo modeſtly and diſcreetly, that Phemius married her; and adopted her ſon, in whom he diſcovered a wonderful genius, and the beſt natural diſpoſition in the world. After the death of Phemius and Critheis, Homer ſucceeded to his father-in-law's fortune and ſchool; and was admired, not only by the inhabitants of Smyrna, but by ſtrangers, who reſorted from all parts to that place of trade. A ſhipmaſter called *Mentes*, who was a man of learning and a lover of poetry, was ſo taken with Homer, that he perſuaded him to leave his ſchool, and to travel with him. Homer, who had then begun his poem of the Iliad, and thought it of great conſequence to ſee the places he ſhould have occaſion to treat of, embraced the opportunity. He embarked with Mentes, and during their ſeveral voyages never failed carefully to note down all that he thought worth obſerving. He travelled into Egypt; from whence he brought into Greece the names of their gods, the chief ceremonies of their worſhip, and a more improved knowledge in the arts than what prevailed in his own country. He viſited Africa and Spain; in his return from whence he touched at Ithaca, where he was much troubled with a rheum falling upon his eyes. Mentes being in haſte to take a turn to Leucadia his native country, left Homer well recommended to Mentor, one of the chief men of the iſland of Ithaca, who took all poſſible care of him. There Homer was informed of many things relating to Ulyſſes, which he afterwards made uſe of in compoſing his Odyſſey. Mentes returning to Ithaca, found Homer cured. They embarked together; and after much time ſpent in viſiting the coaſts of Peloponneſus and the iſlands, they arrived at Colophon, where Homer was again troubled with the defluxion upon his eyes, which proved ſo violent, that he is ſaid to have loſt his ſight. This misfortune made him reſolve to return to Smyrna, where he finiſhed his Iliad. Some time after, the ill poſture of his affairs obliged him to go to Cumæ, where he hoped to have found ſome relief. Here his poems were highly applauded: but when he propoſed to immortalize their town, if they would allow him a ſalary, he was anſwered, that "there would be no end of maintaining all the 'Ομηροι, or blind men;" and hence got the name of *Homer*. He afterwards wandered through ſeveral places, and ſtopped at Chios, where he married, and compoſed his Odyſſey. Some time after, having added many verſes to his poems in praiſe of the cities of Greece, eſpecially of Athens and Argos, he went to Samos, where he ſpent the winter, ſinging at the houſes of the great men, with a train of boys after him. From Samos he went to Io, one of the Sporades, with a deſign to continue his voyage to Athens; but landing by the way at Chios, he fell ſick, died, and was buried on the ſea-ſhore.

Homer, Homicide.

The only inconteſtable works which Homer has left behind him are the Iliad and Odyſſey. The Batrachomyomachia, or battle of the frogs and mice, has been diſputed. The hymns have been diſputed alſo, and attributed by the ſcholiaſts to Cynæthus the rhapſodiſt: but neither Thucydides, Lucian, nor Pauſanias, have ſcrupled to cite them as genuine. Many other pieces are aſcribed to him: epigrams, the Eartiges, the Cecropes, the deſtruction of Oechalia, of which only the names are remaining.

Nothing was ever comparable to the clearneſs and majeſty of Homer's ſtyle; to the ſublimity of his thoughts; to the ſtrength and ſweetneſs of his verſes. All his images are ſtriking; his deſcriptions juſt and exact; the paſſions ſo well expreſſed, and nature ſo finely painted, that he gives to every thing motion, life, and action. But he more particularly excels in invention, and in the different characters of his heroes, which are ſo varied, that they affect us in an inexpreſſible manner. In a word, the more he is read by a perſon of good taſte, the more he is admired. Nor are his works to be eſteemed merely as entertaining poems, or as the monuments of a ſublime and varied genius. He was in general ſo accurate with reſpect to coſtume, that he ſeldom mentioned perſons or things that we may not conclude to have been known during the times of which he writes; and it was Mr Pope's opinion, that his account of people, princes, and countries, was purely hiſtorical, founded on the real tranſactions of thoſe times, and by far the moſt valuable piece of hiſtory and geography left us concerning the ſtate of Greece in that early period. His geographical diviſions of that countty were thought ſo exact, that we are told of many controverſies concerning the boundaries of Grecian cities which have been decided upon the authority of his poems.

Alcibiades gave a rhetorician a box on the ear for not having Homer's writings in his ſchool. Alexander was raviſhed with them, and commonly placed them under his pillow with his ſword: he incloſed the Iliad in the precious caſket that belonged to Darius; "in order, (ſaid he to his courtiers,) that the moſt perfect production of the human mind might be incloſed in the moſt valuable caſket in the world." And one day ſeeing the tomb of Achilles in Sigæa, "Fortunate hero! (cried he), thou haſt had a Homer to ſing thy victories!" Lycurgus, Solon, and the kings and princes of Greece, ſet ſuch a value on Homer's works, that they took the utmoſt pains in procuring correct editions of them, the moſt eſteemed of which is that of Ariſtarchus. Didymus was the firſt who wrote notes on Homer; and Euſtathius, archbiſhop of Theſſalonica, in the 12th century, is the moſt celebrated of his commentators. Mr Pope has given an elegant tranſlation of the Iliad, adorned with the harmony of poetic numbers; and Mad. Dacier has tranſlated both the Iliad and Odyſſey in proſe. But thoſe who deſire to know the ſeveral editions of Homer, and the writers who have employed themſelves on the works of that great poet, may conſult Fabricius, in the firſt volume of his *Bibliotheca Græca*.

HOMICIDE, ſignifies in general, the taking away of any perſon's life. It is of three kinds; *juſtifiable*, *excuſable*, and *felonious*. The firſt has no ſhare of guilt at all; the ſecond very little; but the third is the higheſt crime againſt the law of nature, that man is capable of committing.

I. Juſtifiable homicide is of divers kinds.

1. Such as is owing to ſome unavoidable *neceſſity*, without any will, intention, or deſire, and without any inadvertence or negligence, in the party killing, and therefore without any ſhadow of blame; as, for inſtance, by virtue of ſuch an office as obliges one, in the execution of public juſtice, to put a malefactor to death, who hath forfeited his life by the laws and verdict of his country. This is an act of neceſſity, and even of civil duty; and therefore not only juſtifiable, but commendable, where the law requires it. But the law muſt *require* it, otherwiſe it is not juſtifiable: therefore wantonly to kill the greateſt of malefactors, a felon or a traitor, attainted or outlawed, deliberately, uncompelled, and extrajudicially, is murder. And farther, if judgment of death be given by a judge not authorized by lawful commiſſion, and execution is done accordingly, the judge is guilty of murder. Alſo ſuch judgment, when legal, muſt be executed by the proper officer, or his appointed deputy; for no one elſe is *required* by law to do it, which requiſition it is that juſtifies the homicide. If another perſon doth it of his own head, it is held to be murder: even though it be the judge himſelf. It muſt farther be executed, *ſervato juris ordine*; it muſt purſue the ſentence of the court. If an officer beheads one who is adjudged to be hanged, or *vice verſa*, it is murder: for he is merely miniſterial, and therefore only juſtified when he acts under the authority and compulſion of the law. But, if a ſheriff changes one kind of puniſhment for another, he then acts by his own authority, which extends not to the commiſſion of homicide: and beſides, this licence might occaſion a very groſs abuſe of his power. The king indeed may remit part of a ſentence, as in the caſe of treaſon, all but the beheading: but this is no change, no introduction of a new puniſhment; and in the caſe of felony, where the judgment is *to be hanged*, the king (it hath been ſaid) cannot legally order even a peer to be beheaded.

Again: In ſome caſes homicide is juſtifiable, rather by the *permiſſion*, than by the abſolute *command*, of the law: either for the *advancement* of public *juſtice*, which without ſuch indemnification would never be carried on with proper vigour; or, in ſuch inſtances where it is committed for the *prevention* of ſome atrocious *crime*, which cannot otherwiſe be avoided.

2. Homicides, committed for the *advancement* of public *juſtice*, are, 1. Where an officer, in the execution of his office, either in a civil or criminal caſe, kills a perſon that aſſaults and reſiſts him. 2. If an officer, or any private perſon, attempts to take a man charged with felony, and is reſiſted; and, in the endeavour to take him, kills him.. 3. In caſe of a riot, or rebellious aſſembly, the officers endeavouring to diſperſe the mob are juſtifiable in killing them, both at common law, and by the riot act, 1 Geo. I. c. 5. 4. Where the priſoners in a gaol, or going to gaol, aſſault the the gaoler or officer, and he in his defence kills any of them, it is juſtifiable, for the ſake of preventing an eſcape. 5. If treſpaſſers in foreſts, parks, chaſes, or warrens, will not ſurrender themſelves to the keepers, they may be ſlain; by virtue of the ſtatute 21 Edward I. ſt. 2. *de malefactoribus in parcis*, and 3 & 4 W. & M. c. 10. But, in all theſe caſes, there muſt be an apparent neceſſity on the officer's ſide; viz. that the party could not be arreſted or apprehended, the riot could not be ſuppreſſed, the priſoners could not be kept in hold, the deer-ſtealers could not but eſcape, unleſs ſuch homicide were committed: otherwiſe, without ſuch abſolute neceſſity, it is not juſtifiable. 6. If the champions in a trial by battel killed either of them the other, ſuch homicide was juſtifiable, and was imputed to the juſt judgment of God, who was thereby preſumed to have decided in favour of the truth.

3. In the next place, ſuch homicide as is committed for the *prevention* of any forcible and atrocious *crime*, is juſtifiable by the law of nature; and alſo by the law of England, as it ſtood ſo early as the time of Bracton, and as it is ſince declared by ſtat 24 H. VIII. c. 5. If any perſon attempts a robbery or murder of another, or attempts to break open a houſe *in the night-time*, (which extends alſo to an attempt to burn it,) and ſhall be killed in ſuch attempt, the ſlayer ſhall be acquitted and diſcharged. This reaches not to any crime unaccompanied with force, as picking of pockets; or to the breaking open of any houſe *in the day-time*, unleſs it carries with it an attempt of robbery alſo. So the Jewiſh law, which puniſhed no theft with death, makes homicide only juſtifiable in caſe of *nocturnal* houſe-breaking: "if a thief be found breaking up, and he be ſmitten that he die, no blood ſhall be ſhed for him: but if the ſun be riſen upon him, there ſhall blood be ſhed for him; for he ſhould have made full reſtitution." At Athens, if any theft was committed by night, it was lawful to kill the criminal, if taken in the fact: and, by the Roman law of the twelve tables, a thief might be ſlain by night with impunity; or even by day, if he armed himſelf with any dangerous weapon: which amounts very nearly to the ſame as is permitted by our own conſtitutions.

Exodus xxii. 2.

The Roman law alſo juſtifies homicide, when committed in defence of the chaſtity either of one's ſelf or relations: and ſo alſo, according to Selden, ſtood the law in the Jewiſh republic. The Engliſh law likewiſe juſtifies a woman killing one who attempts to raviſh her: and ſo too the huſband or father may juſtify killing a man, who attempts a rape upon his wife or daughter; but not if he takes them in adultery by conſent; for the one is forcible and felonius, but not the other. And there is no doubt but the forcibly attempting a crime, of a ſtill more deteſtable nature, may be equally reſiſted by the death of the unnatural aggreſſor. For the one uniform principle that runs through our own, and all other laws, ſeems to be this: That where a crime, in itſelf capital, is endeavoured to be committed by force, it is lawful to repel that force by the death of the party attempting. But we muſt not carry this doctrine to the ſame viſionary length that Mr Locke does; who holds, "that all manner of force without right upon a man's perſon, puts him in a ſtate of war with the aggreſſor; and, of conſequence, that, being in ſuch a ſtate of war, he may lawfully kill him that puts him under this unnatural reſtraint." However juſt this concluſion may be in a ſtate of uncivilized nature, yet the law of England, like that of every other well-regulated community, is too tender of the public peace, too careful of the lives of the ſubjects, to adopt ſo contentious a ſyſtem; nor will ſuffer with impunity any crime to be *prevented* by death, unleſs the ſame, if committed, would alſo be *puniſhed* by death.

In theſe inſtances of *juſtifiable* homicide, it may be obſerved, that the ſlayer is in no kind of fault whatſoever, not even in the minuteſt degree; and is therefore to be totally acquitted and diſcharged, with commendation rather than blame. But that is not quite the caſe in *excuſable* homicide, the very name whereof imports ſome fault, ſome error, or omiſſion; ſo trivial, however, that the law excuſes it from the guilt of felony, though in ſtrictneſs it judges it deſerving of ſome little degree of puniſhment.

II. Excuſable homicide is of two ſorts; either *per infortunium*, by miſadventure; or *ſe defendendo*, upon a principle of ſelf-preſervation. We will firſt ſee wherein theſe two ſpecies of homicide are diſtinct, and then wherein they agree.

1. Homicide *per infortunium*, or miſadventure, is where a man, doing a lawful act, without any intention of hurt, unfortunately kills another: as where a man is at work with a hatchet, and the head thereof flies off and kills a ſtander-by; or, where a perſon, qualified to keep a gun, is ſhooting at a mark, and undeſignedly kills a man: for the act is lawful, and the effect is merely accidental. So where a parent is moderately correcting his child, a maſter his apprentice or ſcholar, or an officer puniſhing a criminal, and happens to occaſion his death, it is only miſadventure; for the act of correction was lawful: but if he exceeds the bounds of moderation, either in the manner, the inſtrument, or the quantity of puniſhment, and death enſues, it is manſlaughter at leaſt, and in ſome caſes (according to the circumſtances) murder; for the act of immoderate correction is unlawful. Thus by an edict of the emperor Conſtantine, when the rigour of the Roman law with regard to ſlaves began to relax and ſoften, a maſter was allowed to chaſtiſe his ſlave with rods and impriſonment, and, if death accidentally enſued, he was guilty of no crime: but if he ſtruck him with a club or a ſtone, and thereby occaſioned his death; or if in any other yet groſſer manner "*immoderate ſuo jure utatur, tunc reus homicidii ſit.*"

But, to proceed. A tilt or tournament, the martial diverſion of our anceſtors, was however an unlawful act; and ſo are boxing and ſword-playing, the ſucceeding amuſement of their poſterity: and therefore, if a knight in the former caſe, or a gladiator in the latter, be killed, ſuch killing is felony of manſlaughter. But if the king command or permit ſuch diverſion, it is ſaid to be only miſadventure; for then the act is lawful: In like manner as, by the laws both of Athens and Rome, he who killed another in the *pancratium*, or public games, authoriſed or permitted by the ſtate, was not held to be guilty of homicide. Likewiſe to whip another's horſe, whereby he runs over a child and kills him, is held to be accidental in the rider, for he has done nothing unlawful; but manſlaughter in the perſon who whipped him, for the act was a treſpaſs, and at beſt a piece of idleneſs, of inevitably dangerous conſequence. And in general, if death enſues in conſequence of an idle, dangerous, and unlawful ſport, as ſhooting or caſting ſtones in a town, or the barbarous diverſion of cock-throwing; in theſe and ſimilar caſes, the ſlayer is guilty of manſlaughter, and not miſadventure only; for theſe are unlawful acts.

2. Homicide in *ſelf-defence*, or *ſe defendendo*, upon a ſudden affray, is alſo excuſable rather than juſtifiable, by the Engliſh law. This ſpecies of ſelf-defence muſt be diſtinguiſhed from that juſt now mentioned, as calculated to hinder the perpetration of a capital crime; which is not only a matter of excuſe, but of juſtification. But the ſelf-defence which we are now ſpeaking of, is that whereby a man may protect himſelf from an aſſault, or the like, in the courſe of a ſudden brawl or quarrel, by killing him who aſſaults him. And this is what the law expreſſes by the word *chance-medley*, or (as ſome rather chooſe to write it) *chaud-medley;* the former of which in its etymology ſignifies a *caſual* affray, the latter an affray in the *heat* of blood or paſſion: both of them of pretty much the ſame import; but the former is in common ſpeech too often erroneouſly applied to any manner of homicide by miſadventure; whereas it appears by the ſtatute 24 H. VIII. c. 5. and our ancient books, that it is properly applied to ſuch killing as happens in ſelf-defence upon a ſudden rencounter. The right of natural defence does not imply a right of attacking: for, inſtead of attacking one another for injuries paſt or impending, men need only have recourſe to the proper tribunals of juſtice. They cannot therefore legally exerciſe this right of preventive defence, but in ſudden and violent caſes; when certain and immediate ſuffering would be the conſequence of waiting for the aſſiſtance of the law. Wherefore, to excuſe homicide by the plea of ſelf-defence, it muſt appear that the ſlayer had no other poſſible means of eſcaping from his aſſailant.

In ſome caſes this ſpecies of homicide (upon *chance-medley* in ſelf-defence) differs but little from manſlaughter, which alſo happens frequently upon *chance-medley* in the proper legal ſenſe of the word. But the true criterion between them ſeems to be this; when both parties are actually combating at the time when the mortal ſtroke is given, the ſlayer is then guilty of manſlaughter; but if the ſlayer hath not begun to fight, or (having begun) endeavours to decline any farther ſtruggle, and afterwards, being cloſely preſſed by his antagoniſt, kills him to avoid his own deſtruction, this is homicide excuſable by ſelf-defence. For which reaſon the law requires, that the perſon, who kills another in his own defence, ſhould have retreated as far as he conveniently or ſafely can, to avoid the violence of the aſſault, before he turns upon his aſſailant; and that not fictitiouſly, or in order to watch his opportunity, but from a real tenderneſs of ſhedding his brother's blood. And though it may be cowardice, in time of war between two independent nations, to flee from an enemy; yet between two fellow-ſubjects, the law countenances no ſuch point of honour: becauſe the king and his courts are the *vindices injuriarum*, and will give to the party wronged all the ſatisfaction he deſerves. In this the civil law alſo agrees with ours, or perhaps goes rather farther; "*qui cum aliter tueri ſe non poſſunt, damni culpam dederint, innoxii ſunt.*" The party aſſaulted muſt therefore flee as far as he conveniently can, either by reaſon of ſome wall, ditch, or other impediment; or as far as the fierceneſs of the aſſault will permit him: for it may be ſo fierce as not to allow him to yield a ſtep, without manifeſt danger of his life, or enormous bodily harm; and then in his defence he may kill his aſſailant inſtantly. And this is the doctrine of univerſal juſtice, as well as of the municipal law.

And, as the *manner* of the defence, ſo is alſo the *time* to be conſidered: for if the perſon aſſaulted does not fall upon the aggreſſor till the affray is over, or when he is running away, this is revenge and not defence. Neither, under the colour of ſelf-defence, will the law permit a man to ſcreen himſelf from the guilt of deliberate murder: for if two perſons, A and B, agree to fight a duel, and A gives the firſt onſet, and B retreats as far as he ſafely can, and then kills A, this is murder; becauſe of the previous malice and concerted deſign. But if A upon a ſudden quarrel aſſaults B firſt, and, upon B's returning the aſſault, A really and *bona fide* flees; and, being driven to the wall, turns again upon B and kills him; this may be *ſe defendendo*, according to ſome of our writers: tho' others have thought this opinion too favourable; inaſmuch as the neceſſity, to which he is at laſt reduced, originally aroſe from his own fault. Under this excuſe of ſelf-defence, the principal civil and natural relations are comprehended: therefore, maſter and ſervant, parent and child, huſband and wife, killing an aſſailant in the neceſſary defence of each other reſpectively, are excuſed; the act of the relation aſſiſting being conſtrued the ſame as the act of the party himſelf.

There is one ſpecies of homicide *ſe defendendo*, where the party ſlain is equally innocent as he who occaſions his death: and yet this homicide is alſo excuſable from the great univerſal principle of ſelf-preſervation, which prompts every man to ſave his own life preferable to that of another, where one of them muſt inevitably periſh. As, among others, in that caſe mentioned by lord Bacon, where two perſons, being ſhipwrecked, and getting on the ſame plank, but finding it not able to ſave them both, one of them thruſts the other from it, whereby he is drowned. He who thus preſerves his own life at the expence of another man's, is excuſable through unavoidable neceſſity, and the principle of ſelf-defence; ſince their both remaining on the ſame weak plank is a mutual, though innocent, attempt upon, and an endangering of, each other's life.

Let us next take a view of thoſe circumſtances wherein thoſe two ſpecies of homicide, by miſadventure and ſelf-defence, agree; and thoſe are in their blame and puniſhment. For the law ſets ſo high a value upon the life of a man, that it always intends ſome miſbehaviour in the perſon who takes it away, unleſs by the command or expreſs permiſſion of the law. In the caſe of miſadventure, it preſumes negligence, or at leaſt a want of ſufficient caution in him who was ſo unfortunate as to commit it; who therefore is not altogether faultleſs. And as to the neceſſity which excuſes a man who kills another *ſe defendendo*, lord Bacon entitles it *neceſſitas culpabilis*, and thereby diſtinguiſhes it from the former neceſſity of killing a thief or a malefactor. For the law intends that the quarrel or aſſault aroſe from ſome unknown wrong, or ſome provocation, either in word or deed: and ſince in quarrels both parties may be, and uſually are, in ſome fault; and it ſcarce can be tried who was originally in the wrong; the law will not hold the ſurvivor entirely guiltleſs. But it is clear, in the other caſe, that where I kill a thief who breaks into my houſe, the original default can never be upon my ſide. The law beſides may have a farther view, to make the crime of homicide more odious, and to caution men how they venture to kill another upon their own private judgment; by ordaining, that he who ſlays his neighbour, without an expreſs warrant from the law ſo to do, ſhall in no caſe be abſolutely free from guilt.

Nor is the law of England ſingular in this reſpect. Even the ſlaughter of enemies required a ſolemn purgation among the Jews; which implies, that the death of a man, however it happens, will leave ſome ſtain behind it. And the Moſaical law appointed certain cities of refuge for him "who killed his neighbour unawares; as if a man goeth into the wood with his neighbour to hew wood, and his hand fetcheth a ſtroke with the ax to cut down a tree, and the head ſlippeth from the helve, and lighteth upon his neighbour that he die, he ſhall flee unto one of thoſe cities and live." But it ſeems he was not held wholly blameleſs, any more than in the Engliſh law; ſince the avenger of blood might ſlay him before he reached his aſylum, or if he afterwards ſtirred out of it till the death of the high prieſt. In the imperial law likewiſe caſual homicide was excuſed, by the indulgence of the emperor ſigned with his own ſign manual, "*adnotatione principis*;" otherwiſe, the death of a man, however committed, was in ſome degree puniſhable. Among the Greeks, homicide by miſfortune was expiated by voluntary baniſhment for a year. In Saxony, a fine is paid to the kindred of the ſlain; which alſo, among the weſtern Goths, was little inferior to that of voluntary homicide: and in France, no perſon is ever abſolved in caſes of this nature, without a largeſs to the poor, and the charge of certain maſſes for the ſoul of the party killed.

The penalty inflicted by our laws is ſaid by Sir Edward Coke to have been anciently no leſs than death; which, however, is with reaſon denied by latter and more accurate writers. It ſeems rather to have conſiſted in a forfeiture, ſome ſay of all the goods and chattels, others of only a part of them, by way of fine or *weregild*: which was probably diſpoſed of, as in France, *in pios uſus*, according to the humane ſuperſtition of the times, for the benefit of *his* ſoul who was thus ſuddenly ſent to his account with all his imperfections on his head. But that reaſon having long ceaſed, and the penalty (eſpecially if a total forfeiture) growing more ſevere than was intended, in proportion as perſonal property has become more conſiderable, the delinquent has now, and has had as early as our records will reach, a pardon and writ of reſtitution of his goods as a matter of courſe and right, only paying for ſuing out the ſame. And, indeed, to prevent this expenſe, in caſes where the death has notoriouſly happened by miſadventure or in ſelf-defence, the judges will uſually permit (if not direct) a general verdict of acquittal.

III. Felonious homicide is an act of a very different nature from the former, being the killing of a human creature, of any age or ſex, without juſtification or excuſe. This may be done either by killing one's ſelf, or another man: for the conſideration of which, ſee the articles SELF-*Murder*, MURDER, and MANSLAUGHTER.

HOMILY, in eccleſiaſtical writers, a ſermon, or diſcourſe, upon ſome point of religion, delivered in a plain manner, ſo as to be eaſily underſtood by the common people.—The word is Greek, ομιλια; formed of ομιλος, *cœtus*, "aſſembly, or council."

At the time of the reformation, there were ſeveral of theſe homilies made and printed, and ordered to be read in ſuch churches as were not provided with a ſufficiently learned miniſter, in order to prevent unſound doctrine being taught in remote country places.

In the primitive church, homily rather meant a conference or converſation by way of queſtion and anſwer, which made part of the office of a biſhop, till the 5th century, when the learned prieſts were allowed to preach, catechiſe, &c. in the ſame manner as the biſhops uſed to do.

There are ſtill extant ſeveral fine homilies, compoſed by the ancient fathers, particularly St Chryſoſtom and St Gregory.

De HOMINE *Replegiando*. See *Falſe*-IMPRISONMENT.

The writ *de homino replegiando* lies to replevy a man out of priſon, or out of the cuſtody of any private perſon (in the ſame manner that chattels taken in any diſtreſs may be replevied), upon giving ſecurity to the ſheriff, that the man ſhall be forthcoming to anſwer any charge againſt him. And if the perſon be conveyed out of the ſheriffs juriſdiction, the ſheriff may return that he is eloigned, *elongatus;* upon which a proceſs iſſues (called *capias in withernam*), to impriſon the defendant himſelf, without bail or mainprize, till he produces the party. But this writ is guarded with ſo many exceptions, that it is not an effectual remedy in numerous inſtances, eſpecially where the crown is concerned. See HABEAS *Corpus*.

HOMMOC, a name given by mariners to a hilloc, or ſmall eminence of land, reſembling the figure of a cone, and appearing on the ſea-coaſt of any country.

HOMO, MAN, is ranked by Linnæus under the order of primates; and characteriſed by having four parallel foreteeth both in the upper and lower jaw, and two mammæ on the breaſt. The ſpecies, according to this author, are two, viz. the homo ſapiens, and the homo troglodytes.

He ſubdivides the homo ſapiens into five varieties, viz. the American, the European, the Aſiatic, the African, and what he calls the *monſtrous*. See MAN.

The troglodytes, or orang outang, is a native of Ethiopia, Java, and Amboina. His body is white; he walks erect; and is about one half the ordinary human ſize. He generally lives about 25 years. He conceals himſelf in caves during the day, and ſearches for his prey in the night. He is ſaid to be exceedingly ſagacious, but is not endowed with the faculty of ſpeech. See TROGLODYTES, ORANG OUTANG, and SIMIA.

HOMOLOGOUS, in geometry, an appellation given to the correſponding ſides and angles of ſimilar figures, as being proportional to each other.

HONAN, a province of China, bounded on the north by that of Pecheli and Chanſi, on the weſt by Chanſi, on the ſouth by Houquang, and on the eaſt by Chantong. It is watered by the river Hohango; and beſides the forts, caſtles, and garriſoned towns, it contains eight cities of the firſt rank, and 102 of the ſecond and third. The air of this province is very temperate and healthful, abounding with wheat, rice, paſtures, cattle, oranges of ſeveral ſorts, pomegranates, and all ſorts of European fruits. Towards the weſt it is mountainous and woody, and towards the eaſt it is all cultivated like a garden. It is well watered with fountains, brooks, and rivers, which render it very pleaſant.

HONDERKOOTER (Melchior), a famous Dutch painter born at Utrecht, excelled in painting animals, and eſpecially birds. His pictures ſell at a high price, and are much ſought after. He died at Utrecht in 1695, aged 59.

HONDURAS, a province of North America in New Spain, lying on the North Sea, being about 370 miles in length, and 200 in breadth; it was diſcovered by Chriſtopher Columbus in the year 1502. The Engliſh have been poſſeſſed of the logwood country on the bay of Honduras a great while, and cut large quantities every year. The Moſquito native Americans live in the eaſtern parts; and being independant of the Spaniards, have entered into treaties with the Engliſh, and ſerve them in ſeveral capacities. This province is watered by ſeveral rivers, which enrich the country by their inundations; and it is very fertile in Indian corn. It is ſaid there are ſome mines of gold and ſilver in this province. Valadolid is the capital town.

HONE, a fine kind of white ſtone, uſed for ſetting razors, pen-knives, and the like.

HONEY, a ſweet vegetable juice, collected by the bees from the flowers of various plants, and depoſited in the cells of the comb; from which it is extracted either by ſpontaneous percolation through a ſieve in a warm place, the comb being ſeparated and laid thereon, or by expreſſion. That which runs ſpontaneouſly is purer than that which is expreſſed, a quantity of the wax and other matters being forced out along with it by the preſſure. The beſt ſort of honey is of a thick conſiſtence, a whitiſh colour inclining to yellow, an agreeable ſmell, and pleaſant taſte; both the colour and flavour are ſaid to differ in ſome degree, according to the plants which the bees collect it from. It is ſuppoſed that honey is merely the juice of the flower perſpiring, and becoming inſpiſſated thereon; and that the bee takes it up with its proboſcis, and carries it to be depoſited in its waxen cells, with which the young bees are to be fed in ſummer, and the old ones in winter: but it is certain, that honey can be procured by no other method of collecting this juice than by the bees. The honey wrought by the young bees, and that which is permitted to run from the comb without heat or preſſure, is white and pure, and called *virgin's honey*. The honey of old bees, and that which is forced from the comb by heat or preſſure, is yellow, from the wax. Honey produced where the air is clear and hot, is better than that where the air is variable and cold.—The honey of Narbonne in France, where roſemary abounds, is ſaid to have a very manifeſt flavour of that plant, and to be imitable by adding to other honey an infuſion of roſemary flowers.—Honey, conſidered as a medicine, is a very uſeful detergent and aperient, powerfully diſſolving

Honey-dew.

viſcid juices, and promoting the expectoration of tough phlegm: in ſome particular conſtitutions it has an inconvenience of griping, or of proving purgative; this is ſaid to be in ſome meaſure prevented by previouſly boiling the honey.

HONEY-*Dew*, a ſweet ſaccharine ſubſtance founded on the leaves of certain trees, of which bees are very fond, by the huſbandmen ſuppoſed to fall from the heavens like common dew. This opinion hath been refuted, and the true origin of this and other ſaccharine dews ſhewn by the Abbe Boiſſier de Sauvages, in a memoir read before the Society of Sciences at Montpelier, "Chance (ſays the Abbe) afforded me an opportunity of ſeeing this juice in its primitive form on the leaves of the holm-oak: theſe leaves were covered with thouſands of ſmall round globules, or drops, which, without touching one another, ſeemed to point out the pore from whence each of them had proceeded. My taſte informed me that they were as ſweet as honey: the honey-dew on a neighbouring bramble did not reſemble the former, the drops having run together; owing either to the moiſture of the air which had diluted them, or to the heat which had expanded them. The dew was become more viſcous, and lay in large drops, covering the leaves; in this form it is uſually ſeen.

"The oak had at this time two ſorts of leaves; the old, which were ſtrong and firm; and the new, which were tender, and newly come forth. The honey-dew was found only on the old leaves; tho' theſe were covered by the new ones, and by that means ſheltered from any moiſture that could fall from above. I obſerved the ſame on the old leaves of the bramble, while the new leaves were quite free from it. Another proof that this dew proceeds from the leaves is, that other neighbouring trees not furniſhed with a juice of this kind, had no moiſture on them; and particularly the mulberry, which is a very particular circumſtance, for this juice is a deadly poiſon to ſilk-worms. If this juice fell in the form of a dew, miſt, or fog, it would wet all the leaves without diſtinction, and every part of the leaves, under as well as upper. Heat may have ſome ſhare in its production: for though the common heat promotes only the tranſpiration of the more volatile and fluid juices, a ſultry heat, eſpecially if reflected by clouds, may ſo far dilate the veſſel, as to produce a more viſcous juice, ſuch as the honey-dew.

"The ſecond kind of honey-dew, which is the chief reſource of bees after the ſpring-flowers and dew by tranſpiration on leaves are paſt, owes its origin to a ſmall inſect called a *vine-fretter*; the excrement ejected with ſome force by this inſect makes a part of the moſt delicate honey known in nature. See APHIS.

"Theſe vine-fretters reſt during ſeveral months on the barks of particular trees, and extract their food by piercing that bark, without hurting or deforming the tree. Theſe inſects alſo cauſe the leaves of ſome trees to curl up, and produce galls upon others. They ſettle on branches that are a year old. The juice, at firſt perhaps hard and crabbed, becomes, in the bowels of this inſect, equal in ſweetneſs to the honey obtained from the flowers and leaves of vegetables; excepting that the flowers may communicate ſome of their eſſential oil to the honey, and this may give it a peculiar flavour, as happened to myſelf by planting a hedge of roſemary near my bees at Sauvages: the honey has taſted of it ever ſince, that ſhrub continuing long in flower.

Honey-dew.

"I have obſerved two ſpecies of vine-fretters, which live unſheltered on the bark of young branches; a larger and a leſſer.

"The leſſer ſpecies is of the colour of the bark upon which it feeds, generally green. It is chiefly diſtinguiſhed by two horns, or ſtrait, immoveable, fleſhy ſubſtances, which riſe perpendicularly from the lower ſides of the belly, one on each ſide. This is the ſpecies which live on the young branches of bramble and elder.

"The larger ſpecies is double the ſize of the other; is of a blackiſh colour; and inſtead of the horns which diſtinguiſh the other, have in the ſame part of the ſkin a ſmall button, black and ſhining like jet.

"The buzzing of bees in a tuft of holm-oak, made me ſuſpect that ſomething very intereſting brought ſo many of them thither. I knew that it was not the ſeaſon for expecting honey-dew, nor was it the place where it is uſually found; and was ſurprized to find the tuft of leaves and branches covered with drops which the bees collected with a humming noiſe. The form of the drops drew my attention, and led me to the following diſcovery. Inſtead of being round like drops which had fallen, each formed a ſmall longiſh oval. I ſoon perceived from whence they proceeded. The leaves covered with theſe drops of honey were ſituated beneath a ſwarm of the larger black vine-fretters; and on obſerving theſe inſects, I perceived them from time to time raiſe their bellies, at the extremity of which there then appeared a ſmall drop of an amber colour, which they inſtantly ejected from them to the diſtance of ſome inches. I found by taſting ſome of theſe drops which I had catched on my hand, that it had the ſame flavour with what had before fallen on the leaves. I afterwards ſaw the ſmaller ſpecies of vine-fretters eject their drops in the ſame manner.

"This ejection is ſo far from being a matter of indifference to theſe inſects themſelves, that it ſeems to have been wiſely inſtituted to procure cleanlineſs in each individual, as well as to preſerve the whole ſwarm from deſtruction; for preſſing as they do one upon another, they would otherwiſe ſoon be glued together, and rendered incapable of ſtirring.

"The drops thus ſpurted out fall upon the ground, if not intercepted by leaves or branches; and the ſpots they make on ſtones remain ſome time, unleſs waſhed off by rain. This is the only honey-dew that falls; and this never falls from a greater height than a branch where theſe inſects can cluſter.

"It is now eaſy to account for a phænomenon which formerly puzzled me greatly. Walking under a lime-tree in the king's garden at Paris, I felt my hand wetted with little drops, which I at firſt took for ſmall rain. The tree indeed ſhould have ſheltered me from the rain, but I eſcaped it by going from under the tree. A ſeat placed near the tree ſhone with theſe drops. And being then unacquainted with any thing of this kind, except the honey-dew found on the leaves of ſome particular trees, I was at a loſs to conceive how ſo glutinous a ſubſtance could fall from the leaves in ſuch ſmall drops: for I knew that rain could not overcome its natural attraction to the leaves till it became pretty large drops; but I have ſince found, that the lime-tree is very ſubject to theſe vine-fretters.

“ Bees are not the only inſects that feaſt upon this honey; ants are equally fond of it. Led into this opinion by what naturaliſts have ſaid, I at firſt believed that the horns in the leſſer ſpecies of theſe vine-fretters had in their extremity a liquor which the ants went in ſearch of: but I ſoon diſcovered that what drew the ants after them came from elſewhere, both in the larger and leſſer ſpecies, and that no liquor is diſcharged by the horns.

“ There are two ſpecies of ants which ſearch for theſe inſects. The large black ants follow thoſe which live on the oaks and cheſnut; the leſſer ants attend thoſe on the elder. But as the ants are not, like the bees, provided with the means of ſucking up fluids; they place themſelves near the vine-fretters, in order to ſeize the drop the moment they ſee it appear upon the anus; and, as the drop remains ſame time on the ſmall vine-fretters before they can caſt it off, the ants have leiſure to catch it, and thereby prevent the bees from having any ſhare: but the vine-fretters of the oak and cheſnut being ſtronger, and perhaps more plentifully ſupplied with juice, dart the drop inſtantly, ſo that the larger ants get very little of it.

“ The vine-fretters finding the greateſt plenty of juice in trees about the middle of ſummer, afford alſo at that time the greateſt quantity of honey; and this leſſens as the ſeaſon advances, ſo that in the autumn the bees prefer it to the flowers then in ſeaſon.

“ Though theſe inſects pierce the tree to the ſap in a thouſand places, yet the trees do not ſeem to ſuffer at all from them, nor do the leaves loſe the leaſt of their verdure. The huſbandman therefore acts injudiciouſly when he deſtroys them.”

HONEY-*Guide*, a curious ſpecies of cuckow. See CUCULUS.

HONEY-*Suckle*. See LONICERA.

HONFLEUR, a conſiderable ſea-port town of France, in Upper Normandy, with a good harbour, and trade in bone-lace. It is ſeated on the river Seine, in E. Long. 0. 8. N. Lat. 17. 49.

HONITON, a town of Devonſhire in England, ſeated near the river Otter, over which there is a bridge on the road from London to Exeter. A dreadful fire happened here in July 1747, which conſumed three parts of the town, and the damage was computed at 43,000 l. It ſends two members to parliament; but being no corporation, a portrieve is the returning officer. It has one church, which is half a mile from the town, and a chapel within it; with about 400 houſes, which are chiefly in one broad-paved ſtreet. Here is a large manufactory of bone-lace. W. Long. 3. 11. N. Lat. 50. 43.

HONOUR, a teſtimony of eſteem or ſubmiſſion, expreſſed by words, actions, and an exterior behaviour, by which we make known the veneration and reſpect we entertain for any one on account of his dignity or merit. The word *honour* is alſo uſed in general for the eſteem due to virtue, glory, and reputation. It is alſo uſed for *virtue* and *probity* themſelves, and for an exactneſs in performing whatever we have promiſed; and in this laſt ſenſe we uſe the term, *a man of honour*. But *honour* is more particularly applied to two different kinds of virtue; bravery in men, and chaſtity in women.—Virtue and Honour were deified among the ancient Greeks and Romans, and had a joint temple conſecrated to them at Rome: but afterwards each of them had ſeparate temples, which were ſo placed, that no one could enter the temple of Honour, without paſſing through that of Virtue; by which the Romans were continually put in mind, that virtue is the only direct path to true glory. Plutarch tells us, that the Romans, contrary to their uſual cuſtom, ſacrificed to Honour uncovered; perhaps to denote, that wherever honour is, it wants no covering, but ſhews itſelf openly to the world.

HONOUR, or *Rank*.—The degrees of honour which are obſerved in Britain, may be comprehended under theſe two heads, viz. *nobiles majores*, and *nobiles minores*. Thoſe included under the firſt rank are, archbiſhops, dukes, marquiſes, earls, viſcounts, biſhops, and barons; which are all diſtinguiſhed by the reſpective ornaments of their eſcutcheons: and thoſe of the laſt are baronets, knights, eſquires, and gentlemen. There are ſome authors who will have baronets to be the laſt under the firſt rank; and their reaſon is, becauſe their honour is hereditary, and by patent, as that of the nobility. See COMMONALTY and NOBILITY.

HONOURS *of War*, in a ſiege, is, when a governor, having made a long and vigorous defence, is at laſt obliged to ſurrender the place to the enemy, for want of men and proviſions, and makes it one of his principal articles to march out with the *honours of war*; that is, with ſhouldered arms, drums beating, colours flying, and all their baggage, &c.

Military HONOURS. All armies ſalute crowned heads in the moſt reſpectful manner, drums beating a march, colours and ſtandards dropping, and officers ſaluting. Their guards pay no compliment, except to the princes of the blood; and even that by courteſy, in the abſence of the crowned head.

To the commander in chief the whole line turns out without arms, and the camp-guards beat a march, and ſalute.

To generals of horſe and foot, they beat a march, and ſalute.

Lieutenant-generals of ditto, three ruffs, and ſalute.

Major-generals of ditto, two ruffs, and ſalute.

Brigadiers of ditto, reſted arms, one ruff, and ſalute.

Colonels of ditto, reſted arms, and no beating. Centinels reſt their arms to all field-officers, and ſhoulder to every officer.

All governors, that are not general-officers, ſhall, in all places where they are governors, have one ruff, with reſted arms; but for thoſe who have no commiſſion as governors, no drum ſhall beat.

Lieutenant-governors ſhall have the main-guard turned out to them with ſhouldered arms.

Pruſſian HONOURS *of War*, chiefly imitated by moſt powers in Europe, are,

To the king, all guards beat the march, and all officers ſalute.

Field-marſhals received with the march, and ſaluted in the king's abſence.

General of horſe or foot, four ruffs; but if he commands in chief, a march and ſalute.

Lieutenant-generals of horſe or foot, commanding or not, guards beat three ruffs.

Major-generals of horſe or foot, two ruffs.

Officers, when their guards are under arms, and a general makes a ſignal, muſt reſt to him, but not beat; when not got under arms, and a ſignal made, only ſtand by their arms.

Village-guards go under arms only to the king, field-marſhals, generals of horſe and foot, and to the general of the day.

Generals guards go under arms only to the king, field-marſhals, and the general over whom they mount.

Commanding officers of regiments and battalions, their own quarter and rear guards to turn out; but not to other field-officers, unleſs they are of the day.

Generals in foreign ſervice, the ſame.

HONOURS *paid by Centinels.* Field-marſhals; two centinels with ordered firelocks, at their tent or quarters.

Generals of horſe or foot; two centinels, one with his firelock ſhouldered, the other ordered.

Lieutenant-generals; one, with firelock ordered.

Major-generals; one, with firelock ſhouldered.

The firſt battalion of guards go under arms to the king only; not to ſtand by, nor draw up in the rear of their arms to any other; nor to give centinels to foreigners. Second and third battalions draw up behind their arms to the princes, and to field-marſhals; but when on grenadier-guards or out-poſts, they turn out, as other guards do, to the officers of the day. They give one centinel with ſhouldered arms to the princes of the blood, and to field-marſhals when they lie alone in garriſon.

Court of HONOUR. See *Court of* CHIVALRY.

Fountain of HONOUR. The king is ſo ſtyled, as being the ſource of honours, dignities, &c. See PREROGATIVE.

It is impoſſible that government can be maintained without a due ſubordination of rank; that the people may know and diſtinguiſh ſuch as are ſet over them, in order to yield them their due reſpect and obedience; and alſo that the officers themſelves, being encouraged by emulation and the hopes of ſuperiority, may the better diſcharge their functions: and the law ſuppoſes, that no one can be ſo good a judge of their ſeveral merits and ſervices, as the king himſelf who employs them. It has therefore intruſted him with the ſole power of conferring dignities and honours, in confidence that he will beſtow them upon none but ſuch as deſerve them. And therefore all degrees of nobility, of knighthood, and other titles, are received by immediate grant from the crown: either expreſſed in writing, by writs or letters patent, as in the creations of peers and baronets; or by corporeal inveſtiture, as in the creation of a ſimple knight.

From the ſame principle alſo ariſes the prerogative of erecting and diſpoſing of offices: for honours and offices are in their nature convertible and ſynonymous. All offices under the crown carry in the eye of the law an honour along with them; becauſe they imply a ſuperiority of parts and abilities, being ſuppoſed to be always filled with thoſe that are moſt able to execute them. And, on the other hand, all honours in their original had duties or offices annexed to them: an earl, *comes*, was the conſervator or governor of a county; and a knight, *miles*, was bound to attend the king in his wars. For the ſame reaſon therefore that honours are in the diſpoſal of the king, offices ought to be ſo likewiſe; and as the king may create new titles, ſo may he create new offices: but with this reſtriction, that he cannot create new offices with new fees annexed to them, nor annex new fees to old offices; for this would be a tax upon the ſubject, which cannot be impoſed but by act of parliament. Wherefore, in 13 Hen. IV. a new office being created by the king's letters patent for meaſuring cloths, with a new fee for the ſame, the letters patent were, on account of the new fee, revoked and declared void in parliament.

Upon the ſame, or a like reaſon, the king has alſo the prerogative of conferring privileges upon private perſons. Such as granting place or precedence to any of his ſubjects, as ſhall ſeem good to his royal wiſdom: or ſuch as converting aliens, or perſons born out of the king's dominions, into denizens; whereby ſome very conſiderable privileges of natural-born ſubjects are conferred upon them. Such alſo is the prerogative of erecting corporations; whereby a number of private perſons are united and knit together, and enjoy many liberties, powers, and immunities in their politic capacity, which they were utterly incapable of in their natural.

Maids of HONOUR, are ſix young ladies in the houſehold of the queen and princeſs-royal; the ſalary of thoſe of a queen are 300l. per ann. each, and thoſe of a princeſs dowager of Wales, 200l.

HONOUR-*Point*, in heraldry, is that next above the centre of the eſcutcheon, dividing the upper part into two equal portions.

HONOURABLE, a title conferred on the younger ſons of earls, the ſons of viſcounts and barons; as alſo on ſuch perſons as have the king's commiſſion, and upon thoſe who enjoy places of truſt and honour.

HONOURARY, ſomething done or conferred upon any one, to do him honour. See the article HONOUR.

Honourary is ſometimes underſtood of a perſon who bears or poſſeſſes ſome poſt or title, only for the name's ſake, without doing any thing of the functions belonging to it, or receiving any advantage from it: thus we ſay, honourary counſellors, honourary fellows, &c.

Honourary is alſo uſed for a lawyer's fee, or a ſalary given to public profeſſors in any art or ſcience.

HOOD (Robin), a famous outlaw and deer-ſtealer, who chiefly harboured in Sherwood foreſt in Nottinghamſhire. He was a man of family, which by his pedigree appears to have had ſome title to the earldom of Huntingdon; and played his pranks about the latter end of the 12th century. He was famous for archery, and for his treatment of all travellers who came in his way; levying contributions on the rich, and relieving the poor. Falling ſick at laſt, and requiring to be bled, he is ſaid to have been betrayed and bled to death. He died in 1247; and was buried at Kirklees in Yorkſhire, then a Benedictine monaſtery, where his graveſtone is ſtill ſhewn.

Hood-*Iſland*, one of the Marquesas *Iſlands* in the South Sea. It was diſcovered in April 1774 by captain Cook, who gave it that name from the perſon who firſt ſaw the land. It is the moſt northerly of the cluſter, and lies in S. Lat. 9. 26. W. Long. 139. 13.

HOOF, the horny ſubſtance that covers the feet of divers animals, as oxen, horſes, &c.

Hoof-*bound*, in Farriery. See there, § xlii.

HOOFT (Peter Cornelius Van), an eminent hiſtorian and poet, born at Amſterdam in 1581. He was lord of Muyden, judge of Goyland, and knight of the order of St Michael. He died at the Hague in 1647. He wrote, 1. An excellent hiſtory of the Netherlands, from the abdication of Charles V. to the year 1588. 2. Several Comedies, and other works. By theſe he acquired ſuch reputation, that the Flemings conſidered him as the Homer and Tacitus of the Netherlands.

HOOGUESTRATTEN, a town of the Netherlands in Dutch Brabant, and capital of a county of the ſame name. E. Long. 4. 41. N. Lat. 51. 25.

HOOKE (Robert), a very eminent Engliſh mathematician and philoſopher, was the ſon of Mr John Hooke miniſter of Freſhwater in the Iſle of Wight, where he was born in 1635. He very early diſcovered a genius for mechanics, by making curious toys with great art and dexterity. He was educated under Dr Buſby in Weſtminſter ſchool; where he not only acquired a competent ſhare of Greek and Latin, together with an inſight into Hebrew and ſome other Oriental languages, but alſo made himſelf maſter of a good part of Euclid's elements. About the year 1653 he went to Chriſt-church in Oxford, and in 1655 was introduced to the Philoſophical Society there; where, diſcovering his mechanic genius, he was firſt employed to aſſiſt Dr Willis in his operations in chemiſtry, and afterwards recommended to the honourable Robert Boyle, Eſq; whom he ſerved ſeveral years in the ſame capacity. He was alſo inſtructed in aſtronomy about this time by Dr Seth Ward, Savilian profeſſor of that ſcience; and from henceforward diſtinguiſhed himſelf by many noble inventions and improvements of the mechanic kind. He invented ſeveral aſtronomical inſtruments, for making obſervations both at ſea and land; and was particularly ſerviceable to Mr Boyle in completing the invention of the air-pump. Sir John Cutler having founded a mechanic ſchool in 1664, he ſettled an annual ſtipend on Mr Hooke for life, intruſting the preſident, council, and fellows, of the Royal Society to direct him with reſpect to the number and ſubject of his lectures; and on the 11th of January 1664-5, he was elected by that ſociety, curator of experiments for life, with an additional ſalary. In 1666 he produced to the Royal Society a model for rebuilding the city of London deſtroyed by fire, with which the ſociety was well pleaſed; and the lord mayor and aldermen preferred it to that of the city ſurveyor, though it happened not to be carried into execution. It is ſaid, by one part of this model of Mr Hooke's, it was deſigned to have all the chief ſtreets, as from Leaden-hall to Newgate, and the like, to lie in exact ſtraight lines, and all the other croſs-ſtreets turning out of them at right angles, with all the churches, public buildings, markets, &c. in proper and convenient places. The rebuilding of the city according to the act of parliament requiring an able perſon to ſet out the ground to the proprietors, Mr Hooke was appointed one of the ſurveyors; in which employment he got moſt of part of his eſtate, as appeared pretty evident from a large iron cheſt of money found after his death, locked down with a key in it, and a date of the time, which ſhewed it to have been ſo ſhut up above 30 years.—Mr Oldenburg, ſecretary to the Royal Society, dying in 1677, Mr Hooke was appointed to ſupply his place, and began to take minutes at the meeting in October, but did not publiſh the Tranſactions. In the beginning of the year 1687, his brother's daughter, Mrs Grace Hooke, who had lived with him ſeveral years, died; and he was ſo affected with grief at her death, that he hardly ever recovered it, but was obſerved from that time to become leſs active, more melancholy, and, if that could be, more cynical than ever. At the ſame time, a chancery ſuit in which he was concerned with Sir John Cutler, on account of his ſalary for reading the Cutlerian lectures, made him very uneaſy, and increaſed his diſorder. In 1691, he was employed in forming the plan of the hoſpital near Hoxton, founded by Robert Aſk alderman of London, who appointed archbiſhop Tillotſon one of his executors; and in December the ſame year, Hooke was created doctor of Phyſic, by a warrant from that prelate. In July 1696, the chancery ſuit with Sir John Cutler was determined in his favour, to his inexpreſſible ſatisfaction. His joy on that occaſion was found in his diary thus expreſſed; DOMSHLGISSA: that is, *Deo, Optimo, Maximo, ſit honor, laus, gloria, in ſæcula ſæculorum, Amen.* "I was born on this day of July 1635, and God has given me a new birth: may I never forget his mercies to me! while he gives me breath may I praiſe him!"—In the ſame year 1696, an order was granted to him for repeating moſt of his experiments at the expence of the Royal Society, upon a promiſe of his finiſhing the accounts, obſervations, and deductions from them, and of perfecting the deſcription of all the inſtruments contrived by him; but his increaſing illneſs, and general decay, rendered him unable to perform it. He continued ſome years in this waſting condition; and thus languiſhing till he was quite emaciated, he died March 3d, 1702, at his lodgings in Greſham college, and was buried in St Helen's church, Biſhopſgate ſtreet; his corpſe being attended by all the members of the Royal Society then in London.

As to the character of Mr Hooke, it is not in all reſpects one of the moſt amiable. He made but a deſpicable figure as to his perſon, being ſhort of ſtature, very crooked, pale, lean, and of a meagre aſpect, with dark brown hair, very long, and hanging over his face uncut and lank. Suitable to his perſon, his temper was penurious, melancholy, miſtruſtful: and, though poſſeſſed of great philoſophical knowledge, he had ſo much ambition, that he would be thought the only man who could invent or diſcover; and thus frequently laid claim to the inventions and diſcoveries of others, while he boaſted of many of his own which he never communicated. In the religious part of his character he was ſo far exemplary, that he always expreſſed a great veneration for the Deity; and ſeldom received any remarkable benefit in life, or made any conſiderable diſcovery in nature, or invented any uſeful contrivance, or found out any difficult problem, without ſetting down his acknowledgment to God, as many places in his diary plainly ſhew. He frequently ſtudied the ſacred writings in the original; for he was acquainted with the ancient languages, as well as with all parts of the mathematics.—He wrote, 1. *Lectiones Cutlerianæ.* 2. *Micrographia*, or Deſcriptions of minute bodies made by magnifying glaſſes. 3. A deſcription of helioſcopes. 4. A deſcription of ſome mechanical improvements of lamps and water-poizes, quarto. 5. Philoſophical collections. After his death were publiſhed, 6. Poſthumous works collected from his papers by Richard Waller ſecretary to the Royal Society.

HOOKER (John), *alias* Vowell, was born in Exeter, about the year 1524, the ſecond ſon of Robert Hooker, who in 1529 was mayor of that city. He was inſtructed in grammar learning by Dr Moreman, vicar of Menhinit in Cornwall, and thence removed to Oxford; but to what college is uncertain. Having left the univerſity, he travelled to Germany, and reſided ſome time at Cologne, where he kept exerciſes in law, and probably graduated. Thence he went to Straſburg, where he ſtudied divinity under the famous Peter Martyr. He now returned to England, and ſoon after viſited France, intending to proceed to Spain and Italy; but was prevented by a declaration of war. Returning therefore again to England, he fixed his reſidence in his native city, where, having married, he was in 1554 elected chamberlain, being the firſt perſon who held that office, and in 1571 repreſented his fellow-citizens in parliament. He died in the year 1601, and was buried in the cathedral church at Exeter. He wrote, among other works, 1. Order and uſage of keeping of parliaments in Ireland. 2. The events of comets or blazing ſtars, made upon the ſight of the comet Pagonia, which appeared in November and December 1577. 3. An addition to the chronicles of Ireland from 1546 to 1568; in the ſecond volume of Holinſhed's chronicle. 4. A deſcription of the city of Exeter, and of the ſondrie aſſaults given to the ſame; Holinſh. chron. vol. iii. 5. A book of euſigns. 6. Tranſlation of the hiſtory of the conqueſt of Ireland from the Latin of Giraldus Cambrenſis; in Holinſh. chron. vol. ii. 7. *Synopſis chorographica*, or an hiſtorical record of the province of Devon; never printed.

Hooker (Richard), a learned divine, was born at Heavy-tree, near Exeter, in the year 1553. Some of his anceſtors were mayors of that city, and he was nephew to *John* Hooker the hiſtorian. By this uncle he was firſt ſupported at the univerſity of Oxford, with the addition of a ſmall penſion from Dr Jewel, biſhop of Saliſbury, who in 1561 got him admitted one of the clerks of Corpus-Chriſti college. In 1573 he was elected ſcholar. In 1577 he took the degree of maſter of arts, and was admitted fellow the ſame year. In July 1579, he was appointed deputy profeſſor of the Hebrew language. In October, in the ſame year, he was for ſome trivial miſdemeanor expelled the college, but was immediately reſtored. In 1581 he took orders; and, being appointed to preach at St Paul's croſs, he came to London, where he was unfortunately drawn into a marriage with Joan Churchman, the termagant daughter of his hoſteſs. Having thus loſt his fellowſhip, he continued in the utmoſt diſtreſs till the year 1584, when he was preſented by John Cheny, Eſq. to the rectory of Drayton-Beaucham in Buckinghamſhire. In this retirement he was viſited by Mr Edwin Sandys, and Mr George Cranmer, his former pupils. They found him, with a Horace in his hand, tending ſome ſheep in the common field, his ſervant having been ordered home by his ſweet Xantippe. They attended him to his houſe; but were ſoon deprived of his company by an order, from his wife Joan, for him to come and rock the cradle. Mr Sandys's repreſentation to his father, of his tutor's ſituation, procured him the maſterſhip of the Temple. In this ſituation he met with conſiderable moleſtation from one Travers, lecturer of the Temple, and a bigoted Puritan, who in the afternoon endeavoured to confute the doctrine delivered in the morning. From this diſagreeable ſituation he ſolicited archbiſhop Whitgift to remove him to ſome country retirement, where he might proſecute his ſtudies in tranquillity. Accordingly, in 1591, he obtained the rectory of Boſcomb in Wiltſhire, together with a prebend in the church of Saliſbury, of which he was alſo made ſub-dean. In 1594 he was preſented to the rectory of Biſhopsbourne in Kent, where he died in the year 1600. He was buried in his own pariſh-church, where a monument was erected to his memory by William Cooper, Eſq. He was a meek, pious, and learned divine. He wrote, 1. Eccleſiaſtical politie, in eight books. fol. 2. A diſcourſe of juſtification, &c. with two other ſermons, Oxf. 1612, 4to. Alſo ſeveral other ſermons printed with the Eccleſiaſtical Politie.

Hooker, in naval architecture, a veſſel much uſed by the Dutch, built like a pink, but rigged and maſted like a hoy.

Hookers will lie nearer a wind than veſſels with croſs-ſails can do. They are from 50 to 200 tons burthen, and with a few hands will ſail to the Eaſt Indies.

HOOP, a piece of pliant wood, or iron, bent into a circular form, commonly uſed for ſecuring caſks, &c.

Driving a Hoop, a boyiſh exerciſe, of good effect in rendering the limbs pliable, and for ſtrengthening the nerves.

HOOPER (John), biſhop of Worceſter, and a martyr in the Proteſtant cauſe, was born in Somerſetſhire, and educated at Oxford, probably in Merton-college. In 1518 he took the degree of bachelor of arts, and afterwards became a Ciſtercian monk; but at length, diſliking his fraternity, he returned to Oxford, and there became *infected* with Lutheraniſm. In 1539 he was made chaplain and houſe-ſteward to Sir John Arundel, who afterwards ſuffered with the protector in the reign of Edward VI. But *that very catholic knight*, as Wood calls him, diſcovering his chaplain to be a heretic, Hooper was obliged to leave the kingdom. After continuing ſome time in France, he returned to England, and lived with a gentleman called *Seintlow:* but, being again diſcovered, he eſcaped in the habit of a ſailor to Ireland; thence embarked for the continent, and fixed his abode in Switzerland.

When king Edward came to the crown, Mr Hooper returned once more to his native country. In 1550, by his old patron Sir John Arundel's intereſt with the earl of Warwick, he was conſecrated biſhop of Glouceſter; and in 1552 was nominated to the ſee of Worceſter, which he held *in commendam* with the former. But queen Mary had ſcarce aſcended the throne, before his lordſhip was impriſoned, tried, and, not chooſing to recant, condemned to the flames. He ſuffered this terrible death at Glouceſter, on the 9th of February 1554, being then near 60 years of age. He was an avowed enemy to the church of Rome, and not perfectly reconciled to what he thought remnants of Popery in the church of England. In the former reign he had been one of Bonner's accuſers, which ſufficiently accounts for his being one of queen Mary's firſt ſacrifices to the *holy ſee*. He was a perſon of good parts and learning, as may be found in Fox's *Book of Martyrs*.

HOOPER (George), a very learned writer, biſhop of Bath and Wells, was well ſkilled in mathematics, and in the eaſtern learning and languages. He ſat in thoſe ſees above 24 years, often refuſed a ſeat in the privy council, and could not be prevailed upon to accept of the biſhopric of London on the death of biſhop Compton. He wrote, 1. The church of England free from the imputation of Popery. 2. A diſcourſe concerning Lent. 3. New danger of Preſbytery. 4. An inquiry into the ſtate of the ancient meaſures. 3. *De Valentinianorum hæreſi conjectura*. 6. Several ſermons; and other works.

HOOPING-cough. See (the Index ſubjoined to) MEDICINE.

HOOPOE. See UPUPA.

HOORNBECK (John), profeſſor of divinity in the univerſities of Leyden and Utrecht, was born at Haerlem in 1617. He underſtood the Latin, Hebrew, Chaldaic, Syriac, Rabbinical, Dutch, German, Engliſh, French, and Italian languages; and publiſhed many works, among which are, 1. A refutation of Socinianiſm, in 3 vols 4to. 2. A treatiſe for the conviction of the Jews. 3. Of the converſion of the Heathens. 4. Theological inſtitutions, &c. which are written in Latin. Mr Bayle repreſents him as a complete model of a good paſtor and divinity profeſſor.

HOP, in botany. See HUMULUS.

New land is found to ſucceed better with hops than old; and on this principle they are very cautious in their plantations in Kent, and look forward for the after-produce. When they make a new hop-ground, they plant it with apple-trees at a large diſtance aſunder, and with cherry-trees between: by this means, when the hops have grown ten years, which they judge as much as they will do well, they place their account in the cherry-trees, which bear large crops: theſe they gather for about 30 years, and then they cut them up, and depend upon their apple-trees only; which they find very large and ſtrong by that time.

The dry ſtalks of hops ſhould be burnt on the ground in winter, covering them with a little freſh earth as they burn. This makes together an excellent compoſt, to make the hills of. The land muſt be dug or plowed well, and laid very even; and then the places for the hills marked out by a line, and a ſtick put in every place where one is to be. A thouſand hills may be made in an acre of ground, and ſix or ſeven plants ſet on every hill. From ſix to nine feet ſhould be allowed between every hill, and the grounds in the hills ſhould be better and richer than the common earth. Some plant hops in March and April, but the moſt experienced people prefer the month of October, becauſe they will then ſtrike firm roots, and be ſtrong and vigorous againſt ſpring. The largeſt plants are to be choſen; and it is beſt to procure them from ſome rich ground, where the hills have been laid high; they ſhould be about eight or ten inches long, and have three or four joints or buds a-piece; the holes for planting them are to be dug eight or ten inches deep, and about a foot over; and in each of theſe holes four plants are to be ſet, one in each corner: they may be covered an inch deep over the top, if planted in October; but in ſpring, when they have ſhot from the joints, then they muſt not be buried: after this, the ground muſt be carefully kept clear of weeds.

Dreſſing of HOPS. This is preparing the ground in winter and ſpring for the making a good ſummer-crop. In doing this, the hills upon which the plants ſtand muſt be all pulled down, and undermined on every ſide, till the ſpade comes near the principal root; then ſhake off or remove with the hand the looſe mould from the upper or looſe roots, that you may ſee where the new rots grow out of the old ſets. The old ſets are to be carefully preſerved, but the other roots may be cut away. Whatever time the hills are pulled down, the roots muſt not be cut till March. When the young hops are dreſſed for the firſt time, all the roots are to be cut away that grew the year before, and the ſets are to be cut off within one inch of the ſame; and every year after, they muſt be cut as cloſe as may be to the old roots; but to a weak hop, ſome of the ſhoots are to be left at the dreſſing. Thoſe roots of the plant which grow downwards, are never to be injured, but only thoſe which run horizontally are to be cut. The old roots and the young ones may be eaſily diſtinguiſhed, in that the old ones are always red, and the young white. If there are by accident any wild hops got among the reſt, the places where they grow are to be marked with ſticks, or otherwiſe, at the time of their being gathered; and after this, at the time of dreſſing the ground, that whole hill is to be deſtroyed, and a new one made with new plants in the room of it. When the roots are cut and dreſſed, the rich compoſt is to be put to them; and the hills muſt not be made too high at firſt, leſt they hinder the young ſhoots.

Gathering and drying of HOPS. Hops blow in the latter end of July; in the beginning of Auguſt they bell; and they are ſometimes ripe at the beginning of September, ſometimes later. When they begin to change colour, are eaſily pulled to pieces, and their ſeeds look brown within them, they are ripe; and they are then to be gathered as quick as poſſible, for the leaſt blaſt of wind will hurt them at this time.

The manner of gathering hops, is to take down four hills ſtanding together in the midſt of the garden, and to cut the roots even with the ground, then lay the ground level; and when it is ſwept clean, it makes a floor, on which the hops may be laid and picked. The hop-plants are firſt unwound from the poles, and then the people ſit round and pick off the hops into baſkets.

Care ſhould be taken to dry the hops as faſt as they are picked, for in lying undried they are apt to heat and change colour very quickly. If the quantity picked be ſo large, that the kiln in which they are to be dried is over-ſtocked, they muſt be ſpread thin upon a floor, and they will keep two or three days in that manner without any harm. Indeed, where the quantity is but ſmall, there is no need to have recourſe to the kiln at all; for they will dry much better than any other way, by being laid thin upon a floor, and often turned. The drying of hops is the moſt material part of their manufacture: for if they be ill dried, they loſe all their agreeable flavour; and great caution ſhould be uſed, that they be all equally dried.

Bagging of Hops, a term uſed by the farmers, who cultivate hops, for the laſt thing they have to do with them in order to bring them to market; that is, the putting them up in large bags of coarſe cloth, for carriage. When the hops have been picked and dried in the ooſt, or tin-floor, they are ſo brittle that they would break to pieces and be ſpoiled if they were immediately to be put up; they are therefore to lie together three weeks, or thereabouts, that they may become tough: if they are covered from the air by blankets in the heap, they may be bagged much ſooner than if left open.

The manner of bagging them is this. A hole is made in an upper-floor, ſo large that a man may eaſily go up and down it; then a hoop is fitted to the mouth of the bag, and ſo firmly ſewed on, that it cannot be torn off; the bag is then let down through the hole, and the hoop remaining above, ſtops it from being pulled quite through, being larger than the hole: a few hops are to be firſt thrown into the bag, and a perſon below is to take up a parcel of theſe in each corner of the bag, tying it with a packthread; this makes a ſort of taſſel, by which the bags are afterwards the eaſier managed and turned about. When this is done, one man muſt go down into the bag, and, while another caſts in the hops, he muſt tread them down equally every way with his feet; when the bag is in this manner filled, it is to be ripped from the hoop, and ſewed up, leaving two taſſels at the corners, as at the bottom. A bag of hops thus prepared, may be kept for ſeveral years in a dry place.

Uſes, &c. The tops of this plant, being of a cooling quality, are eaten, when boiled, as an emollient. A decoction of hop-flowers is alſo accounted an antidote againſt poiſon; cures the itch, as well as the ſyrup thereof; and is eſteemed excellent in choleric and peſtilential fevers. The heads and tendrils are good in the ſcurvy and moſt cutaneous diſeaſes. Juleps and apozems are alſo prepared with hops for hypochondriacal and hyſterical affections, and to promote the menſes: but the chief uſe of this plant conſiſts in preſerving beer and other malt-liquors (in which the flower of this plant is a principal ingredient) from turning ſour, and rendering it wholeſome and grateful to the taſte, &c.

Hops were introduced about 250 years ago, from Flanders, and from that time have been aſſiduouſly cultivated in this kingdom. The duties ariſing from them are reckoned about 55,000 l. *per annum*, for which reaſon all public brewers are enjoined under a ſevere penalty to uſe no other bitter than hops.

The benefits derived from hops are ſubject to great uncertainty, no plant being more expoſed to accidents; and, independent of this, too great fertility is to the induſtrious owner ſometimes as fatal as too ſlender a crop. But thoſe who have money, and of courſe are able to wait for a market, avail themſelves of both. The great hop-planter, if a man of ſkill and ſubſtance, ſeldom fails of making, or rather earning a large eſtate. He is continually attentive to his grounds; and by that attention provides for the accurate culture of them, at a ſmall, or at leaſt a moderate expence. In a common year, his profits are conſiderable. In a year of plenty, he lays by a ſtock; and when, in the courſe of four or five years, crops in general fail, his ſtock fetches a large price, and he has a ſure ſale. It hath been computed by thoſe who are eſteemed the beſt judges, that in an acre of hops, producing to the value of 30 l. one moiety goes clear into the pocket of the proprietor, and that the other moiety of it goes in diſcharge of the rent, tythe, and all other expences, except the duty by exciſe, which is, however, drawn back on exportation. The duties on hops imported are ſo high as to prevent their coming in, except in a time of extreme ſcarcity, when the brewery might be otherwiſe injured; and in many other reſpects proviſions have been made by law to render the proprietors of ſo precarious a commodity as ſafe as poſſible.—The deſtroying hops while growing, hath been made felony without benefit of clergy.

HOPKINS (Ezekiel), biſhop of Derry in Ireland, was the ſon of an obſcure clergyman in Devonſhire; and was for ſome time a choriſter of Magdalen college, Oxford, and uſher of the adjoining ſchool. He was afterwards a Preſbyterian miniſter, and was extolled as an excellent preacher. John, lord Roberts, happening to hear him preach, was ſo pleaſed with his perſon, his diſcourſe, and his manner, that he retained him as his chaplain, when he was ſent in quality of lord lieutenant into Ireland, and preferred him to the deanery of Raphoe; and, on his being recalled, ſo ſtrongly recommended him to his ſucceſſor, that he was ſoon preferred to the biſhopric at Raphoe, whence he was tranſlated to Derry. During the war under the earl of Tyrconnel, at the revolution, he withdrew into England; and was choſen miniſter of St Mary, Aldermanbury, in London, where he died in 1690. His ſermons, his expoſition of the ten commandments, and that of the Lord's prayer, are much eſteemed. His works were printed together in 1710, folio. He was the father of Mr Charles Hopkins, ſeveral of whoſe poetical pieces are in Dryden's Miſcellanies.

HOR, a mountain, or mountainous tract of Arabia Petræa, ſituated in that circuit which the Iſraelites took to the ſouth and ſouth-eaſt of Edom in their way to the borders of Moab: on this mountain Aaron died. The inhabitants were called *Horites*. This tract was alſo called *Seir*, either from a native Horite, or from Eſau, by way of anticipation from his hairy habit of body; whoſe poſterity drove out the Horites.

HORAPOLLO, or Horus Apollo, a grammarian of Panaplus in Egypt, according to Suidas, who firſt taught at Alexandria, and then at Conſtantinople under the reign of Theodoſius. There are extant under his name, two books on the hieroglyphics of the Egyptians; which Aldus firſt publiſhed in Greek in 1505, in folio; and they have often been publiſhed ſince, with a Latin verſion and notes. It is not certain, however, that the grammarian of Alexandria was the author of theſe books; they being rather thought to belong to another Horapollo of more ancient date: on which head, ſee *Fabricius's Bibliotheca Græca*.

HORATII, three Roman brothers, who, under the reign of Tullus Hoſtilius, fought againſt the three Curiatii, who belonged to the Albanian army. Two of the Horatii were firſt killed; but the third, by his addreſs, ſucceſſively ſlew the three Curiatii, and by this victory rendered the city of Alba ſubject to the Romans. See Rome.

HORATIUS, ſurnamed *Cocles* from his loſing an eye in combat, was nephew to the conſul Horatius Pulvillus, and deſcended from one of the three brothers who fought againſt the Curiatii. Porſenna, laying ſiege to Rome, drove the Romans from Janiculum; and purſued them to the wooden bridge over the Tiber, which joined the city to Janiculum. Largius, Herminius, and Horatius Cocles, ſuſtained the ſhock of the enemy on the bridge, and prevented their entering the city with the Romans; but Largius and Herminius having paſſed the bridge, Horatius Cocles was left alone, and repulſed the enemy till the bridge was broken under him: he then threw himſelf armed into the Tyber, ſwam acroſs the river, and entered Rome in triumph.

Horatius (Quintus Flaccus), the moſt excellent of the Latin Poets of the lyric and ſatyrical kind, and the moſt judicious critic in the reign of Auguſtus, was the grandſon of a freedman, and was born at Venuſium, 64 B. C. He had the beſt maſters in Rome, after which he completed his education at Athens. Having taken up arms, he embraced the party of Brutus and Caſſius, but left his ſhield at the battle of Philippi. Some time after, he gave himſelf up entirely to the ſtudy of polite literature and poetry. His talents ſoon made him known to Auguſtus and Mecænas, who had a particular eſteem for him, and loaded him with favours. Horace alſo contracted a ſtrict friendſhip with Agrippa, Pollio, Virgil, and all the other great men of his time. He lived without ambition, and led a tranquil and agreeable life with his friends; but was ſubject to a defluxion in his eyes. He died at the age of 57. There are ſtill extant his Odes, Epiſtles, Satires, and Art of Poetry; of which there have been a great number of editions. The beſt are thoſe of the Louvre, in 1642, folio; of Paris, 1691, quarto; of Cambridge, 1699; and that with Bentley's emendations, printed at Cambridge in 1711.

HORD, in geography, is uſed for a company of wandering people, which have no ſettled habitation, but ſtroll about, dwelling in waggons, or under tents, to be ready to ſhift as ſoon as the herbage, fruit, and the preſent province, is eaten bare: ſuch are ſeveral tribes of the Tartars, particularly thoſe who inhabit beyond the Wolga, in the kingdom of Aſtracan and Bulgaria.

A hord conſiſts of 50 or 60 tents, ranged in a circle, and leaving an open place in the middle. The inhabitants in each hord uſually form a military company or troop, the eldeſt whereof is commonly the captain, and depends on the general or prince of the whole nation.

HORDEUM, barley, in botany, a genus of the triandria digynia claſs. The involucrum conſiſts of ſix leaves, and contains three flowers. There are eight ſpecies; only one of which, viz. the murinum, or wall-barley-graſs, is a native of Britain. The native place of the vulgare, or common barley cultivated in our fields, is not known. For the culture, &c. of common barley, ſee Agriculture, n° 118,—122.

HORDICALIA, or Hordicidia, in antiquity, a religious feaſt held among the Romans, wherein they ſacrificed cattle big with young. This feaſt fell on April 15. on which day they ſacrificed 30 cows with calf to the goddeſs Tellus or the Earth; part of them were ſacrificed in the temple of Jupiter. The calves taken out of their bellies were burnt to aſhes at firſt by the pontifices, afterwards by the eldeſt of the veſtal virgins.

HOREB, or Oreb, a mountain of Arabia Petræa, contiguous to and on the ſouth ſide of mount Sinai; the ſcene of many miraculous appearances.

HOREHOUND, Ballota, or *Stachys*, in botany. See Marrubium.

HORIZON, or Horison, in geography and aſtronomy, a great circle of the ſphere, dividing the world into two parts or hemiſpheres; the one upper and viſible, the other lower and hid. The word is pure Greek, οριζων, which literally ſignifies "bounding or terminating the ſight;" being formed of οριζω, *termino, definio*, "I bound, I limit;" whence it is alſo called *finitor*, "finiſher."

The horizon is either *rational* or *ſenſible*.

Rational, true, or *aſtronomical* Horizon, which is alſo called ſimply and abſolutely *the horizon*, is a great circle, whoſe plane paſſes thro' the centre of the earth, and whoſe poles are the zenith and nadir. It divides the ſphere into two equal parts, or hemiſpheres.

Senſible, viſible, or *apparent* Horizon, is a leſſer circle of the ſphere, which divides the viſible part of the ſphere from the inviſible. Its poles, too, are the zenith and nadir: and conſequently the *ſenſible horizon* is parallel to the *rational*; and it is cut at right angles, and into two equal parts, by the verticals.—The *ſenſible horizon* is divided into *eaſtern* and *weſtern*. The *eaſtern* or *ortive* horizon, is that part of the horizon wherein the heavenly bodies riſe. The *weſtern* or *occidual* horizon, is that wherein the ſtars ſet. The altitude or elevation of any point of the ſphere, is an arch of a vertical circle intercepted between it and the ſenſible horizon.

By *ſenſible horizon* is alſo frequently meant a circle, which determines the ſegment of the ſurface of the earth, over which the eye can reach; called alſo the *phyſical horizon*. In this ſenſe we ſay, a ſpacious *horizon*, a narrow ſcanty *horizon*.

HORIZONTAL, ſomething that relates to the horizon, is taken in the horizon, or on a level with the horizon.—We ſay, a *horizontal plane, horizontal line*, &c.

Horizontal *Dial*, is that drawn on a parallel to to the horizon; having its gnomon, or ſtyle, elevated ac-

according to the altitude of the pole of the place it is deſigned for. Horizontal dials are, of all others, the moſt ſimple and eaſy. The manner of deſcribing them, ſee under the article DIAL.

HORIZONTAL *Line*, in perſpective, is a right line drawn through the principal point, parallel to the horizon: or, it is the interſection of the horizontal and perſpective planes. See PERSPECTIVE.

HORIZONTAL *Plane*, is that which is parallel to the horizon of the place, or nothing inclined thereto.

The buſineſs of levelling, is to find whether two points be in the horizontal plane; or how much the deviation is. See LEVELLING.

HORIZONTAL *Plane*, in perſpective, is a plane parallel to the horizon, paſſing through the eye, and cutting the perſpective plane at right angles.

HORIZONTAL *Projection*. See GEOGRAPHY, n° 16, 19.

HORIZONTAL *Range*, or *Level Range*, of a piece of ordnance, is the line it deſcribes, when directed parallel to the horizon or horizontal line. See GUNNERY, *paſſim*.

HORIZONTAL *Moon*. See ASTRONOMY, n° 172.

HORMINUM, CLARY; a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants. There are ſeveral ſpecies; the moſt remarkable of which is the verbenaceum, or common wild clary. It grows naturally on ſandy and gravelly ground in many parts of Britain. It has ſometimes been called *oculus Chriſti*, from the ſuppoſed virtues of its ſeeds in clearing the ſight, which it does by its viſcous covering; for when any thing happens to fall into the eye, if one of the ſeeds is put in at one corner, and the eyelid kept cloſe over it, moving the ſeed gently along the eye, whatever happens to be there will ſtick to it, and ſo be brought out. The virtues of this are ſuppoſed to be the ſame as thoſe of the garden clary, but not quite ſo powerful.

HORN, in phyſiology, a hard ſubſtance growing on the heads of divers animals, particularly the clovenfooted quadrupeds; and ſerving them both as weapons of offence and defence.

The horn of animals is of the ſame nature as their gelatinous matter; and is only that matter charged with a leſs quantity of water, and a larger quantity of earth, and ſufficiently condenſed to have a firm and ſolid conſiſtence. By digeſting horn with water in Papin's digeſter, it may be entirely converted into jelly.

Horn is a perfectly animaliſed matter, and furniſhes in diſtillation the ſame principles as all animal-matters; that is, at firſt a pure phlegm, with a degree of heat not exceeding that of boiling water; then a volatile alkaline ſpirit, which becomes more and more penetrating and ſtrong; a fetid, light, and thin oil; a concrete volatile ſalt, which forms ramifications upon the ſides of the receiver; much air; fetid oil, which becomes more and more black and thick; and laſtly, it leaves in the retort a conſiderable quantity of almoſt incombuſtible coal, from which, after its incineration, ſcarcely any fixed alkali can be obtained.

Animal oil, and particularly that which is drawn firſt in the diſtillation of horn, is ſuſceptible of acquiring great thinneſs and volatility by repeated diſtillations, and is then called the *oil of dippel*.

The horns of ſtags, and of other animals of that kind, are the moſt proper to furniſh the animal oil to be rectified in the manner of dippel; becauſe they yield the largeſt quantity. Theſe horns alſo differ from the horns of other animals in this, that they contain a larger quantity of the ſame kind of earth which is in bones; hence they ſeem to poſſeſs an intermediate nature betwixt horns and bones.

Hart's-HORN. See HART's-*Horn*.

Hart's-HORN *calcined to Whiteneſs*. The phlogiſton of the coal of hart's-horn, although very difficultly combuſtible, may nevertheleſs be burnt with more eaſe than the coal of other horns, and with nearly the ſame facility as bones may. This coal, by being calcined with a long-continued and ſtrong fire, is changed into a very white earth called *hart's-horn calcined to whiteneſs*. This earth is employed in medicine as an abſorbent. It is given in dyſenteries and labour-pains which are ſuppoſed to be cauſed by acrid and ill-digeſted matters. Hart's-horn calcined to whiteneſs and levigated, is the baſis of Sydenham's white decoction, which is commonly preſcribed in theſe diſeaſes.

Hart's-HORN *prepared philoſophically*. This name is given to hart's-horn deprived by water of almoſt all its gelatinous part, ſo that its becomes brittle; and when its outer part is taken off, it is thus rendered very white, and is applicable to the ſame uſes as that which is calcined by fire.

Dyeing of HORN—Black is performed by ſteeping braſs in aqua-fortis till it be returned green: with this the horn is to be waſhed once or twice, and then put into a warmed decoction of logwood and water. Green is begun by boiling it, &c. in alum-water; then with verdigriſe, ammoniac, and white-wine vinegar; keeping it hot therein till ſufficiently green. Red is begun by boiling it in alum-water, and finiſhed by decoction in a liquor compounded of quick-lime ſteeped in rain-water, ſtrained, and to every pint an ounce of Brazil-wood added. In this decoction the bone, &c. is to be boiled till ſufficiently red.

Dr Lewis informs us that horns receive a deep black ſtain from ſolution of ſilver. It ought to be diluted to ſuch a degree as not ſenſibly to corrode the ſubject; and applied two or three times, if neceſſary, at conſiderable intervals, the matter being expoſed as much as poſſible to the ſun, to haſten the appearance and deepening of the colour.

Dyeing or ſtaining HORN *to imitate Tortoiſe-ſhell*.—The horn to be dyed muſt be firſt preſſed into proper plates, ſcales, or other flat form; and the following mixture prepared. Take of quick-lime two parts, and of litharge one part; temper them together to the conſiſtence of a ſoft paſte with ſoap-ley. Put this paſte over all the parts of the horn, except ſuch as are proper to be left tranſparent, in order to give it a nearer reſemblance of the tortoiſe-ſhell. The horn muſt remain in this manner covered with the paſte till it be thoroughly dry; when, the paſte being bruſhed off, the horn will be found partly opaque and partly tranſparent, in the manner of tortoiſe-ſhell; and when put over a foil, of the kind of latten called *aſſidue*, will be ſcarcely diſtinguiſhable from it. It requires ſome degree of fancy and judgment to diſpoſe of the paſte in ſuch a manner as to form a variety of tranſparent parts, of different magnitudes and figures, to look like the effect of nature: and it will be an improvement to add ſemi-tranſparent parts; which may be done by mixing whiting with ſome of the paſte to weaken its operation in particular places; by which ſpots of a reddiſh brown will be produced, which if properly interſperſed, eſpecially on the edges of the dark parts, will greatly increaſe both the beauty of the work, and its ſimilitude with the real tortoiſe-ſhell.

HORN is alſo a ſort of muſical inſtrument of the wind kind; chiefly uſed in hunting, to animate and bring together the dogs and the hunters. The term anciently was, *wind a horn;* all horns being in thoſe times compaſſed: but ſince ſtraight horns are come in faſhion, they ſay *blow a horn*, and ſometimes *ſound a horn*.—There are various leſſons on a horn; as the recheat, double recheat, royal recheat, running or farewell recheat, &c. See RECHEAT.

Cape-HORN. See *Terra del* FUEGO.

HORN-*Beam*, in botany. See CARPINUS.

HORN-*Blend*, is a black or green indurated bole or clay, conſiſting of ſcaly particles, which are diſtinguiſhable from thoſe of mica, by being leſs ſhining, thicker, and rectangular. It is generally found amongſt iron ores, and ſometimes intermixed with mica, forming a compact ſtone.

Human HORNS. In Dr Charles Leigh's natural hiſtory of Lancaſhire, Cheſhire, and the Peak in Derbyſhire, is the print of a woman with two horns on her head. When ſhe was 28 years of age an excreſcence grew upon her head like a wen, which continued 30 years, and then grew into two horns. After four years ſhe caſt them, and in their place grew two others. After four years ſhe caſt theſe alſo; and the horns which were on her head in 1668 (the time when the account was written) were then looſe. Her picture and one of her horns are in Aſhmole's muſeum. In the univerſity library at Edinburgh is preſerved a horn which was cut from the head of Elizabeth Love, in the 50th year of her age. It grew three inches above the ear, and was growing ſeven years.

HORN-*Fiſh*, *Gar fiſh*, or *Sea-Needle*. See ESOX.

HORN-*Work*, in fortification, an outwork compoſed of two demi-baſtions joined by a curtin. See FORTIFICATION.

HORNBY, a town of Lancaſhire in England, ſeated on a branch of the river Lune, and beautified with a handſome parochial chapel. The ruins of a decayed caſtle are ſtill to be ſeen here. W. Long. 2. 20. N. Lat. 54. 6.

HORN-CASTLE, a town of Lincolnſhire in England. It had a caſtle, as the name imports; from the architecture of which, and the Roman coins that are ſometimes dug up here, it is thought to have been a camp or ſtation of the Romans. The town is well built, and is almoſt ſurrounded with water. W. Long. 0. 2. N. Lat. 31. 20.

HORNDON, a town in Eſſex, in England. It ſtands near a rivulet, that at a ſmall diſtance from hence falls into the Thames, which is there called the *Hope*. E. Long. 0. 30. N. Lat. 51. 20.

HORNECK (Dr Anthony), a learned and pious divine, was born at Baccharach, in the Lower Palatinate, in 1641. He ſtudied divinity under Dr Spanheim at Heidelberg; and afterwards coming to England, completed his ſtudies at Oxford, and became vicar of Allhallows in that city. In 1665, he removed into the family of the duke of Albemarle; and was tutor to his grace's ſon, then lord Torrington. The duke preſented him to the rectory of Doulton in Devonſhire, and procured for him a prebend in Exeter. He was afterwards choſen preacher of the Savoy. In 1693, he was collated to a prebend in Weſtminſter, and the ſame year admitted to a prebend in the cathedral of Wells. He publiſhed, 1. The great law of conſideration. 2. The happy aſcetick. 3. Delight and judgment. 4. The fire of the altar. 5. The exerciſe of prayer. 6. The crucified Jeſus. 7. Several ſermons, and other works. He died in 1696, and was interred in Weſtminſter abbey, where a monument is erected to his memory.

HORNERS, thoſe people whoſe buſineſs it is to prepare various utenſils of the horns of cattle. The horners were a very ancient and conſiderable fraternity in the city of London ſome hundred years ago. In the reign of Edward II. they complained to parliament, that by foreigners buying up the horns in England, they were in danger of being ruined, and this buſineſs loſt to the nation. For this reaſon was made the ſtatute 6 Edw. IV. by which the ſale of horns to foreigners, (except ſuch as the ſaid horners refuſed), was prohibited; and the wardens had power granted them to ſearch all the markets in London and 24 miles round, and to inſpect Sturbridge and Ely fairs, to prevent ſuch practices, and to purchaſe horns at ſtated prices. But on plauſible pretences this law was repealed in the reign of James I. and thereupon the old evil revived. The horners again applied to parliament, and king Edward's ſtatute was renewed (excepting as to the inſpection of the fairs,) and ſtill remains in force. The importation of unwrought horns into this country is alſo prohibited. In 1750, there were exported to Holland 514,500 lantern-leaves, beſides powder-flaſks. There was formerly a duty of 20 ſhillings a thouſand, under which in 1682 were exported 76,650; but in the reign of George I. this duty was taken off, and theſe and all other manufactures made of horns may be exported free. The preſent company of horners were incorporated January 12th 1638; and conſiſt of a maſter, two wardens, and nine aſſiſtants, without livery or hall. They have a warehouſe in Spitalfields, to which the horns are ſent as brought from town and country markets, and thence regularly divided, the widows and orphans of deceaſed members having equal ſhares.

HORNET, in zoology, a very bold and venomous inſect of the flying kind. It greatly reſembles the waſp; only it is twice as large, and the head is of a longer and ſlenderer ſhape, and the eyes formed ſomewhat in the figure of a half moon. They build under ground, and in winter hide themſelves in hollow trees. They feed on fleſh, and when very hungry will ſeize upon a ſmall bird. Mouffet relates, that they have been ſeen ſingly to purſue and kill a ſparrow, and afterwards feed on its fleſh.—Mr Evelyn informs us, that they are very pernicious to trees, and will peel them round to the very timber, as if they had been unbarked by cattle. They are deſtroyed by ſtopping up their entrances with tar or gooſe-dung, or conveying the fumes of brimſtone into their cells.

HORNET-*Fly*, in natural hiſtory, a very large two-winged fly, which has the ſhape and colours of the hornet, and is at firſt ſight ſcarce to be diſtinguiſhed from it. The principal colour of the body of this fly is yellow; but it has two long and large black lines placed tranſverſely upon it, and has a black corcelet and a yellow head. Theſe lay, at a proper ſeaſon, a large number of oblong white eggs, which hatch into large and long worms, whoſe chief food is the worms and nymphs of the humble bees. The worm of this fly is continually found in the neſts of theſe bees, where it never meddles with the wax or honey, but preys only upon the young offspring of the creature.

HORNING, in Scots law, a writing iſſuing from the ſignet, in his majeſty's name, at the inſtance of a creditor againſt his debtor, commanding him to pay or perform within a certain time.

HORNSEY, a town in Yorkſhire, in England. It is almoſt ſurrounded by a ſmall arm of the ſea; and the church having a high ſteeple, is a noted ſea-mark. Not many years ago there was a ſtreet here called *Hornſey beck*, which was waſhed away by the ſea, except a houſe or two. E. Long. 0. 6. N. Lat. 54. 0.

HOROLOGIUM, a general name for inſtruments to meaſure the hours, as a watch, clock, dial, &c. See DIAL and WATCH.

HOROSCOPE, in aſtrology, is the degree of the aſcendant, or the ſtar that riſes above the horizon at a certain moment, which is obſerved in order to predict ſome future event, as the ſucceſs of a deſign, the fortune of a perſon who was at that inſtant born, &c.

HOROSCOPY. See DIVINATION, n° 2.

HORROX (Jeremiah), an eminent Engliſh aſtronomer in the 17th century, was born at Texteth near Liverpool in Lancaſhire in 1619. He died, to the great loſs of that ſcience and of the world, in the 23d year of his age, after he had juſt finiſhed his *Venus in ſole viſa*; which, with ſome other works, were publiſhed by Dr Wallis, in quarto.

HORROR, ſtrictly ſignifies ſuch an exceſs of fear as makes a perſon tremble.—In medicine, it denotes a ſhivering and ſhaking of the whole body, coming by fits. It is common at the beginning of all fevers, but is particularly remarkable in thoſe of the intermittent kind. See (*Index* ſubjoined to) MEDICINE.

HORSE, in zoology. See the article EQUUS.

Hunting HORSE, a name given to a horſe qualified to carry a perſon in the chaſe. The ſhape of the horſe deſigned for this ſervice ſhould be ſtrong, and well knit together, as the jockeys expreſs it. Irregular or unequal ſhapes in theſe creatures are always a token of weakneſs. The inequalities in ſhape, which ſhew a horſe improper for the chace, are the having a large head and a ſmall neck, a large leg and a ſmall foot, &c. The head of a hunting horſe indeed ſhould always be large, but the neck ſhould alſo be thick and ſtrong to ſupport it. The head ſhould be lean, the noſtrils wide, and the wind-pipe ſtrait. In order to his behaving well in the field, he ought to have great care and indulgence in the ſtable; to have as much reſt and quiet as may be; to be kept well ſupplied with good meat, clean litter, and freſh water by him; he ſhould be often dreſſed, and ſuffered to ſleep as much as he pleaſes. He ſhould be fed in ſuch a manner as that his dung may be rather ſoft than hard, and it muſt be of a bright and clean colour. All this may be eaſily managed by the continual obſervance and change of his food as occaſion requires. After his uſual ſcowerings, he ſhould have exerciſe, and maſhes of ſweet malt; and bread and beans, or wheat and beans mixed together, are to be his beſt food, and beans and oats his worſt.

There is a general practice among grooms, of giving their hunting horſes wheat-ſtraw, as ſoon as they take them up from the graſs. They ſay they do this to take up their bellies; but there ſeems to be much reaſon for diſapproving ſuch a practice. The change is very violent, and the nature of the ſtraw ſo heating and drying, that there ſeems great reaſon to fear, that the aſtringent nature of it would be prejudicial more than at firſt is perceived. It is always found, that the dung is hard after this food, and is voided with pain and difficulty, which is in general very wrong for this kind of horſes. It is better, therefore, to avoid this ſtraw-feeding; and to depend upon moderate airing, warm clothing, good old hay, and old corn, than to have recourſe to any thing of this kind.

It is a rule with all ſtaunch ſportſmen, that no horſe ſhould be uſed in hunting till he is five years old. Some will hunt them at four: but the horſe at this time is not come up to his true ſtrength and courage; and will not only fail at any tough trials, but will be ſubject to ſtrains and accidents of that kind, much more than if he was kept for another year, when his ſtrength would be more confirmed.

Management of a HORSE *upon and after a Journey.* See that his ſhoes be not too ſtrait, or preſs his feet, but be exactly ſhaped; and let him be ſhod ſome days before you begin a journey, that they may be ſettled to his feet.

Obſerve that he is furniſhed with a bitt proper for him, and by no means too heavy, which may incline him to carry low, or to reſt upon the hand when he grows weary, which horſemen call *making uſe of his fifth leg*.

Sportſm. Dict.

The mouth of the bitt ſhould reſt upon his bars about half a finger's-breadth from his tuſhes, ſo as not to make him frumble his lips; the curb ſhould reſt in the hollow of his beard a little above the chin; and if it gall him, you muſt defend the place with a piece of buff, or other ſoft leather.

Take notice that the ſaddle do not reſt upon his withers, reins, or back-bone, and that one part of it do not preſs his back more than another.

Some riders gall a horſe's ſides below the ſaddle with their ſtirrup-leathers, eſpecially if he be lean; to hinder it, you ſhould fix a leather-ſtrap between the points of the fore and hind-bows of the ſaddle, and make the ſtirrup-leather paſs over them.

Begin your journey with ſhort marches, eſpecially if your horſe has not been exerciſed for a long time: ſuffer him to ſtale as often as you find him inclined; and not only ſo, but invite him to it: but do not excite your mares to ſtale, becauſe their vigour will be thereby diminiſhed.

It is adviſable to ride very ſoftly, for a quarter or half an hour before you arrive at the inn, that the horſe not being too warm, nor out of breath, when put into the ſtable, you may unbridle him: but if your buſineſs obliges you to put on ſharply, you muſt

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then (the weather being warm) let him be walked in a man's hand, that he may cool by degrees; otherwiſe, if it be very cold, let him be covered with cloths, and walked up and down in ſome place free from wind; but in caſe you have not the conveniency of a ſheltered walk, ſtable him forthwith, and let his whole body be rubbed and dried with ſtraw.

Although ſome people will have their horſes legs rubbed down with ſtraw as ſoon as they are brought into the ſtable, thinking to ſupple them by that means; yet it is one of the greateſt errors that can be committed, and produces no other effects than to draw down into the legs thoſe humours that are always ſtirred up by the fatigue of the journey: not that the rubbing of horſes legs is to be diſallowed; on the contrary, we highly approve of it, only would not have it done at their firſt arrival, but when they are perfectly cooled.

Being come to your inn, as ſoon as your horſe is partly dried, and ceaſes to beat in the flanks, let him be unbridled, his bitt waſhed, cleanſed, and wiped, and let him eat his hay at pleaſure.

If your horſe be very dry, and you have not given him water on the road, give him oats waſhed in good mild ale.

The duſt and ſand will ſometimes ſo dry the tongues and mouths of horſes, that they loſe their appetites: in ſuch caſe, give them bran well moiſtened with water to cool and refreſh their mouths; or waſh their mouths and tongues with a wet ſpunge, to oblige them to eat.

The foregoing directions are to be obſerved after moderate riding; but if you have rid exceſſively hard, unſaddle your horſe, and ſcrape off the ſweat with a ſweating-knife, or ſcraper, holding it with both hands, and going always with the hair; then rub his head and ears with a large hair-cloth, wipe him alſo between the fore-legs and hind-legs; in the mean while, his body ſhould be rubbed all over with ſtraw, eſpecially under his belly and beneath the ſaddle, till he is thoroughly dry.

That done, ſet on the ſaddle again, cover him; and if you have a warm place, let him be gently led up and down in it, for a quarter of an hour; but if not, let him dry where he ſtands.

Or you may unſaddle him immediately; ſcrape off the ſweat; let the oſtler take a little vinegar in his mouth, and ſquirt it into the horſe's; then rub his head, between the fore and hind-legs, and his whole body, till he is pretty dry: let him not drink till thoroughly cool and has eaten a few oats; for many, by drinking too ſoon, have been ſpoiled. Set the ſaddle in the ſun or by a fire, in order to dry the pannels.

When horſes are arrived in an inn, a man ſhould, before they are unbridled, lift up their feet, to ſee whether they want any of their ſhoes, or if thoſe they have do not reſt upon their ſides; afterwards he ſhould pick and clear them of the earth and gravel, which may be got betwixt their ſhoes and ſoles.

If you water them abroad, upon their return from the river, cauſe their feet to be ſtopped with cowdung, which will eaſe the pain therein; and if it be in the evening, let the dung continue in their feet all night, to keep them ſoft and in good condition: but if your horſe have brittle feet, it will be requiſite to anoint the fore-feet, at the on-ſetting of the hoofs, with butter, oil, or hog's-greaſe, before you water him in the morning, and in dry weather they ſhould be alſo greaſed at noon.

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Many horſes, as ſoon as unbridled, inſtead of eating, lay themſelves down to reſt, by reaſon of the great pain they have in their feet, ſo that a man is apt to think them ſick: but if he looks to their eyes, he will ſee they are lively and good; and if he offers them meat as they are lying, they will eat it very willingly; yet if he handles their feet, he will find them extremely hot, which diſcovers their ſuffering in that part. You muſt therefore ſee if their ſhoes do not reſt upon their ſoles, which is ſomewhat difficult to be certainly known, without unſhoeing them; but if you take off their ſhoes, then look to the inſide of them, and you may perceive that thoſe parts which reſt upon the ſoles are more ſmooth and ſhining than the others: in this caſe you are to pare their feet in thoſe parts, and fix on their ſhoes again, anointing the hoofs, and ſtopping the ſoles, with ſcalding hot black pitch or tar.

After a long day's journey, at night feel your horſe's back, if he be pinched, galled, or ſwelled, (if you do not immediately diſcover it, perhaps you may after ſupper), there is nothing better than to rub it with good brandy and the white of an egg. If the galls are between the legs, uſe the ſame remedy; but if the oſtler rubs him well between the legs, he will ſeldom be galled in that part.

In order to preſerve horſes after travel, take theſe few uſeful inſtructions. When you are arrived from a journey, immediately draw the two heel-nails of the fore-feet; and, if it be a large ſhoe, then four: two or three days after, you may blood him in the neck, and feed him for ten or twelve days only with wet bran, without giving him any oats; but keep him well littered.

The reaſon why you are to draw the heel-nails, is becauſe the heels are apt to ſwell, and if they are not thus eaſed, the ſhoes would preſs and ſtraiten them too much: it is alſo adviſable to ſtop them with cowdung for a while; but do not take the ſhoes off, nor pare the feet, becauſe the humours are drawn down by that means.

The following bath will be very ſerviceable for preſerving your horſe's legs. Take the dung of a cow or ox, and make it thin with vinegar, ſo as to be of the conſiſtence of thick broth; and having added a handful of ſmall ſalt, rub his fore-legs from the knees, and the hind-legs from the gambrels, chafing them well with and againſt the hair, that the remedy may ſink in and ſtick to thoſe parts, that they may be all covered over with it. Thus leave the horſe till morning, not wetting his legs, but giving him his water that evening in a pail: next morning lead him to the river, or waſh his legs in well-water, which is very good, and will keep them from ſwelling.

Thoſe perſons, who, to recover their horſes feet, make a hole in them, which they fill with moiſtened cow-dung, and keep it in their fore-feet during the ſpace of a month, do very ill; becauſe, though the continual moiſture that iſſues from the dung occaſions the growing of the hoof, yet it dries and ſhrinks

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ſhrinks it ſo exceſſively when out of that place, that it ſplits and breaks like glaſs, and the foot immediately ſtraitens. For it is certain, that cow-dung (contrary to the opinion of many people) ſpoils a horſe's hoof: it does indeed moiſten the ſole; but it dries up the hoof, which is of a different nature from it. In order, therefore, to recover a horſe's feet, inſtead of cow-dung, fill a hole with blue wet clay, and make him keep his fore-feet in it for a month.

Moſt horſes that are fatigued, or over-rid, and made lean by long journeys, have their flanks altered without being purſy, eſpecially vigorous horſes that have worked too violently.

There is no better method to recover them, than to give each of them in the morning half a pound of honey very well mingled with ſcalded bran; and when they readily eat the half pound, give them the next time a whole one, and afterwards two pounds, every day continuing this courſe till your horſes are empty, and purge kindly with it; but as ſoon as you perceive that their purging ceaſes, forbear to give them any more honey.

You may adminiſter powder of liquorice in the ſcalded bran for a conſiderable time; and to cool their blood, it will not be improper to let them have three or four gliſters.

In caſe the horſe be very lean, it is expedient to give him ſome wet bran, over and above his proportion of oats; and graſs is alſo extraordinary beneficial, if he be not purſy.

If it be a mare, put her to a horſe; and if ſhe never had a foal before, it will enlarge her belly.

Sometimes exceſſive feeding may do horſes more harm than good, by rendering them ſubject to the farcy. You ſhould therefore be cautious in giving them too great a quantity at a time, and take a little blood from them now and then.

When a horſe begins to drink it heartily, it is a certain ſign that he will recover in a ſhort time. As to the method of giving him water during a journey, obſerve the following rules:

All the while you are upon a journey, let your horſe drink of the firſt good water you come to, after ſeven o'clock in the morning if it be in ſummer-time, and after nine or ten in winter.

That is accounted good water, which is neither too quick and piercing, nor too muddy and ſtinking.

This is to be done, unleſs you would have him gallop a long time after drinking; for if ſo, you muſt forbear.

Though it is the cuſtom of England to run and gallop horſes after drinking, which we call *watering-courſes*, to bring them (as they ſay) into wind; yet, ſays M. de Solleyſel, it is the moſt pernicious practice that can be imagined for horſes, by which many are rendered purſy.

While a horſe is drinking, draw up his head five or ſix times, making him move a little between every draught; and notwithſtanding he be warm, and ſweat very much, yet if he is not quite out of breath, and you have ſtill four or five miles to ride, he will be better after drinking a little, than if he had drank none at all: it is true, indeed, that if the horſe is very warm, you ſhould, at coming out of the water, redouble your pace, to make him go at a gentle trot, to warm the water in his belly.

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You ought to let him drink after this manner during the whole time of your journey: becauſe, if when you happen to bait he be hot or ſweaty, you muſt not let him drink for a long time, as it would endanger his life; and when his bridle is taken off, his exceſſive thirſt will hinder him from eating, ſo that he will not offer to touch his meat for an hour or two, which perhaps your occaſions will not allow you for a baiting time, and not to have any food will render him unfit for travel.

If you meet with any ford before you come to your inn, ride the horſe through it two or three times, but not up to his belly: this will not only cleanſe his legs; but the coldneſs of the water will bind up the humours, and prevent them from deſcending.

If your horſe has been very warm, and you have not had the conveniency of watering him upon the road, he will, when unbridled, eat but very little; therefore he ſhould have his oats given him waſhed in ale or beer, or only ſome of them, if you intend to feed him again after he has drank.

Some are of opinion, that horſes are often ſpoiled by giving them oats before their water; becauſe they ſay, the water makes the oats paſs too ſoon, and out of the ſtomach undigeſted. But M. de Solleyſel affirms, that though it be the common cuſtom not to do it till after, yet it is proper to feed with oats both before and after, eſpecially if the horſe be warm, and has been hard rid; for they will be a great deal the better for it, and in no danger of becoming ſick.

HORSE-*Cheſtnut*. See ÆSCULUS.

HORSE-*Guards*. See GUARDS.

HORSE-*Muſcle*. See MUSCLE.

HORSE-*Radiſh*. See COCHLEARIA.

HORSE-*Shoes*. See SHOEING.

HORSE-*Vetch*. See HIPPOCREPIS.

Animated HORSE-*Hairs*, a term uſed to expreſs a ſort of long and ſlender water-worm of a blackiſh colour, and ſo much reſembling a horſe-hair that it is generally, by the vulgar, ſuppoſed to be the hair fallen from a horſe's mane into the water as he drinks, and there animated by ſome ſtrange power. Dr Liſter has at large confuted this opinion in the Philoſophical Tranſactions. See the article SETACEOUS *Worms*.

Breeding of HORSES. When the ſtallion is choſen, and all the mares intended for him are collected together, there muſt be another ſtone-horſe, to diſcover which of the mares are in heat; and, at the ſame time, contribute to inflame them. All the mares are to be brought ſucceſſively to this ſtone-horſe; which ſhould alſo be enflamed, and ſuffered frequently to neigh. As he is for leaping every one, ſuch as are not in heat keep him off, whilſt thoſe which are ſo ſuffer him to approach them. But inſtead of being allowed to ſatisfy his impulſe, he muſt be led away, and the real ſtallion ſubſtituted in his ſtead. This trial is neceſſary for aſcertaining the true time of the mare's heat, eſpecially of thoſe which have not yet had a colt; for with regard to ſuch as have recently foaled, the heat uſually begins nine days after their delivery; and on that very day they may be led to the ſtallion to be covered; and nine days after, by the experiment abovementioned, it may be known whether they are ſtill in heat. If they are, they muſt be covered a ſecond time; and

Buffon's Nat. Hiſt.

thus ſucceſſively every ninth day while their heat continues: for when they are impregnated, their heat abates, and in a few days ceaſes entirely.

But that every thing may be done eaſily and conveniently, and at the ſame time with ſucceſs and advantage, great attention, expence and precaution are requiſite. The ſtud muſt be fixed in a good ſoil, and in a ſuitable place, proportioned to the number of mares and ſtallions intended to be uſed. This ſpot muſt be divided into ſeveral parts, incloſed with rails or ditches well fenced; in the part where the paſture is the richeſt, the mares in fold, and thoſe with colts by their ſides, are to be kept. Thoſe which are not impregnated, or have not yet been covered, are to be ſeparated, and kept with the fillies in another cloſe, where the paſture is leſs rich, that they may not grow too fat, which would obſtruct the progreſs of generation. Laſtly, the young ſtone colts, or geldings, are to be kept in the drieſt part of the fields, and where the ground is moſt unequal; that by running over the uneven ſurface, they may acquire a freedom in the motion of their legs and ſhoulders. This cloſe, where the ſtone colts are kept, muſt be very carefully ſeparated from the others, leſt the young horſes break their bounds, and enervate themſelves with the mares. If the tract be ſo large as to allow of dividing each of theſe cloſes into two parts, for putting oxen and horſes into them alternately, the paſture will laſt much longer than if continually eaten by horſes; the ox improving the fertility, whereas the horſe leſſens it. In each of theſe cloſes ſhould be a pond; ſtanding water being better than running, which often gripes them: and if there are any trees in the ground, they ſhould be left ſtanding, their ſhade being very agreeable to the horſes in great heats; but all ſtems or ſtumps ſhould be grubbed up, and all holes levelled, to prevent accidents. In theſe paſtures your horſes ſhould feed during the ſummer; but in the winter the mares ſhould be kept in the ſtable and fed with hay. The colts alſo muſt be houſed, and never ſuffered to feed abroad in winter, except in very fine weather. Stallions that ſtand in the ſtable ſhould be fed more with ſtraw than hay; and moderately exerciſed till covering time, which generally laſts from the beginning of April to the end of June. But during this ſeaſon they ſhould have no other exerciſe, and be plentifully fed, but with the ſame food as uſual. Before the ſtallion is brought to the mare, he ſhould be dreſſed, as that will greatly increaſe his ardour. The mare muſt alſo be curried, and have no ſhoes on her hind feet, ſome of them being tickliſh, and will kick the ſtallion. A perſon holds the mare by the halter, and two others lead the ſtallion by long reins; when he is in a proper ſituation, another aſſiſtant carefully directs the yard, pulling aſide the mare's tail, as a ſingle hair might hurt him dangerouſly. It ſometimes happens that the ſtallion does not complete the work of generation, coming from the mare without making any injection: it ſhould therefore be attentively obſerved, whether, in the laſt moments of the copulation, the dock of the ſtallion's tail has a vibrating motion; for ſuch a motion always accompanies the emiſſion of the ſeminal lymph. If he has performed the act, he muſt on no conſideration be ſuffered to repeat it; but be led away directly to the ſtable, and there kept two days. For, however able a good ſtallion may be of covering every day during the three months, it is much better to let him be led to a mare only every other day: his produce will be greater, and he himſelf leſs exhauſted. During the firſt ſeven days, let four different mares be ſucceſſively brought to him; and the ninth day let the firſt be again brought, and ſo ſucceſſively while they continue in heat: but as ſoon as the heat of any one is over, a freſh mare is to be put in her place, and covered in her turn every nine days; and as ſeveral retain even at the firſt, ſecond, or third time, it is computed that a ſtallion, by ſuch management, may, during the three months, cover 15 or 18 mares, and beget 10 or 12 colts. Theſe animals have a very large quantity of the ſeminal lymph; ſo that a conſiderable portion of it is ſhed during the emiſſion. In the mares likewiſe is an emiſſion, or rather diſtillation of the ſeminal lymph, during the whole time they are horſing; ejecting a viſcid whitiſh lymph, called the *heats*, which ceaſe on conception. This ichor the Greeks called *hippomanes;* and pretended that philtres might be made of it, one remarkable effect of which was, to render a horſe frantic with luſt. This hippomanes is very different from that found in the ſecundines of the foal, which Mr Daubenton firſt diſcovered, and has ſo accurately deſcribed its nature, origin, and ſituation. The ejection of this liquor is the moſt certain ſign of the mare's heat; but it is alſo known by the inflation of the lower part of the vulva, by her frequent neighings, and attempts to get to the horſes. After being covered, nothing more is requiſite than to lead her away to the field. The firſt foal of a mare is never ſo ſtrongly formed as the ſucceeding; ſo that care ſhould be taken to procure for her, the firſt time, a larger ſtallion, that the defect of the growth may be compenſated by the largeneſs of the ſize. Particular regard ſhould alſo be had to the difference or congruity of the faſhion of the ſtallion and the mare, in order to correct the faults of the one by the perfections of the other: eſpecially never to make any diſproportionate copulations, as of a ſmall horſe with a large mare, or a large horſe with a ſmall mare; as the produce of ſuch copulation would be ſmall, or badly proportioned. It is by gradations that we muſt endeavour to arrive at natural beauty: for inſtance, to give to a mare a little too clumſy, a well-made horſe and finely ſhaped; to a ſmall mare, a horſe a little higher; to a mare which is faulty in her forehand, a horſe with an elegant head and noble cheſt, &c.

It has been obſerved, that horſes fed in dry and light grounds, produce temperate, ſwift, and vigorous foals, with muſcular legs and a hard hoof; while the ſame bred in marſhes and moiſt paſtures have produced foals with a large heavy head, a thick carcaſs, clumſy legs, bad hoofs, and broad feet. Theſe differences proceed from the air and food, which is eaſily underſtood; but what is more difficult to be accounted for, and ſtill more eſſential than what we have hitherto obſerved, is, to be continually croſſing the breed to prevent a degeneracy.

In coupling of horſes, the colour and ſize ſhould be ſuited to each other, the ſhape contraſted, and the breed croſſed by an oppoſition of climates: but horſes and mares foaled in the ſame ſtud ſhould never be joined. Theſe are eſſential articles; but there are others which ſhould

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ſhould by no means be neglected: as that no ſhort-docked mares be ſuffered in a ſtud, becauſe from their being unable to keep off the flies, they are much more tormented by them than others which have a long ſweeping tail; and their continual agitations from the ſtings of theſe inſects, occaſions a diminution in the quantity of their milk, and has a great influence on the conſtitution and ſize of the colt, which will be vigorous in proportion as its dam is a good nurſe. Care muſt alſo be taken, that the ſtud mares be ſuch as have been always brought up in paſtures, and never over-worked. Mares which have always been brought up in the ſtable on dry food, and afterwards turned to graſs, do not breed at firſt: ſome time is required for accuſtoming them to this new aliment.

Though the uſual ſeaſon for the heat of mares be from the beginning of April to the end of June, yet it is not uncommon to find ſome among a large number, that are in heat before that time: but it is adviſable to let this heat paſs over without giving them to the ſtallion, becauſe they would foal in winter; and the colts, beſides the inclemency of the ſeaſon, would have bad milk for their nouriſhment. Again, if the mares are not in heat till after the end of June, they ſhould not be covered that ſeaſon; becauſe the colts being foaled in ſummer, have not time for acquiring ſtrength ſufficient to repel the injuries of the following winter.

Many, inſtead of bringing the ſtallion to the mare, turn him looſe into the cloſe, where all the mares are brought together; and there leave him to chooſe ſuch as will ſtand to him. This is a very advantageous method for the mares: they will always take horſe more certainly than in the other; but the ſtallion, in ſix weeks, will do himſelf more damage than in ſeveral years by moderate exerciſe, conducted in the manner we have already mentioned.

When the mares are pregnant, and their belly begins to ſwell, they muſt be ſeparated from thoſe that are not, leſt they hurt them. They uſually go 11 months and ſome days; and foal ſtanding, whereas moſt other quadrupeds lie down. Thoſe that cannot foal without great difficulty, muſt be aſſiſted; the foal muſt be placed in a proper ſituation; and ſometimes, if dead, drawn out with cords. The head of the colt uſually preſents itſelf firſt, as in all other animals: at its coming out of the matrix, it breaks the ſecundines or integuments that incloſe it, which is accompanied with a great flux of the lymph contained in them; and at the ſame time one or more ſolid lumps are diſcharged, formed by the ſediment of the inſpiſſated liquor of the allantoides. This lump, which the ancients called the *hippomenes of the colt*, is ſo far from being, as they imagined, a maſs of fleſh adhering to the head of the colt, that it is ſeparated from it by a membrane called *amnios*. As ſoon as the colt is fallen, the mare licks it, but without touching the hippomenes; which points out another error of the ancients, who affirmed that ſhe inſtantly devours it.

The general cuſtom is, to have a mare covered nine days after her foaling, that no time may be loſt; but it is certain, that the mare having, by this means, both her preſent and future foal to nouriſh, her ability is divided, and ſhe cannot ſupply both ſo largely as ſhe might one only. It would therefore be better, in order to have excellent horſes, to let the mares be covered only every other year; they would laſt the longer, and bring foals more certainly: for, in common ſtuds, it is ſo far from being true that all mares which have been covered bring colts every year, that it is conſidered as a fortunate circumſtance if half or at moſt two thirds of them foal.

Mares, when pregnant, will admit of copulation; but it is never attended with any ſuperfœtation. They uſually breed till they are 14 or 15 years of age; and the moſt vigorous till they are above 18. Stallions, when well managed, will engender till the age of 20, and even beyond; but it muſt be obſerved, that ſuch horſes as are ſooneſt made ſtallions, are alſo the ſooneſt incapable of generation: thus the large horſes, which acquire ſtrength ſooner than the ſlender, and are therefore often uſed as ſtallions as ſoon as they are four years old, are incapable of generation before they are ſixteen.

Gelding of HORSES. See GELDING.
Rearing of HORSES. See COLT.

HORSEMANSHIP;

Or, The Art of Riding, and of Training and Managing HORSES.

SECT. I. *The method of preparing horſes to be mounted.*

THOUGH all horſes are generally bought at an age when they have already been backed, they ſhould be begun and prepared for the rider with the ſame care, gentleneſs and caution, as if they had never been handled or backed, in order to prevent accidents, which might elſe ariſe from ſkittiſhneſs or other cauſes: and as it is proper that they ſhould be taught the figure of the ground they are to go upon when they are at firſt mounted, they ſhould be previouſly trotted in a *longe* on circles, without any one upon them.

Earl of Pembroke's Directions.

The manner of doing this is as follows: Put an eaſy *caveſſon* upon the horſe's noſe, and make him go forwards round you, ſtanding quiet and holding the *longe*; and let another man, if you find it neceſſary, follow him with a whip. All this muſt be done very gently, and but a little at a time: for more horſes are ſpoiled by overmuch work, than by any other treatment whatever; and that by very contrary effects; for ſometimes it drives them into vice, madneſs, and deſpair, and often ſtupifies and totally diſpirits them.

The firſt obedience required in a horſe is going forwards: till he perform this duty freely, never even think of making him rein back, which would inevitably make him reſtive: as ſoon as he goes forwards readily, ſtop and careſs him. You muſt remember in this, and likewiſe in every other exerciſe, to uſe him to go equally well to the right and left; and when he obeys, careſs him and diſmiſs him immediately. If a horſe, that is very young, takes fright and ſtands ſtill, lead on another horſe before him, which probably will induce him inſtantly to follow. Put a ſnaffle in his mouth; and when he goes freely, ſaddle him, girting him at firſt very looſe. Let the cord, which you hold, be long and looſe; but not ſo much ſo as to endanger the horſe's entangling his legs in it. It muſt be obſerved, that ſmall circles, in the beginning, would conſtrain the horſe too much, and put him upon defending himſelf. No bend muſt be required at firſt: never ſuffer him to gallop falſe; but whenever he attempts it, ſtop him without delay, and then ſet him off afreſh. If he gallops of his own accord, and true, permit him to continue it; but if he does it not voluntarily, do not demand it of him at firſt. Should he fly and jump, ſhake the cord gently upon his noſe without jerking it, and he will fall into his trot again. If he ſtands ſtill, plunges or rears, let the man who holds the whip make a noiſe with it; but never touch him, till it be abſolutely neceſſary to make him go on. When you change hands, ſtop and careſs him, and entice him by fair means to come up to you: for by preſenting yourſelf, as ſome do, on a ſudden before horſes, and frightening them to the other ſide, you run a great riſk of giving them a ſhyneſs. If he keeps his head too low, ſhake the *caveſſon* to make him raiſe it: and in whatever the horſe does, whether he walks, trots, or gallops, let it be a conſtant rule, that the motion be determined and really ſuch as is intended, without the leaſt ſhuffling, pacing, or any other irregular gait.

SECT. II. *The method of placing the rider and rendering him firm on horſeback, with ſome occaſional inſtructions for riders and the horſes.*

IT is neceſſary that the greateſt attention, and the ſame gentleneſs that is uſed in teaching the horſes, be obſerved likewiſe in teaching the rider, eſpecially at the beginning. Every method and art muſt be practiſed to create and preſerve, both in man and horſe, all poſſible feeling and ſenſibility; contrary to the uſage of moſt riding-maſters, who ſeem induſtriouſly to labour at aboliſhing theſe principles both in one and the other. As ſo many eſſential points depend upon the manner in which a man is at firſt placed on horſeback, it ought to be conſidered and attended to with the ſtricteſt care and exactneſs.

The abſurdity of putting a man, who perhaps has never before been upon a horſe, on a rough trotting horſe, on which he is obliged to ſtick with all the force of his arms and legs, is too obvious to need mentioning. This rough work, all at once, is plainly as detrimental at firſt, as it is excellent afterwards in proper time. No man can be either well or firmly ſeated on horſeback, unleſs he be maſter of the balance of his body, quite unconſtrained, with a full poſſeſſion of himſelf, and at his eaſe: none of which requiſites can he enjoy, if his attention be otherwiſe engaged; as it muſt wholely be in a raw, unſuppled, and unprepared lad, who is put at once upon a rough horſe: in ſuch a diſtreſsful ſtate, he is forced to keep himſelf on at any rate, by holding to the bridle (at the expence of the ſenſibility both of his own hand and the horſe's mouth), and by clinging with his legs, in danger of his life, and to the certain depravation of a right feeling in the horſe.

The firſt time a man is put on horſeback, it ought to be upon a very gentle one. He never ſhould be made to trot, till he is quite eaſy in the walk; nor gallop, till he is able to trot properly. The ſame muſt be obſerved in regard to horſes: they ſhould never be made to trot till they are obedient, and their mouths are well formed on a walk; nor be made to gallop, till the ſame be effected on a trot. When he is arrived at ſuch a degree of firmneſs in his ſeat, the more he trots, and the more he rides rough horſes, the better. This is not only the beſt method, but alſo the eaſieſt and the ſhorteſt: by it a man is ſoon made ſufficiently an horſeman for a ſoldier: but by the other deteſtable methods that are commonly uſed, a man, inſtead of improving, contracts all ſorts of bad habits, and rides worſe and worſe every day; the horſe too becomes daily more and more unfit for uſe. In proceeding according to the manner propoſed, a man is rendered firm and eaſy upon the horſe, both his own and the horſe's ſenſibility is preſerved, and each in a ſituation fit to receive and practiſe all leſſons effectually.

Among the various methods that are uſed of placing people on horſeback, few are directed by reaſon. Before you let the man mount, teach him to know, and always to examine, if the curb be well placed, (that is, when the horſe has a bit in his mouth, which at firſt he ſhould not; but only a ſnaffle, till the rider is firm in his ſeat, and the horſe alſo ſomewhat taught): likewiſe to know if the noſe-band be properly tight; the throat-band looſiſh; and the mouth-piece neither too high nor too low in the horſe's mouth, but rightly put ſo as not to wrinkle the ſkin nor to hang lax; the girts drawn moderately, but not too tight; and the crupper and the breaſt-plate properly adjuſted. A very good and careful hand may venture on a bit at firſt, and ſucceed with it full as well as by beginning with a ſnaffle alone: on colts, indeed, it is better, in all ſchools whatſoever, to avoid any preſſure on the bars juſt at firſt, which a curb, though ever ſo delicately uſed, muſt in ſome degree occaſion. When the bridle, *&c.* have been well looked to, let the man approach the horſe gently near the ſhoulder; then taking the reins and an handful of the mane in his left hand, let him put his foot ſoftly in the left ſtirrup, by pulling it towards him, leſt he touch the horſe with his toe; then raiſing himſelf up, let him reſt a moment on it with his body upright, but not ſtiff; and after that, paſſing his right leg clear over the ſaddle without rubbing againſt any thing, let him ſeat himſelf gently down. He muſt be cautious not to take the reins too ſhort, for fear of making the horſe rear, run, or fall back, or throw up his head; but let him hold them of an equal length, neither tight nor ſlack, and with the little finger betwixt them. It is fit that horſes ſhould be accuſtomed to ſtand ſtill to be mounted, and not to ſtir till the rider pleaſes. All ſoldiers ſhould be inſtructed to mount and diſmount equally well on both ſides, which may be of great uſe in times of hurry and confuſion. Then place the man in his ſaddle, with his body rather back, and his head held up with eaſe, without ſtiffneſs; ſeated neither forwards, nor very backwards; with the breaſt puſhed out a little, and the lower part of the body likewiſe a little forwards; the thighs and legs turned in without conſtraint, and

Of placing the rider.

and the feet in a ſtraight line, neither turned in nor out. By this poſition, the natural weight of the thighs has a proper and ſufficient preſſure of itſelf, and the legs are in readineſs to act when called upon: they muſt hang down eaſy and naturally; and be ſo placed, as not to be wriggling about, touching and tickling the horſe's ſides, but always near them in caſe they ſhould be wanted, as well as the heels.

The body muſt be carefully kept eaſy and firm, and without any rocking when in motion; which is a bad habit very eaſily contracted, eſpecially in galloping. The left elbow muſt be gently leant againſt the body, a little forwards: unleſs it be ſo reſted, the hand cannot be ſteady, but will always be checking, and conſequently have pernicious effects on the horſe's mouth. And the hand ought to be of equal height with the elbow; if it were lower, it would conſtrain and confine the motion of the horſe's ſhoulders: but, as the mouths of horſes are different, the place of the hand alſo muſt occaſionally differ: a leaning, low, heavy fore-hand requires a high hand; and a horſe that pokes out his noſe, a low one. The right-hand arm muſt be placed in ſymmetry with the left; only let the right hand be a little forwarder or backwarder, higher or lower, as occaſions may require, in order that both hands may be free: both arms muſt be a little bent at the elbow, to prevent ſtiffneſs.

A ſoldier's right hand ſhould be kept unemployed in riding; it carries the ſword, which is a ſufficient buſineſs for it.

There remains one farther obſervation, that ought not to be omitted, about the hand, that it muſt be kept clear of the body; i. e. about two inches and a half forwards from it, with the nails turned oppoſite to the belly, and the wriſt a little rounded with eaſe; a poſition not leſs graceful than ready for ſlackening, tightening, and moving the reins from one ſide to the other, as may be found neceſſary.

When the men are well placed, the more rough trotting they have without ſtirrups, the better; but with a ſtrict care always, that their poſition be preſerved very exactly. In all caſes, great care muſt be taken to hinder their clinging with their legs: in ſhort, no ſticking by hands or legs is ever to be allowed of at any time. If the motion of the horſe be too rough, ſlacken it, till the rider grows by degrees more firm: and when he is quite firm and eaſy on his horſe in every kind of motion, ſtirrups may be given him; but he muſt never leave off trotting often without any.

The ſtirrups muſt be neither ſhort nor long; but of ſuch a length, that when the rider, being well placed, puts his feet into them, (about one third of the length of each foot from the point of it,) the points may be between two and three inches higher than the heels. The rider muſt not bear upon his ſtirrups, but only let the natural weight of his legs reſt on them: For if he bear upon them, he would be raiſed above and out of his ſaddle; which ſhould never be, except in charging ſword in hand, with the body inclined forwards at the very inſtant of attacking. Spurs may be given, as ſoon as the rider is grown familiar with ſtirrups; or even long before, if his legs are well placed.

Inſtructions concerning both man and horſe.

A hand ſhould always be firm, but delicate: a horſe's mouth ſhould never be ſurpriſed by any ſudden tranſition of it, either from ſlack to tight, or from tight to ſlack. Every thing in horſemanſhip muſt be effected by degrees, but at the ſame time with ſpirit and reſolution. That hand which, by giving and taking properly, gains its point with the leaſt force, is the beſt; and the horſe's mouth, under this ſame hand's directions, will alſo conſequently be the beſt, ſuppoſing equal advantages in both from nature. This principle of gentleneſs ſhould be obſerved upon all occaſions in every branch of horſemanſhip. Sometimes the right hand may be neceſſary, upon ſome troubleſome horſes, to aſſiſt the left: but the ſeldomer this is done, the better; eſpecially in a ſoldier, who has a ſword to carry, and to make uſe of.

The ſnaffle muſt on all occaſions be uppermoſt; that is to ſay, the reins of it muſt be above thoſe of the bridle, whether the ſnaffle or the bit be uſed ſeparately, or whether they be both uſed together. When the rider knows enough, and the horſe is ſufficiently prepared and ſettled to begin any work towards ſuppling, one rein muſt be ſhortened according to the ſide worked to; but it muſt never be ſo much ſhortened, as to make the whole ſtrength reſt on that rein alone: for, not to mention that the work would be falſe and bad, one ſide of the horſe's mouth would by that means be always deadened; whereas, on the contrary, it ſhould always be kept freſh by its own play, and by the help of the oppoſite rein's acting delicately in a ſomewhat ſmaller degree of tenſion; the joint effect of which produces in a horſe's mouth the proper, gentle, and eaſy degree of *appui* or bearing.

A coward and a madman make alike bad riders, and are both alike diſcovered and confounded by the ſuperior ſenſe of the creature they are mounted upon, who is equally ſpoilt by both, though in very different ways. The coward, by ſuffering the animal to have his own way, not only confirms him in his bad habits, but creates new ones in him: and the madman, by falſe and violent motions and corrections, drives the horſe, through deſpair, into every bad and vicious trick that rage can ſuggeſt.

It is very requiſite in horſemanſhip, that the hand and legs ſhould act in correſpondence with each other in every thing; the latter always ſubſervient and aſſiſtant to the former. Upon circles, in walking, trotting, or galloping, the outward leg is the only one to be uſed, and that only for a moment at a time, in order to ſet off the horſe true, or put him right if he be falſe; and as ſoon as that is done, it muſt be taken away again immediately: but if the horſe be lazy, or otherwiſe retains himſelf, both legs muſt be uſed, and preſſed to his ſides at the ſame time together. The leſs the legs are uſed in general, the better. Very delicate good riders, with horſes they have dreſſed themſelves, will ſcarcely ever want their help. By the term *outward* is underſtood the ſide which is more remote from the centre; and by *inward* is meant the ſide next to the centre. In reining back, the rider ſhould be careful not to uſe his legs, unleſs the horſe backeth on his ſhoulders; in which caſe they muſt be both applied gently at the ſame time, and correſpond with the hand. If the horſe refuſe to back at all, the rider's legs muſt be gently approached, till the horſe lifts up a leg, as if to go forwards; at which time, when that leg is in the

Inſtructions concerning both man and horſe.

the air, the rein of the ſame ſide with that leg which is lifted up, will eaſily bring that ſame leg backwards, and accordingly oblige the horſe to back; but if the horſe offers to rear, the legs muſt be inſtantly removed away. The inward rein muſt be tighter on circles, ſo that the horſe may bend and look inwards; and the outward one croſſed over a little towards it; and both held in the left hand.

Let the man and horſe begin on very ſlow motions, that they may have time to underſtand and reflect on what is taught them; and in proportion as the effects of the reins are better comprehended, and the manner of working becomes more familiar, the quickneſs of motion muſt be increaſed. Every rider muſt learn to feel, without the help of the eye, when a horſe goes falſe, and remedy the fault accordingly: this is an intelligence, which nothing but practice, application, and attention, can give, in the beginning on ſlow motions. A horſe may not only gallop falſe, but alſo trot and walk falſe. If a horſe gallops falſe, that is to ſay, if going to the right he leads with the left leg, or if going to the left he leads with the right; or in caſe he is diſunited, *i. e.* if he leads with the oppoſite leg behind to that which he leads with before; ſtop him immediately, and put him off again properly. The method of effecting this, is by approaching your outward leg, and putting your hand outwards; ſtill keeping the inward rein the ſhorter, and the horſe's head inwards, if poſſible: and if he ſhould ſtill reſiſt, then bend and pull his head outwards alſo; but replace it again, bent properly inwards, the moment he goes off true. A horſe is ſaid to be diſunited to the right, when going to the right, and conſequently leading with the right leg before, he leads with the left behind; and is ſaid to be diſunited to the left, when going to the left, and conſequently leading with the left leg before, he leads with the right behind. A horſe may at the ſame time be both falſe and diſunited; in correcting both which faults, the ſame method muſt be uſed. He is both falſe and diſunited to the right, when in going to the right he leads with the left leg before, and the right behind; notwithſtanding that hinder leg be with propriety more forward under his belly than the left, becauſe the horſe is working to the right: And he is falſe and diſunited to the left, when in going to the left he leads with the right leg before, and the left behind; notwithſtanding, as above, that hinder leg be with propriety more forward under his belly than the right, becauſe the horſe is working to the left.

In teaching men a right ſeat on horſeback, the greateſt attention muſt be given to prevent ſtiffneſs, and ſticking by force in any manner upon any occaſion: ſtiffneſs diſgraces every right work; and ſticking ſerves only to throw a man (when diſplaced) a great diſtance from his horſe by the ſpring he muſt go off with: whereas, by a proper equilibrating poſition of the body, and by the natural weight only of the thighs, he cannot but be firm and ſecure in his ſeat.

As the men become more firm, and the horſes more ſupple, it is proper to make the circles leſs; but not too much ſo, for fear of throwing the horſes forwards upon their ſhoulders.

Some horſes, when firſt the bit is put into their mouths, if great care be not taken, will put their heads very low. With ſuch horſes, raiſe your right hand with the *bridoon* in it, and play at the ſame time with the bit in the left hand, giving and taking.

On circles, the rider muſt lean his body inwards; unleſs great attention be given to make him do it, he will be perpetually loſing his ſeat outwards. It is ſcarce poſſible for him to be diſplaced, if he leans his body properly inwards.

Of ſuppling horſes.

SECT. III. *The method of ſuppling horſes with men upon them, by the* EPAULE en dedans, *&c. with and without a* longe, *on circles and on ſtraight lines.*

WHEN a horſe is well prepared and ſettled in all his motions, and the rider firm, it will be proper then to proceed on towards a farther ſuppling and teaching of both.

In ſetting out upon this new work, begin by bringing the horſe's head a little more inwards than before, pulling the inward rein gently to you by degrees. When this is done, try to gain a little on the ſhoulders, by keeping the inward rein the ſhorter, as before, and the outward one croſſed over towards the inward one. The intention of theſe operations is this: The inward rein ſerves to bring in the head, and procures the bend; whilſt the outward one, that is a little croſſed, tends to make that bend perpendicular, and as it ſhould be, that is to ſay, to reduce the noſe and the forehead to be in a perpendicular line with each other: it alſo ſerves, if put forwards, as well as alſo croſſed, to put the horſe forwards, if found neceſſary; which is often requiſite, many horſes being apt in this and other works rather to loſe their ground backwards than otherwiſe, when they ſhould rather advance: if the noſe were drawn in towards the breaſt beyond the perpendicular, it would confine the motion of the ſhoulders, and have other bad effects. All other bends, beſides what are above ſpecified, are falſe. The outward rein, being croſſed, not in a forward ſenſe, but rather a little backwards, ſerves alſo to prevent the outward ſhoulder from getting too forwards, and makes it approach the inward one; which facilitates the inward leg's croſſing over the outward one, which is the motion that ſo admirably ſupples the ſhoulders. Care muſt be taken, that the inward leg paſs over the outward one, without touching it; this inward leg's croſſing over muſt be helped alſo by the inward rein, which you muſt croſs towards and over the outward rein every time the outward leg comes to the ground, in order to lift and help the inward leg over it: at any other time, but juſt when the outward leg comes to the ground, it would be wrong to croſs the inward rein, or to attempt to lift up the inward leg by it; nay, it would be demanding an abſolute impoſſibility, and lugging about the reins and horſe to no purpoſe: becauſe in this caſe, a very great part of the horſe's weight reſting then upon that leg, would render ſuch an attempt not only fruitleſs, but alſo prejudicial to the ſenſibility of the mouth, and probably oblige him to defend himſelf; and moreover, it would put the horſe under a neceſſity of ſtraddling before, and alſo of leading with the wrong leg, without being productive of any ſuppling motion whatſoever.

When the horſe is thus far familiarly accuſtomed to what you have required of him, then proceed to effect by irections for men d horſes.

by degrees the ſame croſſing in his hinder legs. By bringing in the fore-legs more, you will of courſe engage the hinder ones in the ſame work: if they reſiſt, the rider muſt bring both reins more inwards; and, if neceſſary, put back alſo, and approach his inward leg to the horſe; and if the horſe throws out his croup too far, the rider muſt bring both reins outwards, and, if abſolutely neceſſary, he muſt alſo make uſe of his outward leg, in order to replace the horſe properly: obſerving that the croup ſhould always be conſiderably behind the ſhoulders, which in all actions muſt go firſt; and, the moment that the horſe obeys, the rider muſt put his hand and leg again in their uſual poſition.

Nothing is more ungraceful in itſelf, more detrimental to a man's ſeat, or more deſtructive of the ſenſibility of a horſe's ſides, than a continual wriggling unſettledneſs in a horſeman's legs, which prevents the horſe from ever going a moment together true, ſteady, or determined.

A horſe ſhould never be turned, without firſt moving a ſtep forwards: and when it is doing, the rider muſt not lift his elbow, and diſplace himſelf; a motion only of the hand from the one ſide to the other being ſufficient for that purpoſe. It muſt alſo be a conſtant rule, never to ſuffer a horſe to be ſtopped, mounted or diſmounted, but when he is well placed. The ſlower the motions are when a man or horſe is taught any thing, the better.

At firſt, the figures worked upon muſt be great, and afterwards made leſs by degrees, according to the improvement which the man and horſe make; and the cadenced pace alſo, which they work in, muſt be accordingly augmented. The changes from one ſide to the other, muſt be in a bold determined trot, and at firſt quite ſtraight forwards, without demanding any ſide-motion on two *piſtes*, which is very neceſſary to require afterwards when the horſe is ſufficiently ſuppled. By two *piſtes* is meant, when the fore-parts and hinder parts do not follow but deſcribes two different lines.

In the beginning, a *longe* is uſeful on circles, and alſo on ſtraight lines, to help both the rider and the horſe; but afterwards, when they are grown more intelligent, they ſhould go alone. At the end of the leſſon, rein back; then put the horſe, by a little at a time, forwards, by approaching both legs gently to his ſides, and playing with the bridle: if he rears, puſh him out immediately into a full trot. Shaking the *caveſſon* on the horſe's noſe, and alſo putting one's ſelf before him and rather near to him, will generally make him back, though he otherwiſe refuſe to do it: and moreover a ſlight uſe and approaching of the rider's legs, will ſometimes be neceſſary in backing, in order to prevent the horſe from doing it too much upon his ſhoulders; but the preſſure of the legs ought to be very ſmall, and taken quite away the moment that he puts himſelf enough upon his haunches. If the horſe does not back upon a ſtraight line properly, the rider muſt not be permitted to have recourſe immediately to his leg, and ſo diſtort himſelf by it; but firſt try, if croſſing over his hand and reins to which ever ſide may be neceſſary, will not be alone ſufficient; which moſt frequently it will; if not, then employ the leg.

After a horſe is well prepared and ſettled, and goes freely on in all his ſeveral paces, he ought to be in all his works kept, to a proper degree, upon his haunches, with his hinder legs well placed under him; whereby he will be always pleaſant to himſelf and his rider, will be light in hand, and ready to execute whatever may be demanded of him, with facility, vigour, and quickneſs.

Of head to the wall, &c.

The common method that is uſed, of forcing a horſe ſidewiſe, is a moſt glaring abſurdity, and very hurtful to the animal in its conſequences; for inſtead of ſuppling him, it obliges him to ſtiffen and defend himſelf, and often makes a creature, that is naturally benevolent, reſtive, frightened, and vicious.

For horſes, who have very long and high fore-hands, and who poke out their noſes, a running ſnaffle is of excellent uſe; but for ſuch as bore and keep their heads low, a common one is preferable; though any horſe's head indeed may be kept up alſo with a running one, by the rider's keeping his hands very high and forwards: but whenever either is uſed alone without a bridle upon horſes that carry their heads low and that bore, it muſt be ſawed about from one ſide to the other.

This leſſon of the *epaul en dedans*, ſhould be taught to ſuch people as are likely to become uſeful in helping to teach men and to break horſes; and the more of ſuch that can be found, the better: none others ſhould ever be ſuffered upon any occaſion to let their horſes look any way beſides the way they are going. But all horſes whatever, as likewiſe all men, who are deſigned for the teaching others, muſt go thoroughly and perfectly through this excellent leſſon, under the directions of intelligent inſtructors, and often practiſe it too afterwards; and, when that is done, proceed to and be finiſhed by the leſſons of head and tail to the wall.

SECT. IV. *Of the head to the wall, and of the croup to the wall.*

THIS leſſon ſhould be practiſed immediately after that of the *epaule en dedans*, in order to place the horſe properly the way he goes, &c. The difference between the head to the wall, and the croup to the wall, conſiſts in this: in the former, the fore-parts are more remote from the centre, and go over more ground; in the latter, the hinder-parts are more remote from the centre, and conſequently go over more ground: in both, as likewiſe in all other leſſons, the ſhoulders muſt go firſt. In riding-houſes, the head to the wall is the eaſier leſſon of the two at firſt, the line to be worked upon being marked by the wall, not far from his head.

The motion of the legs to the right, is the ſame as that of the *epaule en dedans* to the left, and ſo *vice verſa*; but the head is always bent and turned differently: in the *epaule en dedans*, the horſe looks the contrary way to that which he goes; in this, he looks the way he is going.

In the beginning, very little bend muſt be required; too much at once would aſtoniſh the horſe, and make him defend himſelf: it is to be augmented by degrees. If the horſe abſolutely refuſes to obey, it is a ſign that either he or his rider has not been ſufficiently prepared by previous leſſons. It may happen, that weakneſs or a hurt in ſome part of the body, or ſometimes temper, though ſeldom, may be the cauſe of the horſe's defending himſelf: it is the rider's buſineſs to find out

from

Head to the wall, &c.

from whence the obſtacle ariſes; and if he finds it to be from the firſt mentioned cauſe, the previous leſſons muſt be reſumed again for ſome time; if from the ſecond, proper remedies muſt be applied; and if from the laſt cauſe, when all fair means that can be tried have failed, proper corrections with coolneſs and judgment muſt be uſed.

In practiſing this leſſon to the right, bend the horſe to the right with the right rein; helping the left leg over the right (at the time when the right leg is juſt come to the ground), with the left rein croſſed towards the right, and keeping the right ſhoulder back with the right rein towards your body, in order to facilitate the left leg's croſſing over the right; and ſo likewiſe *vice verſa* to the left, each rein helping the other by their properly mixed effects. In working to the right, the rider's left leg helps the hinder-parts on to the right, and his right leg ſtops them if they get too forwards; and ſo *vice verſa* to the left: but neither ought to be uſed, till the hand being employed in a proper manner has failed, or finds that a greater force is neceſſary to bring about what is required than it can effect alone: for the legs ſhould not only be correſponding with, but alſo ſubſervient to the hand; and all unneceſſary aids, as well as all force, ought always to be avoided as much as poſſible.

In the execution of all leſſons, the equilibre of the rider's body is of great uſe to the horſe: it ought always to go with and accompany every motion of the animal; when to the right, to the right; and when to the left, to the left.

Upon all horſes, in every leſſon and action, it muſt be obſerved, that there is no horſe but has his own peculiar appui or degree of bearing, and alſo a ſenſibility of mouth, as likewiſe a rate of his own, which it is abſolutely neceſſary for the rider to diſcover and make himſelf acquainted with. A bad rider always takes off at leaſt the delicacy of both, if not abſolutely deſtroys it. The horſe will inform his rider when he has got his proper bearing in the mouth, by playing pleaſantly and ſteadily with his bit, and by the ſpray about his chaps. A delicate and good hand will not only always preſerve a light appui, or bearing, in its ſenſibility; but alſo of a heavy one, whether naturally ſo or acquired, make a light one. The lighter this appui can be made, the better; provided that the rider's hand correſponds with it; if it does not, the the more the horſe is properly prepared, ſo much the worſe. Inſtances of this inconvenience of the beſt of appuis, when the rider is not equally taught with the horſe, may be ſeen every day in ſome gentlemen, who try to get their horſes *bitted* as they call it, without being ſuitably prepared themſelves for riding them: the conſequence of which is, that they ride in danger of breaking their necks; till at length, after much hauling about, and by the joint inſenſibility and ignorance of themſelves and their grooms, the poor animals gradually become mere ſenſeleſs unfeeling poſts; and thereby grow, what they call, *ſettled*. When the proper appui is found, and made of courſe as light as poſſible, it muſt not be kept duly fixed without any variation, but be played with; otherwiſe one equally-continued tenſion of reins would render both the rider's hand and the horſe's mouth very dull. The ſlighteſt and frequent giving and taking, is therefore neceſſary to keep both perfect.

Whatever pace or degree of quickneſs you work in, (be it ever ſo faſt, or ever ſo ſlow,) it muſt be cadenced; time is as neceſſary for an horſeman as for a muſician.

This leſſon of the head and of the tail to the wall, muſt be taught every ſoldier: ſcarce any manœuvre can be well performed without it. In cloſing and opening of files, it is almoſt every moment wanted.

To make horſes ſtand fire, &c.

Sect. V. *The method of making horſes ſtand fire, noiſes, alarms, ſights,* &c.

In order to make horſes ſtand fire, the ſound of drums, and all ſorts of different noiſes, you muſt uſe them to it by degrees in the ſtable at feeding-time; and inſtead of being frightened at it, they will ſoon come to like it as a ſignal for eating.

With regard to ſuch horſes as are afraid of burning objects, begin by keeping them ſtill at a certain diſtance from ſome lighted ſtraw: careſs the horſe; and in proportion as his fright diminiſhes, approach gradually the burning ſtraw very gently, and increaſe the ſize of it. By this means he will very quickly be brought to be ſo familiar with it, as to walk undaunted even through it.

As to horſes that are apt to lie down in the water, if animating them, and attacking them vigorouſly, ſhould fail of the deſired effect, then break a ſtraw-bottle full of water upon their heads, and let the water run into their ears, which is a thing they apprehend very much.

All troop-horſes muſt be taught to ſtand quiet and ſtill when they are ſhot off from, to ſtop the moment you preſent, and not to move after firing till they are required to do it; this leſſon ought eſpecially to be obſerved in light troops: in ſhort, the horſes muſt be taught to be ſo cool and undiſturbed, as to ſuffer the rider to act upon him with the ſame freedom as if he was on foot. Patience, coolneſs, and temper, are the only means requiſite for accompliſhing this end. Begin by walking the horſe gently, then ſtop and keep him from ſtirring for ſome time, ſo as to accuſtom him by degrees not to have the leaſt idea of moving without orders: if he does, then back him; and when you ſtop him, and he is quite ſtill, leave the reins quite looſe.

To uſe a horſe to fire-arms, firſt put a piſtol or a carabine in the manger with his feed; then uſe him to the ſound of the lock and the pan; after which, when you are upon him, ſhew the piece to him, preſenting it forwards, ſometimes on one ſide, ſometimes on the other: when he is thus far reconciled, proceed to flaſh in the pan; after which, put a ſmall charge into the piece, and ſo continue augmenting it by degrees to the quantity which is commonly uſed: if he ſeems uneaſy, walk him forward a few ſteps ſlowly; and then ſtop, back, and careſs him. Horſes are often alſo diſquieted and unſteady at the claſh, and drawing, and returning of ſwords; all which they muſt be familiarized to by little and little, by frequency and gentleneſs.

It is very expedient for all cavalry in general, but particularly for light cavalry, that their horſes ſhould be very ready and expert in leaping over ditches, hedges, gates, &c. The leaps, of whatever ſort they are, which the

Of reining back, &c.

the horſes are brought to in the beginning, ought to be very ſmall ones; the riders muſt keep their bodies back, raiſe their hands a little in order to help the fore-parts of the horſe up, and be very attentive to their equilibre. It is beſt to begin at a low bar covered with furze, which pricking the horſe's legs, if he does not raiſe himſelf ſufficiently, prevents his contracting a ſluggiſh and dangerous habit of touching, as he goes over, which any thing yielding and not pricking would give him a cuſtom of doing. Let the ditches you firſt bring horſes to be narrow; and in this, as in every thing elſe, let the increaſe be made by degrees. Accuſtom them to come up to every thing which they are to leap over, and to ſtand coolly at it for ſome time; and then to raiſe themſelves gently up in order to form to themſelves an idea of the diſtance. When they leap well ſtanding, then uſe them to walk gently up to the leap, and to go over it without firſt halting at it; and after that practice is familiar to them, repeat the like in a gentle trot, and ſo by degrees faſter and faſter, till at length it is as familiar to them to leap flying on a full gallop as any other way: all which is to be acquired with with great facility by calm and ſoft means, without any hurry.

As horſes are naturally apt to be frightened at the ſight and ſmell of dead horſes, it is adviſable to habituate them to walk over and leap over carcaſes of dead horſes: and as they are particularly terrified at this ſight, the greater gentleneſs ought conſequently to be uſed.

Horſes ſhould alſo be accuſtomed to ſwim, which often may be neceſſary upon ſervice; and if the men and horſes both are not uſed to it, both may be frequently liable to periſh in the water. A very ſmall portion of ſtrength is ſufficient to guide a horſe, any-where indeed, but particularly in the water, where they muſt be permitted to have their heads, and be no-ways conſtrained in any ſhape.

The unreaſonable rage in Britain of cutting off all extremities from horſes, is in all caſes a very pernicious cuſtom. It is particularly ſo in regard to a troop-horſe's tail. It is almoſt incredible, how much they ſuffer at the picket for want of it: conſtantly fretting, and ſweating, kicking about and laming one another, tormented, and ſtung off their meat, miſerable, and helpleſs; whilſt other horſes, with their tails on, bruſh off all flies, are cool and at their eaſe, and mend daily; whilſt the docked ones grow every hour more and more out of condition.

Sect. VI. *The method of reining back,—and of moving forwards immediately after;—of piaſing,—of pillars,* &c.

Never finiſh your work by reining back with horſes that have any diſpoſition towards retaining themſelves; but always move them forwards, and a little upon the haunches alſo, after it, before you diſmount, (unleſs they retain themſelves very much indeed, in which caſe nothing at all muſt be demanded from the haunches). This leſſon of reining back, and piaſing, is excellent to conclude with, and puts an horſe well and properly on the haunches: It may be done, according as horſes are more or leſs ſuppled, either going forwards, backing, or in the ſame place: if it is done well advancing, or at moſt on the ſame ſpot, it is full ſufficient for a ſoldier's horſe: For to piaſe in backing, is rather too much to be expected in the hurry which cannot but attend ſuch numbers both of men and horſes as muſt be taught together in regiments. This leſſon muſt never be attempted at all, till horſes are very well ſuppled, and ſomewhat accuſtomed to be put together; otherwiſe it will have very bad conſequences, and create reſtiveneſs. If they refuſe to back, and ſtand motionleſs, the rider's legs muſt be approached with the greateſt gentleneſs to the horſe's ſides; at the ſame time that the hand is acting on the reins to ſolicit the horſe's backing. This ſeldom fails of procuring the deſired effect, by raiſing one of the horſe's fore-legs, which being in the air, has no weight upon it, and is conſequently very eaſily brought backwards by a ſmall degree of tenſion in the reins. When this leſſon is well performed, it is very noble and uſeful, and has a pleaſing air; it is an excellent one to begin teaching ſcholars with.

Of curing reſtiveneſs, &c.

The leſſon is particularly ſerviceable in the pillars, for placing ſcholars well at firſt. Very few regimental riding-houſes have pillars, and it is fortunate they have not: for though, when properly made uſe of with ſkill, they are one of the greateſt and beſt diſcoveries in horſemanſhip; they muſt be allowed to be very dangerous and pernicious, when they are not under the direction of a very knowing perſon.

Sect. VII. *The method of curing reſtiveneſſes, vices, defences, ſtarting,* &c.

Whenever a horſe makes reſiſtance, one ought, before remedy or correction is thought of, to examine very minutely all the tackle about him, if any thing hurts or tickles him, whether he has any natural or accidental weakneſs, or in ſhort any the leaſt impediment in any part. For want of this precaution, many fatal diſaſters happen: the poor dumb animal is frequently accuſed falſely of being reſtive and vitious; is uſed ill without reaſon; and, being forced into deſpair, is in a manner obliged to act accordingly, be his temper and inclination ever ſo well diſpoſed. It is very ſeldom the caſe, that a horſe is really and by nature vitious; but if ſuch be found, he will deſpiſe all careſſes, and then chaſtiſements become neceſſary.

Correction, according as you uſe it, throws a horſe into more or leſs violent action, which, if he be weak, he cannot ſupport: but a vitious ſtrong horſe is to be conſidered in a very different light, being able both to undergo and conſequently to profit by all leſſons; and is far preferable to the beſt-natured weak one upon earth. Patience and attention are never failing means to reclaim ſuch a horſe: in whatſoever manner he defends himſelf, bring him back frequently with gentleneſs (not however without having given him proper chaſtiſement if neceſſary) to the leſſon which he ſeems moſt averſe to. Horſes are by degrees made obedient, through the hope of recompenſe and the fear of puniſhment: how to mix theſe two motives judiciouſly together, is a very difficult matter; it requires much thought and practice; and not only a good head, but a good heart likewiſe. The cooleſt and beſt-natured rider will always ſucceed beſt. By a dexterous uſe of the incitements above mentioned, you will gradually bring the horſe to temper and obedience; mere force, and want of ſkill and coolneſs, Of rearing, ſtarting, &c.

would only tend to confirm him in bad tricks. If he be impatient or choleric, never ſtrike him, unleſs he abſolutely refuſe to go forwards; which you muſt reſolutely oblige him to do, and which will be of itſelf a correction, by preventing his having time to meditate and put in execution any defence by retaining himſelf. Reſiſtance in horſes, you muſt conſider, is ſometimes a mark of ſtrength and vigour, and proceeds from ſpirits, as well as ſometimes from vice and weakneſs. Weakneſs frequently drives horſes into vitiouſneſs, when any thing wherein ſtrength is neceſſary is demanded from them; nay, it inevitably muſt: great care therefore ſhould always be taken to diſtinguiſh from which of theſe two cauſes any remedy or puniſhment is thought of. It may ſometimes be a bad ſign when horſes do not at all defend themſelves, and proceed from a ſluggiſh diſpoſition, a want of ſpirit and of a proper ſenſibility. Whenever one is ſo fortunate as to meet with a horſe of juſt the right ſpirit, activity, delicacy of feeling, with ſtrength and good-nature, he cannot be cheriſhed too much; for ſuch a one is a rare and ineſtimable jewel, and, if properly treated, will in a manner do every thing of himſelf. Horſes are oftener ſpoilt by having too much done to them, and by attempts to dreſs them in too great an hurry, than by any other treatment.

If after a horſe has been well ſuppled, and there are no impediments, either natural or accidental, if he ſtill perſiſts to defend himſelf, chaſtiſements then become neceſſary: but whenever this is the caſe, they muſt not be frequent, but always firm, though always as little violent as poſſible; for they are both dangerous and very prejudicial when frequently or ſlightly played with, and ſtill more ſo when uſed too violently.

It is impoſſible, in general, to be too circumſpect in leſſons of all kinds, in aids, chaſtiſements, or careſſes. Some have quicker parts, and more cunning, than others. Many will imperceptibly gain a little every day on their rider. Various, in ſhort, are their diſpoſitions and capacities. It is the rider's buſineſs to find out their different qualities, and to make them ſenſible how much he loves them, and deſires to be loved by them; but at the ſame time that he does not fear them, and will be maſter.

Plunging is a very common defence among reſtive and vitious horſes: if they do it in the ſame place, or backing, they muſt, by the rider's legs and ſpurs firmly applied, be obliged to go forwards, and their heads kept up high But if they do it flying forwards, keep them back, and ride them gently and very ſlow for a good while together. Of all bad tempers and qualities in horſes, thoſe which are occaſioned by harſh treatment and ignorant riders are the worſt.

Rearing is a bad vice, and, in weak horſes eſpecially, a very dangerous one. Whilſt the horſe is up, the rider muſt yield his hand; and when the horſe is deſcending, he muſt vigorouſly determine him forwards: if this be done at any other time but whilſt the horſe is coming down, it may add a ſpring to his rearing, and make him fall backwards. With a good hand on them, horſes ſeldom perſiſt in this vice; for they are themſelves naturally much afraid of falling backwards. If this method fails, you muſt make the horſe kick up behind, by getting ſomebody on foot to ſtrike him behind with a whip; or, if that will not effect it, by pricking him with a goad.

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Starting often proceeds from a defect in the ſight; which therefore muſt be carefully looked into. Whatever the horſe is afraid of, bring him up to it gently; if you careſs him every ſtep he advances, he will go quite up to it by degrees, and ſoon grow familiar with all ſorts of objects. Nothing but great gentleneſs can correct this fault; for if you inflict puniſhment, the apprehenſion of chaſtiſement becomes prevalent, and cauſes more ſtarting than the fear of the object. If you let him go by the object, without bringing him up to it, you increaſe the fault, and confirm him in his fear: the conſequence of which is, he takes his rider perhaps a quite contrary way from what he was going, becomes his maſter, and puts himſelf and the perſon upon him every moment in great danger.

With ſuch horſes as are to a very great degree fearful of any objects, make a quiet horſe, by going before them, gradually entice them to approach nearer and nearer to the thing they are afraid of. If the horſe, thus alarmed, be undiſcipled and headſtrong, he will probably run away with his rider; and if ſo, his head muſt be kept up high, and the ſnaffle ſawed backwards and forwards from right to left, taking up and yielding the reins of it, as alſo the reins of the bit: but this latter muſt not be ſawed backwards and forwards like the ſnaffle, but only taken up and yielded properly. No man ever yet did, or ever will, ſtop a horſe, or gain any one point over him, by main force, or by pulling a dead weight againſt him.

SECT. VIII. *Rules for Bad Horſemen.*

Thomſon's Rules.

In the firſt place, every horſe ſhould be accuſtomed to ſtand ſtill when he is mounted. One would imagine this might be readily granted; yet we ſee how much the contrary is practiſed. When a gentleman mounts at a livery-ſtable, the groom takes the horſe by the bit, which he bends tight round his under jaw: the horſe ſtriving to go on, is forced back; advancing again, he frets, as he is again ſtopped ſhort, and hurt by the manner of holding him. The rider, in the mean time, mounting without the bridle, or at leaſt holding it but ſlightly, is helped to it by the groom, who being thoroughly employed by the horſe's fluttering, has at the ſame time both bridle and ſtirrup to give. This confuſion would be prevented, if every horſe was taught to ſtand ſtill when he is mounted. Forbid your groom therefore, when he rides your horſe to water, to throw himſelf over him from a horſe-block, and kick him with his leg, even before he is fairly upon him. This wrong manner of mounting, is what chiefly teaches your horſe the vitious habit againſt which we are here warning. On the other hand, a conſtant practice of mounting in the proper manner, is all that is neceſſary to prevent a horſe's going on till the rider is quite adjuſted in the ſaddle.

The next thing neceſſary therefore is, that the rider ſhould mount properly. The common method is to ſtand near the croup, or hinder part of the horſe, with the bridle held very long in the right hand. By this manner of holding the bridle before you mount, you are liable to be kicked; and when you are mounted, your horſe may go on ſome time, or play what gambols

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bols he pleaſes, before the rein is ſhort enough in your hand to prevent him. It is common likewiſe, for an awkward rider, as ſoon as his foot is in the ſtirrup, to throw himſelf with all his force to gain his ſeat; which he cannot do, till he hath firſt overbalanced himſelf on one ſide or the other: he will then wriggle into it by degrees. The way to mount with eaſe and ſafety is, to ſtand rather before than behind the ſtirrup. In this poſture take the bridle ſhort, and the mane together in your left hand, helping yourſelf to the ſtirrup with your right, ſo that your toe may not touch the horſe in mounting. When your left foot is in the ſtirrup, move on your right, till you face the ſide of the horſe, looking acroſs over the ſaddle. Then with your right hand graſp the hinder part of the ſaddle; and with that and your left, which holds the mane and bridle, lift yourſelf upright on your left foot. Remain thus a mere inſtant on your ſtirrup, only ſo as to divide the action into two motions. While you are in this poſture, you have a ſure hold with both hands, and are at liberty, either to get ſafely down, or to throw your leg over and gain your ſeat. By this deliberate motion, likewiſe, you avoid, what every good horſeman would endeavour to avoid, putting your horſe into a flutter.

When you diſmount, hold the bridle and mane together in your left hand, as when you mounted; put your right hand on the pommel of the ſaddle, to raiſe yourſelf; throw your leg back over the horſe, graſp the hinder part of the ſaddle with your right hand, remain a moment on your ſtirrup, and in every reſpect diſmount as you mounted; only what was your firſt motion when you mounted, becomes the laſt in diſmounting. Remember not to bend your right knee in diſmounting, leſt your ſpur ſhould rub againſt the horſe.

It may be next recommended to hold your bridle at a convenient length. Sit ſquare, and let not the purchaſe of the bridle pull forward your ſhoulder; but keep your body *even*, as it would be if each hand held a rein. Hold your reins with the whole graſp of your hand, dividing them with your little finger. Let your hand be perpendicular; your thumb will then be uppermoſt, and placed on the bridle. Bend your wriſt a little outward; and when you pull the bridle, raiſe your hand toward your breaſt, and the lower part of the palm rather more than the upper. Let the bridle be at ſuch a length in your hand, as, if the horſe ſhould ſtumble, you may be able to raiſe his head, and ſupport it by the ſtrength of your arms, and the weight of your body thrown backward. If you hold the rein too long, you are ſubject to fall backward, as your horſe riſes.

If, knowing your horſe perfectly well, you think a tight rein unneceſſary, advance your arm a little (but not your ſhoulder) towards the horſe's head, and keep your uſual length of rein. By this means, you have a check upon your horſe, while you indulge him.

If you ride with a curb, make it a rule to hook on the chain yourſelf; the moſt quiet horſe may bring his rider into danger, ſhould the curb hurt him. If, in fixing the curb, you turn the chain to the right, the links will unfold themſelves, and then oppoſe a farther turning. Put on the chain looſe enough to hang down on the horſe's under lip, ſo that it may not riſe and preſs his jaw, till the reins of the bridle are moderately pulled.

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If your horſe has been uſed to ſtand ſtill when he is mounted, there will be no occaſion for a groom to hold him: but if he does, ſuffer him not to touch the reins, but that part of the bridle which comes down the cheek of the horſe. He cannot then interfere with the management of the reins, which belongs to the rider only; and holding a horſe by the curb (which is ever painful to him) is evidently improper when he is to ſtand ſtill.

Another thing to be remembered is, not to ride with your arms and elbows as high as your ſhoulders; nor let them ſhake up and down with the motion of the horſe. The poſture is unbecoming, and the weight of the arms (and of the body too if the rider does not ſit ſtill) acts in continual jerks on the jaw of the horſe, which muſt give him pain, and make him unquiet, if he has a tender mouth, or any ſpirit.

Bad riders wonder why horſes are gentle as ſoon as they are mounted by ſkilful ones, tho' their ſkill ſeems unemployed: the reaſon is, the horſe goes at his eaſe, yet finds all his motions watched; which he has ſagacity enough to diſcover. Such a rider hides his whip, if he finds his horſe is afraid of it; and keeps his legs from his ſides, if he finds he dreads the ſpur.

Avoid the ungraceful cuſtom of letting your legs ſhake againſt the ſides of the horſe: and as you are not to keep your arms and elbows high, and in motion; ſo you are not to rivet them to your ſides, but let them fall eaſy. One may, at a diſtance, diſtinguiſh a genteel horſeman from an awkward one: the firſt ſits ſtill, and appears of a piece with his horſe; the latter ſeems flying off at all points.

It is often ſaid with emphaſis, that ſuch a one has no *ſeat* on horſeback; and it means, not only that he does not ride well, but that he does not ſit on the right part of the horſe. To have a *good ſeat*, is to ſit on that part of the horſe, which, as he ſprings, is the centre of motion; and from which, of courſe, any weight would be with moſt difficulty ſhaken. As in the riſing and falling of a board placed *in æquilibrio*, the centre will be always moſt at reſt; the true ſeat will be found in that part of your ſaddle, into which your body would naturally ſlide, if you rode without ſtirrups; and is only to be preſerved by a proper poiſe of the body, though the generality of riders imagine it is to be done by the graſp of the thighs and knees. The rider ſhould conſider himſelf as united to his horſe in this point; and when ſhaken from it, endeavour to reſtore the balance.

Perhaps the mention of the two extremes of a bad ſeat may help to deſcribe the true one. The one is, when the rider ſits very far back on the ſaddle, ſo that his weight preſſes the loins of the horſe; the other, when his body hangs forward over the pommel of the ſaddle. The firſt may be ſeen practiſed by grooms, when they ride with their ſtirrups affectedly ſhort; the latter, by fearful horſemen on the leaſt flutter of the horſe. Every *good* rider has, even on the hunting ſaddle, as *determined* a place for his thighs, as can be determined for him by the bars of a demi peak. Indeed there is no difference between the ſeat of either: only, as in the firſt you ride with ſhorter ſtirrups, your body will be conſequently more behind your knees.

To

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To have a good ſeat yourſelf, your ſaddle muſt ſit well. To fix a preciſe rule might be difficult: it may be a *direction*, to have your ſaddle preſs as nearly as poſſible on that part which we have deſcribed as the point of union between the man and horſe; however, ſo as not to obſtruct the motion of the horſe's ſhoulders. Place yourſelf in the middle or loweſt part of it: ſit erect; but with as little conſtraint as in your ordinary ſitting. The eaſe of action marks the gentleman: you may repoſe yourſelf, but not lounge. The ſet and ſtudied erectneſs acquired in the riding-houſe, by thoſe whoſe deportment is not eaſy, appears ungenteel and unnatural.

If your horſe ſtops ſhort, or endeavours by riſing and kicking to unſeat you, bend not your body forward, as many do in thoſe circumſtances: that motion throws the breech backward, and you off your fork or twiſt, and out of your ſeat; whereas, the advancing the lower part of your body, and bending back the upper part and ſhoulders, is the method both to keep your ſeat, and to recover it when loſt. The bending your body back, and that in a great degree, is the greateſt ſecurity in *flying* leaps; it is a ſecurity too, when your horſe leaps *ſtanding*. The horſe's riſing does not try the rider's ſeat; the laſh of his hind legs is what ought chiefly to be guarded againſt, and is beſt done by the body's being greatly inclined back. Stiffen not your legs or thighs; and let your body be pliable in the loins, like the coachman's on his box. This looſe manner of ſitting will elude every rough motion of the horſe; whereas the fixture of the knees, ſo commonly laid a ſtreſs on, will in great ſhocks conduce to the violence of the fall.

Was the cricket-player, when the ball is ſtruck with the greateſt velocity, to hold his hand firm and fixed when he receives it, the hand would be bruiſed, or perhaps the bones fractured by the reſiſtance. To obviate this accident, he therefore gradually yields his hand to the motion of the ball for a certain diſtance; and thus by a due mixture of oppoſition and obedience, catches it without ſuſtaining the leaſt injury. The caſe is exactly the ſame in riding: the ſkilful horſeman will recover his poiſe, by giving ſome way to the motion; and the ignorant horſeman will be flung out of his ſeat, by endeavouring to be fixed.

Stretch not out your legs before you; this will puſh you againſt the back of the ſaddle: neither gather up your knees, like a man riding on a pack; this throws your thighs upwards: each practice unſeats you. Keep your legs ſtraight down; and ſit not on the moſt fleſhy part of the thighs, but turn them inwards, ſo as to bring in your knees and toes: and it is more ſafe to ride with the ball of the foot preſſing on the ſtirrup, than with the ſtirrup as far back as the heel; for the preſſure of the heel being in that caſe behind the ſtirrup, keeps the thighs down.

When you find your thighs thrown upwards, widen your knees to get them and the upper part of your fork lower down on the horſe. Graſp the ſaddle with the hollow or inner part of your thighs, but not more than juſt to aſſiſt the balance of your body: this will alſo enable you to keep your ſpurs from the horſe's ſides, and to bring your toes in, without that affected and uſeleſs manner of bringing them in practiſed by many. Sink your heels ſtraight down; for while your heels and thighs keep down, you cannot fall: this (aided with the bend of the back) gives the ſecurity of a ſeat, to thoſe who bear themſelves up in their ſtirrups in a ſwift gallop, or in the alternate riſing and falling in a full trot.

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Let your ſeat determine the length of your ſtirrups, rather than the ſtirrups your ſeat. If more preciſion is requiſite, let your ſtirrups (in the hunting ſaddle) be of ſuch a length, as that, when you ſtand in them, there may be the breadth of four fingers between your ſeat and the ſaddle.

It would greatly aſſiſt a learner, if he would practiſe riding in a large circle, as directed ſect. ii. without ſtirrups; keeping his face looking on the outward part of the circle ſo as not to have a full view of the horſe's head, but juſt of that ear which is on the outward part of the circle; and his ſhoulder, which is towards the centre of the circle, very forward. By this means you learn to balance your body, and keep a true ſeat, independent of your ſtirrups: you may probably likewiſe eſcape a fall, ſhould you at any time loſe them by being accidentally ſhaken from your ſeat.

As the ſeat in ſome meaſure depends on the ſaddle, it may not be amiſs to obſerve, that becauſe a ſaddle with a high pommel is thought dangerous, the other extreme prevails, and the pommel is ſcarce allowed to be higher than the middle of the ſaddle. The ſaddle ſhould lie as near the back-bone as can be, without hurting the horſe; for the nearer you ſit to his back, the better ſeat you have. If it does ſo, it is plain the pommel muſt riſe enough to ſecure the withers from preſſure: therefore, a horſe whoſe withers are higher than common, requires a higher pommel. If, to avoid this, you make the ſaddle of a more ſtraight line, the inconvenience ſpoken of follows; you ſit too much above the horſe's back, nor can the ſaddle form a proper ſeat. There ſhould be no ridge from the button at the ſide of the pommel, to the back part of the ſaddle. That line alſo ſhould be a little concave, for your thighs to lie at eaſe. In ſhort, a ſaddle ought to be, as nearly as poſſible, as if cut out of the horſe.

When you want your horſe to move forward, raiſe his head a little, and touch him gently with your whip; or elſe, preſs the calves of your legs againſt his ſides. If he does not move faſt enough, preſs them with more force, and ſo till the ſpur juſt touches him. By this practice, he will (if he has any ſpirit) move upon the laſt preſſure of the leg. Never ſpur him by a kick; but if it be neceſſary to ſpur him briſkly, keep your heels cloſe to his ſides, and ſlacken their force as he becomes obedient.

When your horſe attempts to be vitious, take each rein ſeparate, one in each hand, and advancing your arms forward, hold him very ſhort. In this caſe, it is common for the rider to pull him hard, with his arms low. But the horſe by this means having his head low too, has it more in his power to throw out his heels: whereas, if his head be raiſed very high, and his noſe thrown out a little, which is conſequent, he can neither riſe before nor behind; becauſe he can give himſelf neither of thoſe motions, without having his head at liberty. A plank placed *in æquilibrio*, cannot riſe at one end unleſs it ſinks at the other.

If your horſe is headſtrong, pull not with one con-

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tinued pull, but ſtop, and back him often, juſt ſhaking the reins, and making little repeated pulls till he obeys. Horſes are ſo accuſtomed to bear on the bit when they go forward, that they are diſcouraged if the rider will not let them do ſo.

If a horſe is looſe-necked, he will throw up his head at a continued pull; in which ſituation, the rider, ſeeing the front of his face, can have no power over him. When your horſe does thus, drop your hand and give the bridle play, and he will of courſe drop his head again into its proper place: while it is coming down, make a ſecond gentle pull, and you will find his mouth. With a little practice, this is done almoſt inſtantaneouſly; and this method will ſtop, in the diſtance of a few yards, a horſe, which will run away with thoſe who pull at him with all their might. Almoſt every one muſt have obſerved, that when a horſe feels himſelf pulled with the bridle, even when he is going gently, he often miſtakes what was deſigned to ſtop him, as a direction to bear on the bit and to go faſter.

Keep your horſe's head high, that he may raiſe his neck and creſt; play a little with the rein, and move the bit in his mouth, that he may not preſs on it in one conſtant and continued manner: be not afraid of raiſing his head too high; he will naturally be too ready to bring it down, and tire your arms with its weight, on the leaſt abatement of his mettle. When you feel him heavy, ſtop him, and make him go back a few paces: thus you break by degrees his propenſity to preſs on his bridle.

You ought not to be pleaſed (though many are) with a round neck, and a head drawn in towards his breaſt: let your horſe carry his head bridling in, provided he carries it high, and his neck arching upwards; but if his neck bends downwards, his figure is bad, his ſight is too near his toes, he leans on the bridle, and you have no command over him. If he goes preſſing but lightly on the bridle, he is the more ſure-footed, and goes pleaſanter; as your wriſt only may guide him. If he hangs down his head, and makes you ſupport the weight of that and his neck with your arms bearing on his fore-legs, (which is called *being on his ſhoulders*), he will ſtrike his toes againſt the ground, and ſtumble.

If your horſe is heavy upon the bit, tie him every day, for an hour or two, with his tail to the manger, and his head as high as you can make him lift it, by a rein on each poſt of the ſtall, tied to each ring of the ſnaffle bit.

Horſe-breakers and grooms have a great propenſity to bring a horſe's head *down*, and ſeem to have no ſeat without a ſtrong hold by the bridle. They know indeed, that the head ſhould yield to the reins, and the neck form an arch; but do not take the proper pains to make it an arch *upward*. A temporary effect of attempting to raiſe a horſe's head, may perhaps be making him puſh out his noſe. They will here tell you, that his head is too high already; whereas it is not the diſtance from his *noſe*, but from the *top* of his head, to the ground, which determines the head to be high or low. Beſides, although the fault is ſaid to be in the manner of carrying the head, it ſhould rather be ſaid to be in that of the neck; for if the neck was raiſed, the head would be more in the poſition of one ſet on a well formed neck.

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The deſign therefore of lifting up the head, is to raiſe the neck, and *thereby* bring in the head; for even while the bridle makes the ſame line from the rider's hand to the bit, the horſe's noſe may be either drawn in, or thruſt out, according as his neck is raiſed or depreſſed. Inſtead of what has been here recommended, we uſually ſee colts broke with their heads caveſſoned very low, their necks ſtiff, and not in the leaſt ſuppled. When the breaking-tackle is left off, and they are mounted for the road, having more food and reſt, they frequently plunge, and a ſecond breaking becomes neceſſary. Then, as few gentlemen can manage their own horſes, they are put into the hands of grooms, from whom they learn a variety of bad habits.

If, on the other hand, your horſe carries his head (or rather his noſe) too high, he generally makes ſome amends by moving his ſhoulders lightly, and going ſafely. Attend to the cauſe of this fault. Some horſes have their necks ſet ſo low on their ſhoulders, that they bend firſt down, then upwards, like a ſtag's. Some have the upper line of their necks, from their ears to their withers, too ſhort. A head of this ſort cannot poſſibly bend inwards and form an arch, becauſe the vertebræ (or neck bones) are too ſhort to admit of flexure; for in long and ſhort necked horſes the number of the vertebræ is the ſame. In ſome, the jaw is ſo thick, that it meets the neck, and the head by this means has not room to bend. On the other hand, ſome have the under line from the jaw to the breaſt, ſo ſhort, that the neck cannot riſe.

In all theſe caſes you may gain a *little* by a nice hand with an eaſy bit; but no curb, martingale, or other forcible method, will *teach* a horſe to carry his head or neck in a poſture which nature has made uneaſy to him. By trying to pull in his noſe farther than he can bear, you will add a bad habit to nature. You could not indeed *contrive* a more effectual method to make him continually toſs his noſe up, and throw his foam over you.

The rule already given to ride a looſe-necked horſe, will be a proper one for all light-mouthed horſes: one caution being added, which is, always to ſearch whether his ſaddle or girths may not in ſome way pinch him; and whether the bit may not hurt his lip by being too high in his mouth: becauſe, whenever he frets from either of theſe cauſes, his head will not be ſteady.

It is a common cuſtom to be always pulling at the bridle, as if to ſet off to advantage either the ſpirit of the horſe, or the ſkill of the rider. Our horſes therefore are taught to hold their heads low, and pull ſo, as to bear up the rider from the ſaddle, ſtanding in his ſtirrups, even in the gentleſt gallop: how very improper is this, we are experimentally convinced, when we happen to meet with a horſe which gallops otherwiſe. We immediately ſay, *he canters excellently*, and find the eaſe and pleaſure of his motion. When horſes are deſigned for the race, and ſwiftneſs is the only thing conſidered, the method may be a good one.

It is not to be wondered that *dealers* are always pulling at their horſes; that they have the ſpur conſtantly in their ſides, and are at the ſame time continually checking the rein: by this means they make them bound, and champ the bit, while their rage has

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the appearance of ſpirit. Theſe people ride with their arms ſpread, and very low on the ſhoulders of their horſes: this method makes them ſtretch their necks, and gives a better appearance to their fore-hands; it conceals alſo a thick jaw, which, if the head was up, would prevents its yielding to the bit; it hides likewiſe the ewe-neck, which would otherwiſe ſhew itſelf. Indeed, if you have a horſe unſteady to the bit, formed with a natural heavy head, or one which carries his noſe obſtinately in the air, you muſt find his mouth where you can, and make the beſt of him.

Many horſes are taught to ſtart by whipping them for ſtarting. How is it poſſible they can know it is deſigned as a puniſhment? In the riding-houſe, you teach your horſe to riſe up before, and to ſpring and laſh out his hinder legs, by whipping him when tied between two pillars, with his head a little at liberty. If he underſtood this to be a puniſhment for doing ſo, he would not by that method learn to do it. He ſeems to be in the ſame manner *taught* to ſpring and fly when he is frightened. Moſt horſes would go quietly paſt an object they were beginning to fly from, if their riders, inſtead of gathering up their bridles, and ſhewing themſelves ſo ready, ſhould throw the reins looſe upon their necks.

When a horſe ſtarts at any thing on one ſide, moſt riders turn him out of the road, to make him go up to what he ſtarts at: if he does not get the better of his fear, or readily comply, he generally goes paſt the object, making with his hinder parts, or croup, a great circle out of the road; whereas, he ſhould learn to keep ſtraight on, without minding objects on either ſide.

If he ſtarts at any thing on the left, hold his head high, and keep it ſtraight in the road, pulling it *from* looking at the thing he ſtarts at, and keeping your right leg hard preſſed againſt his ſide, towards his flank: he will then go ſtraight along the road. By this method, and by turning his head a little more, he may be forced with his croup cloſe up to what frightened him; for as his head is pulled one way, his croup neceſſarily turns the other. Always avoid a quarrel with your horſe, if you can: if he is apt to ſtart, you will find occaſions enough to exerciſe his obedience, when what he ſtarts at lies directly in his way, and you *muſt* make him paſs; if he is not ſubject to ſtart, you ſhould not contend with him about a trifle.

It muſt be obſerved, however, that this rule in going paſt an object may perhaps be a little irregular in a managed horſe, which will always obey the leg: but even ſuch a horſe, if he is really afraid, and not reſtive, it may not be amiſs to make look another way; unleſs the object be ſomething you would particularly accuſtom him to the ſight of.

The caſe will alſo be different with a horſe whoſe fear is owing to his being not uſed to objects; but ſuch a one is not to be rode by any horſeman to whom theſe rules are directed: the ſtarting here meant ariſes merely from the horſe's being pamper'd, and ſpringing through livelineſs.

The notion of the neceſſity of making a horſe go immediately up to every thing he is afraid of, and not ſuffering him to become maſter of his rider, ſeems to be in general carried too far. It is an approved and good method to conquer a horſe's fear of the ſound of a drum, by beating one near to him at the time of feeding him: this not only familiarizes the noiſe to him, but makes it pleaſant, as a fore-runner of his meat*; whereas, if he was whipped up to it, he might perhaps ſtart at it as long as he lived. Might not this be applied to his ſtarting at other things, and ſhew that it would be better to ſuffer him (provided he does not turn back) to go a little from, and avoid an object he has a diſlike to, and to accuſtom him to it by degrees, convincing him, as it were, that it will not hurt him; than to puniſh him, quarrel with him, and perhaps ſubmit to his will at laſt, while you inſiſt on his overcoming his fear in an inſtant? If he ſees a like object again, it is probable he will recollect his dread, and arm himſelf to be diſobedient.

We are apt to ſuppoſe, that a horſe fears nothing ſo much as his rider: but may he not, in many circumſtances, be afraid of inſtant deſtruction? of being cruſhed? of being drowned? of falling down a precipice? Is it a wonder that a horſe ſhould be afraid of a loaded waggon? may not the hanging load ſeem to threaten the falling on him? There cannot be a rule more general, than, in ſuch a caſe, to ſhew him there is room for him to paſs. This is done by turning his head a very little from the carriage, and preſſing your leg, which is fartheſt from it, againſt his ſide.

A horſe is not to ſtop without a ſign from his rider. —Is it not then probable, that when he is driven up to a carriage he ſtarts at, he conceives himſelf obliged either to attack or run againſt it? Can he underſtand the rider's ſpurring him with his face directed to it, as a ſign for him to paſs it? That a horſe is eaſily alarmed for his face and eyes, (he will even catch back his head from a hand going to careſs him); that he will not go with any force, face to face, even to another horſe, (if in his power to ſtop); and that he ſees perfectly ſideways,—may be uſeful hints for the treatment of horſes, with regard to ſtarting.

Though you ought not to whip a horſe for ſtarting, there can be no good effect from clapping his neck with your hand to encourage him. If one took any notice of his ſtarting, it ſhould be rather with ſome tone of voice which he uſually underſtood as an expreſſion of diſlike to what he is doing; for there is *oppoſition* mixed with his ſtarting, and a horſe will ever repeat what he finds has foiled his rider.

Notwithſtanding the direction above given, of not preſſing a horſe up to a carriage he ſtarts at; yet if one which you apprehend will frighten him meets you at a narrow part of the road, when you have once let him know he is to paſs it, be ſure you remain determined, and preſs him on. Do this more eſpecially when part of the carriage has already paſſed you: for if, when he is frightened, he is accuſtomed to go back, and turn round, he will certainly do it if he finds, by your hand ſlackening, and legs not preſſing, that you are irreſolute; and this at the moſt dangerous point of time, when the wheels of the carriage take him as he turns. Remember not to touch the curb-rein at this time; it will certainly check him. It is not known to every one, that the perſon who would lead a horſe by the bridle, ſhould not turn his face to him when he refuſes to follow him: if, beſides this, he raiſes his arms, ſhews his whip, or pulls the bridle with jerks, he frightens the horſe, inſtead of perſua-

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* See Sect. v.

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ding him to follow; which a little patience may bring about.

Ride with a ſnaffle; and uſe your curb, if you have one, only occaſionally. Chooſe your ſnaffle full and thick in the mouth, eſpecially at the ends to which the reins are faſtened. Moſt of them are made too ſmall and long; they cut the horſe's mouth, and bend back over the bars of his jaw, working like pincers.

The management of the curb is too nice a matter to enter on here, farther than to preſcribe great caution in the uſe of it: a turn of the wriſt, rather than the weight of your arm, ſhould be applied to it. The elaſticity of a rod, when it hath hooked a fiſh, may give you ſome idea of the proper play of a horſe's head on his bridle; his ſpirit and his pliableneſs are both marked by it.

A horſe ſhould never be put to do any thing in a curb, which he is not ready at: you may force him, or pull his head any way, with a ſnaffle; but a curb acts only in a ſtraight line. It is true, that a horſe will be turned out of one track into another by a curb, but it is becauſe he knows it as a *ſignal*. When he is put to draw a chair, and does not underſtand the neceſſity he is then under of taking a larger ſweep when he turns, you frequently ſee him *reſtive*, as it is then called: but put him on a ſnaffle, or buckle the rein to that part of the bit which does not curb him; and the horſe ſubmits to be pulled about, till he underſtands what is deſired of him. Theſe directions ſuppoſe your horſe to have ſpirit, and a good mouth: if he has not, you muſt take him as he is, and ride him with ſuch a bit as you find moſt eaſy to yourſelf.

When you ride a journey, be not ſo attentive to your horſe's nice carriage of himſelf, as to your encouragement of him, and keeping him in good-humour. Raiſe his head; but if he flags, you may indulge him with bearing a little more upon the bit than you would ſuffer in an airing. If a horſe is lame, tender-footed, or tired, he naturally hangs upon his bridle. On a journey, therefore, his mouth will depend greatly on his ſtrength and the goodneſs of his feet. Be then very careful about his feet, and let not a farrier ſpoil them. You will be enabled to keep them from danger, by the directions given under the article SHOEING.

Very few, although practiſed in riding, know they have any power over a horſe, but by the bridle; or any uſe for the ſpur, except to make him go forward. A little experience will teach them a farther uſe. If the left ſpur touches him (and he is at the ſame time prevented from going forward), he has a ſign, which he will ſoon underſtand, to move ſideways to the right. In the ſame manner to the left, if the right ſpur is cloſed to him: he afterwards, through fear of the ſpur, obeys a touch of the leg; in the ſame manner as a horſe moves his croup from one ſide of the ſtall to the other, when any one ſtrikes him with his hand. In ſhort, his croup is guided by the leg, as his head is by the bridle. He will never diſobey the leg, unleſs he becomes reſtive. By this means you will have a far greater power over him: he will move ſideways, if you cloſe one leg to him; and ſtraight forward, if both: even when he ſtands ſtill, your legs held near him will keep him on the watch; and with the ſlighteſt, unſeen motion of the bridle upwards, he will raiſe his head, and ſhew his forehand to advantage.

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On this uſe of the legs of the rider, and guidance of the croup of the horſe, are founded all the *airs* (as the riding-maſters expreſs themſelves) which are taught in the manage; the paſſage, or ſide-motion of troopers to cloſe or open their files, and indeed all their evolutions. But the convenience of ſome degree of this diſcipline for common uſe, is the reaſon of mentioning it here. It is uſeful if a horſe is apt to ſtumble or ſtart. If to the firſt, by preſſing your legs to his flank, and keeping up his head, he is made to go light on his fore-legs, which is aiding and ſupporting him; and the ſame if he does actually ſtumble, by helping him at the very inſtant to exert himſelf, while as yet any part of him remains not irrecoverably impreſſed with the precipitate motion. Hence this uſe of the hand and legs of the rider is called *giving aids* to a horſe; for, as to holding up the weight of a heavy unactive horſe, by mere pulling, it is as impoſſible as to recover him when falling down a precipice.

A horſe is ſupported and helped by the hands and legs of his rider, in every action they require of him; hence he is ſaid to perform his *airs* by the *aids* from his rider.

The ſame manner is uſeful if a horſe ſtarts. For if when he is beginning to fly to one ſide, you leg on the ſide he is flying to, he ſtops his ſpring immediately. He goes paſt what he ſtarted at, keeping ſtraight on, or as you chooſe to direct him; and he will not fly back from any thing, if you preſs him with both legs. You keep his haunches under him, going down a hill; help him on the ſide of a bank; more eaſily avoid the wheel of a carriage; and approach more gracefully and nearer to the ſide of a coach, or horſeman. When a pampered horſe curvets irregularly, and twiſts his body to and fro, turn his head either to the right or left, or both alternately, (but without letting him move out of the track), and preſs your leg to the oppoſite ſide: your horſe cannot then ſpring on his hind-legs to one ſide, becauſe your leg prevents him; nor to the other, becauſe his head looks that way, and a horſe does not ſtart and ſpring to the ſide on which he looks. Here it may not be amiſs to obſerve the impropriety of the habit which many riders have, of letting their legs ſhake againſt the ſides of the horſe: if a horſe is taught, they are then continually preſſing him to violent action; and if he is not, they render him inſenſible and incapable of being taught. The fretting of a hot horſe will hence be exceſſive, as it can no otherwiſe be moderated, than by the utmoſt ſtillneſs of the ſeat, hands, and legs of the rider.

Colts at firſt are taught to *bear* a bit, and by degrees to *pull* at it. If they did not preſs it, they could not be guided by it. By degrees they find their necks ſtronger than the arms of a man; and that they are capable of making great oppoſition, and often of foiling their riders. Then is the time to make them ſupple and pliant in every part. The part which of all others requires moſt this pliancy, is the neck. Hence the metaphor of *ſtiff-necked* for *diſobedient*. A horſe cannot move his head, but with the muſcles of his neck: this may be called his *helm;* it guides his courſe, changes and directs his motion.

The uſe of this pliancy in the different parts and limbs of a horſe has been already ſhewn in a former ſection. The preſent ſection being directed to the *unexperienced* horſeman, it may ſuffice to add, that *his* idea of ſuppleneſs need only be, that of an ability and readineſs in a horſe to move every limb, on a ſign given him by the hands or legs of his rider; as alſo, to bend his body, and move in a ſhort compaſs, quick and collected within himſelf, ſo as inſtantly to be able to perform any other motion.

HORSHAM, a town of Suſſex in England, ſeated near St Leonard's foreſt, ſending two members to parliament. W. Long. 0. 22. N. Lat. 51. 10.

HORSTIUS (James), profeſſor of medicine in the univerſity of Helmſtadt, in the 16th century. He joined devotion with the knowledge and practice of phyſic. He carefully prayed to God to bleſs his preſcriptions, and publiſhed a form of prayer upon this ſubject. He alſo wrote, 1. A treatiſe on the qualities of a good phyſician. 2. Another on the qualities of a good apothecary. 3. A treatiſe of the plague, in German. 4. A commentary *in libros Hippocratis de corde*, and other works.

Horstius (Gregory), nephew of the former, called *the Æſculapius of Germany*, publiſhed ſeveral books, which are eſteemed.

HORTAGILERS, in the grand ſignior's court, upholſterers, or tapeſtry-hangers. The grand ſignior has conſtantly 400 in his retinue when he is in the camp: theſe go always a day's journey before him, to fix upon a proper place for his tent, which they prepare firſt; and afterwards thoſe of the officers, according to their rank.

HORTENSIUS (Quintus), a celebrated Roman orator, the cotemporary of Cicero, pleaded with univerſal applauſe at 19 years of age, and continued the ſame profeſſion during 48 years. But being at laſt eclipſed by Cicero, he quitted the bar, and embraced a military life; became a military tribune, prætor, and afterwards conſul, about 70 B. C. Cicero ſpeaks of him in ſuch a manner as makes us regret the loſs of his orations. Hortenſius had a wonderful memory, and delivered his orations without writing down a ſingle word, or forgetting one particular that had been advanced by his adverſaries. He died very rich, a little before the civil war, which he had endeavoured by all poſſible means to prevent.

HORTUS SICCUS, a DRY GARDEN; an appellation given to a collection of ſpecimens of plants, carefully dried and preſerved.

Take a ſpecimen of a plant in flower, and with it one of its bottom-leaves, if it have any; bruiſe the ſtalk, if too rigid; ſlit it, if too thick; ſpread out the leaves and flowers on paper; cover the whole with more paper, and lay a weight over all. At the end of 18 hours take out the plants, now perfectly flatted; lay them on a bed of dry common ſand; ſift over them more dry ſand, to the depth of two inches, and thus let them lie about three weeks: the leſs ſucculent dry much ſooner, but they take no harm afterwards. If the floor of a garret be covered in ſpring with ſand two inches deep, leaving ſpace for walking to the ſeveral parts, it will receive the collection of a whole ſummer, the covering of ſand being ſifted over every parcel as laid in. They need no farther care, from the time of laying them, till they are taken up to be ſtuck on paper. The cement uſed is a ſolution of gum-arabic in water.

Plants may be dried very well without ſand, by only putting them frequently into freſh quires of paper, or a few by only preſſing them between the leaves of a book; but the ſand-method preſerves the colour beſt, and is done with leaſt trouble.

HOSANNA, a Hebrew word, ſignifying *ſave now*, or *ſave, we beſeech thee;* from the frequent uſe of which, during the feaſt of tabernacles, the whole ſolemnity got the appellation of *Hoſanna Rabbi*.

HOSE, from the Saxon *Hoſa*, a ſtocking. See Stocking.

HOSEA, a canonical book of the Old Teſtament, ſo called from the prophet of that name, its author, who was the ſon of Beri, and the firſt of the leſſer prophets. He lived in the kingdom of Samaria, and delivered his prophecies under the reign of Jeroboam II. and his ſucceſſors, kings of Iſrael; and under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. His principal deſign is to publiſh the groſs idolatries of the people of Iſrael and Judah, to denounce the divine vengeance againſt them, and to foretel the captivity in Aſſyria.

In the beginning of Hoſea's prophecy, we read that the Lord directed him *to take unto him a wife of whoredoms, and children of whoredoms;* that is, to marry a woman of a bad life. This was deſigned as a figurative deſcription of the idolatry and infidelity of Samaria and the ten tribes, formerly the Lord's ſpouſe, but afterwards become adulterous and corrupt. Many interpreters, ſhocked at the irregularity of this marriage of the prophet, fancy that it only paſſed in viſion; whilſt others think, that the marriage was real, though figurative of the things it deſcribed, and which were afterwards to be performed.

HOSPINIAN (Rodolphus), one of the greateſt writers that Switzerland has given birth to. He was born in 1547, at Altorf near Zurich; obtained the freedom of Zurich; and was made proviſor of the abbey ſchool. Notwithſtanding this employment, he undertook a noble work of vaſt extent, which was a *Hiſtory of the Errors of Popery*. Though he could not complete this work according to his plan, he publiſhed ſome conſiderable parts of it: what he publiſhed on the Euchariſt, and another work called *Concordia Diſcors*, exceedingly exaſperated the Lutherans. He did not reply to them; but turning his arms againſt the Jeſuits, publiſhed *Hiſtoria Jeſuitica*, &c. Theſe writings gained him preferment; he being appointed archdeacon of Caroline church, and then miniſter of the abbey-church. He died in 1626; and there was an edition of his works publiſhed at Geneva 1681, in ſeven volumes in folio.

HOSPITAL (Michael de l'), chancellor of France in the 16th century, was one of the greateſt men of his age, and had raiſed himſelf by degrees. He agreed to an edict much ſeverer againſt the Proteſtants than he could have wiſhed, to prevent the introduction of the inquiſition. It was that of Romorantin. The ſpeeches he made, in order to inſpire a ſpirit of toleration, made him much ſuſpected by the Roman Catholics, and extremely odious to the court of Rome. The maxims of ſtate, upon which he regulated himſelf, were of great advantage to France, ſince he formed ſome diſciples who oppoſed, in proper time, the pernicious attempts of the leaguers, and rendered them abortive.—His pacific views being diſliked by Catharine de Medicis, who had contributed to his advancement, ſhe excluded him from the council of war, and occaſioned his diſgrace. He retired, however, of his own accord, in 1568; and ſpent the reſt of his life at his country-ſeat at Vignai, where he died in 1573, aged 68. His poems are eſteemed. He alſo publiſhed ſome excellent ſpeeches and memoirs.

HOSPITAL, popularly Spittal, a place or building erected, out of charity, for the reception and ſupport of the poor, aged, infirm, ſick, and otherwiſe helpleſs. The word is formed of the Latin *hoſpes*, "hoſt, ſtranger." See Host.

In the ages of the church, the biſhop had the immediate charge of all the poor, both ſound and diſeaſed, as alſo of widows, orphans, ſtrangers, &c.—When the churches came to have fixed revenues allotted them, it was decreed, that at leaſt one fourth part thereof ſhould go to the relief of the poor; and to provide for them the more commodiouſly, divers houſes of charity were built, which are ſince denominated *hoſpitals*. They were governed wholly by the prieſts and deacons, under the inſpection of the biſhop. In courſe of time, ſeparate revenues were aſſigned for the hoſpitals; and particular perſons, out of motives of piety and charity, gave lands and money for erecting of hoſpitals. When the church-diſcipline began to relax, the prieſts, who till then had been the adminiſtrators of hoſpitals, converted them into a ſort of benefices, which they held at pleaſure, without giving account thereof to any body; reſerving the greateſt part of the income to their own uſe; ſo that the intentions of the founders were fruſtrated.—To remove this abuſe, the council of Vienne expreſsly prohibited the giving any hoſpital to ſecular prieſts in the way of a benefice; and directed the adminiſtration thereof to be given to ſufficient and reſponſible laymen, who ſhould take an oath, like that of tutors, for the faithful diſcharge thereof, and be accountable to the ordinaries.—This decree was executed and confirmed by the council of Trent.

In Britain, hoſpitals are buildings properly endowed, or otherwiſe ſupported by charitable contributions, for the reception and ſupport of the poor, aged, infirm, ſick, or helpleſs.

A charitable foundation laid thus for the ſuſtenance and relief of the poor, is to continue for ever. Any perſon ſeized of an eſtate in fee, may, by deed inrolled in chancery, erect and found an hoſpital, and nominate ſuch heads and governors therein as he ſhall think fit; and this charitable foundation ſhall be incorporated, and ſubject to the inſpection and guidance of the heads and viſitors nominated by the founder. Likewiſe ſuch corporations ſhall have, take, and purchaſe lands, ſo as not to exceed 200 l. a-year, provided the ſame be not held of the king; and to make leaſes, reſerving the accuſtomed yearly rent *.

Hospital-*Fever*, a name given to the malignant catarrhal fever, as being frequent in hoſpitals. See (the *Index* ſubjoined to) Medicine.

HOSCHIUS (Sidronius), a jeſuit, who was born at Marke, in the dioceſe of Ypres, in 1596, and died at Tongres in 1653. He wrote ſome elegies and other poems in Latin, with great purity and elegance.

HOSPITALITY, the practice of entertaining ſtrangers.—Dr Robertſon ſpeaking of the middle ages, ſays, "Among people whoſe manners are ſimple, and who are ſeldom viſited by ſtrangers, hoſpitality is a virtue of the firſt rank. This duty of hoſpitality was ſo neceſſary in that ſtate of ſociety which took place during the middle ages, that it was not conſidered as one of thoſe virtues which men may practiſe or not, according to the temper of their minds and the generoſity of their hearts. Hoſpitality was enforced by ſtatutes, and thoſe who neglected the duty were liable to puniſhment. The laws of the Slavi ordained that the moveables of an inhoſpitable perſon ſhould be confiſcated, and his houſe burnt. They were even ſo ſolicitous for the entertainment of ſtrangers, that they permitted the landlord to ſteal for the ſupport of his gueſt."

HOSPITALLERS, an order of religious knights, now known by the title of *knights of Malta*. See Malta.

HOSPITIUM, a term uſed in old writers either for an inn or a monaſtery, built for the reception of ſtrangers and travellers. See Inn and Monastery.

HOSPODAR, a title borne by the princes of Walachia and Moldavia, who receive the inveſtiture of their principalities from the grand ſignior. He gives them a veſt and ſtandard; they are under his protection, and obliged to ſerve him, and he even ſometimes depoſes them; but in other reſpects they are abſolute ſovereigns within their own dominions.

HOST, hospes, a term of mutual relation, applied both to a perſon who lodges and entertains another, and to the perſon thus lodged, &c.—The word is formed of the Latin *hoſpes*, which ſome will have thus called, *quaſi hoſtium* or *oſtium petens*; for *oſtium* was anciently wrote with an aſpirate.—Thus the innkeeper ſays, he has a good *hoſt*, in ſpeaking of the traveller who lodges with him: and the traveller, again, ſays, he has a kind *hoſt*, in ſpeaking of his landlord.

It muſt be obſerved then, that it was the cuſtom among the ancients, when any ſtranger aſked for lodging, for the maſter of the houſe, and the ſtranger, each of them to ſet a foot on their own ſide of the threſhold, and ſwear they would neither of them do any harm to the other.—It was this ceremony that raiſed ſo much horror againſt thoſe who violated the law or right of hoſpitality on either ſide; inaſmuch as they were looked on as perjured.

Inſtead of *hoſpes*, the ancient Latins called it *hoſtis*; as Cicero himſelf informs us: though in courſe of time, *hoſtis* came to ſignify an enemy; ſo much was the notion of hoſpitality altered.

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* See *Corporation*.

Hoſt, in the church of Rome, a name given to the elements uſed in the euchariſt, or rather to the conſecrated wafer; which they pretend to offer up every day, a new hoſt or ſacrifice for the ſins of mankind.—They pay adoration to the hoſt, upon a falſe preſumption that the elements are no longer bread and wine, but tranſubſtantiated into the real body and blood of Chriſt. See Transubstantiation.

HOSTAGE, a perſon given up to an enemy as a ſecurity for the performance of the articles of a treaty.

Hot-*Beds*, in gardening, beds made with freſh horſe-dung, or tanner's bark, and covered with glaſſes to defend them from cold winds.

By the ſkilful management of hot-beds, we may imitate the temperature of warmer climates; by which means, the ſeeds of plants brought from any of the countries within the torrid zone, may be made to flouriſh even under the poles.

The hot-beds commonly uſed in kitchen-gardens, are made with new horſe-dung mixed with the litter of a ſtable, and a few ſea-coal-aſhes, which laſt are of ſervice in continuing the heat of the dung. This ſhould remain ſix or ſeven days in a heap; and being then turned over, and the parts mixed well together, it ſhould be again caſt into a heap; where it may continue five or ſix days longer, by which time it will have acquired a due heat. Theſe hot-beds are made in the following manner: In ſome ſheltered part of the garden, dig out a trench of a length and width proportionable to the frames you intend it for; and if the ground be dry, about a foot or a foot and a half deep; but if it be wet, not above ſix inches: then wheel the dung into the opening, obſerving to ſtir every part of it with a fork, and to lay it exactly even and ſmooth on every part of the bed, laying the bottom part of heap, which is commonly free from litter, upon the ſurface of the bed: and if it be deſigned for a bed to plant out cucumbers to remain for good, you muſt make a hole in the middle of the place deſigned for each light about ten inches over, and ſix deep, which ſhould be filled with good freſh earth, thruſting in a ſtick to ſhew the places where the holes are; then cover the bed all over with the earth that was taken out of the trench, about four inches thick, and put on the frame, letting it remain till the earth be warm, which commonly happens in three or four days after the bed is made, and then the plants may be placed in it. But if your hot-bed be deſigned for other plants, there need be no holes made in the dung; but after having ſmoothed the ſurface with a ſpade, you ſhould cover the dung about three or four inches thick with good earth, putting on the frames and glaſſes as before. In making theſe beds, care muſt be taken to ſettle the dung cloſe with a fork; and if it be pretty full of long litter, it ſhould be trod down equally on every part. During the firſt week or ten days after the bed is made, you ſhould cover the glaſſes but ſlightly in the night, and in the day-time carefully raiſe them, to let out the ſteam: but as the heat abates, the covering ſhould be increaſed; and as the bed grows cold, new hot dung ſhould be added round the ſides of it.

The hot-bed made with tanner's bark, is, however, much preferable to that deſcribed above, eſpecially for all tender exotic plants and fruits, which require an even degree of warmth to be continued for ſeveral months, which cannot be effected with horſe-dung. The manner of making them is as follows: Dig a trench about three feet deep, if the ground be dry; but if wet, it muſt not be above a foot deep at moſt, and muſt be raiſed two feet above the ground. The length muſt be proportioned to the frames intended to cover it; but it ſhould never be leſs than ten or twelve feet, and the width not leſs than ſix. The trench ſhould be bricked up round the ſides to the abovementioned height of three feet, and filled in the ſpring with freſh tanner's bark that has been lately drawn out of their vats, and has lain in a round heap, for the moiſture to drain out of it, only three or four days: as it is put in, gently beat it down equally with a dung-fork; but it muſt not be trodden, which would prevent its heating, by ſettling it too cloſe: then put on the frame, covering it with glaſſes; and in about ten days or a fortnight, it will begin to heat; at which time plunge your pots of plants or ſeed into it, obſerving not to tread down the bark in doing it. Theſe beds will continue three or four months in a good temper of heat; and if you ſtir up the bark pretty deep, and mix a load or two of freſh bark with the old when you find the warmth decline, you will preſerve its heat two or three months longer. Many lay ſome hot horſe-dung in the bottom of the trench under the bark; but this ought never to be practiſed unleſs the bed is wanted ſooner than the bark would heat of itſelf, and even then there ought only to be a ſmall quantity of dung at the bottom.

The frames which cover theſe beds, ſhould be proportioned to the ſeveral plants they are deſigned to contain. If they are to cover the ananas or pine-apple, the back part ſhould be three feet high, and the lower part fifteen inches: if the bed be intended for taller plants, the frame muſt be made of a depth proportionable to them: but if it be for ſowing of ſeeds, the frame need not be above fourteen inches high at the back, and ſeven in the front; by which means, the heat will be much greater.

HOTEL, a French term, anciently ſignifying a houſe, or dwelling place.—It is now more commonly uſed for the palaces, or houſes of the king, princes, and great lords. In this ſenſe they ſay, the *hotel de Conde*, *hotel de Conti*, *hotel du Louvre*, &c.

The grand *prevot de l'hotel*, is the firſt judge of the officers of the king's houſehold. His juriſdiction is much like that of lord ſteward of the houſehold of the king of England.

The *hotel de ville* is what we call a *town-houſe*, or *town-hall*.

Hotel, is likewiſe uſed for a large inn, alſo for a large lodging-houſe ready furniſhed.

HOTMAN (Francis), one of the moſt learned civilians in the 16th century. He profeſſed law at Bourges: but, on account of religion, retired to Geneva, read lectures on civil law there, and publiſhed books with ſuch ſtrength againſt the perſecutors, that great promiſes were made to him to engage him not to write any more in that manner; but he did not regard their offers. He died at Baſil in 1590. His *Franco-Gallia* is well known, having been done in Engliſh by lord Moleſworth. Some perſons think he

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was the author of *Vindiciæ contra Tyrannos*. All his works were printed at Geneva in 1599, in 3 vols folio.

HOTTENTOTS, a people in the ſouthern part of Africa, whoſe country ſurrounds the empire of Monomotapa, in form of a horſe-ſhoe, extending, according to Magin, from the Negroeſt of Cabo as far as the Cape of Good Hope; and from thence northward to the river Magnica, or Rio de St Spirita, including Mattatan a diſtinct kingdom. According to Sanutus, this coaſt, beginning at the Mountains of the Moon under the tropic of Capricorn in 23°½ S. Lat. extends north beyond the Cape to the coaſt of Zanguebar; having the Indian ſea on the eaſt, the Ethiopic on the weſt, the ſouthern ocean on the ſouth; and on the north the kingdoms of Mattatan, Monomotapa, and the coaſt of Zanguebar, or rather the Mountains of the Moon, which divide it from the reſt of the continent.

The Europeans firſt became acquainted with this country in the year 1493, when Bartholomew Diaz, a Portugueſe admiral, diſcovered the moſt ſoutherly point of Africa now called the *Cape of Good Hope*, but by him *Cabo dos totos tormentos*, or Cape of all Plagues, on account of the ſtorms he met with in the neighbourhood; but John, then king of Portugal, having from the account of Diaz concluded that a paſſage to the Eaſt Indies was now diſcovered, changed the name to that of the *Cape of Good Hope*, which it ſtill retains. In 1497, it was circumnavigated by Vaſco de Gama, who made a voyage to India that way; however, it remained uſeleſs to Europeans till the year 1650, when Van Riebeck a Duch ſurgeon firſt ſaw the advantages that would accrue to the Eaſt India company in Holland, from a ſettlement at ſuch a convenient diſtance both from home and from India. The colony which he planted has ever ſince continued in the hands of the Dutch, has greatly increaſed in value, and is viſited by all the European ſhips trading to the Eaſt Indies.

The country now poſſeſſed by the Dutch is of pretty conſiderable extent, and comprehends that part of the African coaſt on the weſt called *Terra de Natal*. It is naturally barren and mountainous; but the induſtry of the Dutch hath overcome all natural difficulties, and it now produces not only a ſufficiency of all the neceſſaries of life for the inhabitants, but alſo for the refreſhment of all the Europeans who paſs and repaſs that way.

The coaſt abounds in capes, bays, and roads. Thirty leagues to the eaſt of the Cape of Good Hope, in S. Lat. 34. 21. is another Cape which runs out beyond 35°, called by the Portugueſe, who firſt doubled it, *Cabo dos Agulhas*, or the *Cape of Needles*, on account of ſome ſtrange variations in the magnetical needle obſerved as they came near it. Near this Cape is a flat ſhore, with plenty of fiſh: it begins in the weſt near a freſh-water river, and, extending 15 leagues in the main ſea, ends in the eaſt near *Fiſh-bay*. Cabo Falſo, ſo called by the Portugueſe, who returning from India miſtook it for the Cape of Good Hope, lies to the eaſtward between theſe two capes, about eight or nine leagues beyond that of Good Hope. Along the coaſts, on both ſides of the Cape of Good Hope, are many fine bays, where ſhips may ride in the greateſt ſafety. Twenty-ſeven leagues to the northweſt is Saldonha bay, ſo named from a Portugueſe captain ſhipwrecked on the coaſt. The largeſt and moſt commodious is *Table* or *Vaſel Bay*, on the ſouth, and near the mountain of that name, ſix leagues in circumference, with four-fathom water cloſe to the beach, and ſheltered from all but northweſt winds, which blow ſtraight up. Oppoſite to this bay is *Robu Eilan*, or the Iſland of Rabbits, in 34. 30. S. Lat. 67 leagues eaſt from the Cape of Good Hope. Peter Both, in 1661, diſcovered a bay, which he named *Uleeſt*, ſheltered only from north winds, in which is a ſmall iſland, and on the weſt a rivulet of freſh water extremely convenient for European mariners. Twenty-five or thirty leagues farther eaſt, Both diſcovered Marſhall Bay, afterwards named by the Portugueſe *Seno Formoſo*. Next to this is *Seno de Lago*, from its reſemblance to a lake. There are ſeveral roads in this bay, and an iſland called *Ilha dos Caos*. Cabo de S. Franciſco, and Cabo das Serras are marked upon charts between theſe two bays. Near the latter of theſe capes is Cabo de Arecito, and the iſland Contento; and ſomething more north-eaſt is St Chriſtopher's river, called *San Chriſtovano* by the Portugueſe, and by the Hottentots *Nagod*. The country beyond this river, was called by the Portugueſe, who diſcovered it on the day of our Lord's nativity, *Terra de Natal*. Between the Cape of Good Hope and Cabo das Agulhas are the Sweet, Salt, and Jagulina rivers, which run into the ſea, and Sweet-water river flows from the Table-mountain.

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The moſt remarkable mountains in this country are Table-hill, Lion-hill, Wind-hill, and the Tiger-hills. The three firſt lie near Table-bay, and ſurround Table-valley, where the Cape-town ſtands. The firſt is the higheſt, and extends to the ſouth and a little weſt, from the centre of the valley. Kolben determined its height to be 1857 feet. Mr Forſter, who lately viſited this part of the world, informs us, that "the extremity of Africa towards the ſouth is a maſs of high mountains, of which the outermoſt are craggy, black, and barren, conſiſting of a coarſe granite, which contains no heterogeneous parts, ſuch as petrified ſhells, &c. nor any volcanic productions. The ground gradually riſes on all ſides towards the three mountains which lie round the bottom of the bay, keeping low and level only near the ſea-ſide, and growing ſomewhat marſhy in the Iſthmus between Falſe and Table Bays, where a ſalt rivulet falls into the latter. The marſhy part has ſome verdure, but intermixed with a great deal of ſand. The higher grounds, which, from the ſea-ſide, have a parched and dreary appearance, are, however, covered with an immenſe variety of plants, among which are a prodigious number of ſhrubs, but ſcarce one or two ſpecies that deſerve the name of *trees*. There are alſo a few ſmall plantations wherever a little run of water moiſtens the ground. The aſcent of Table-mount is very ſteep and difficult, on account of the number of looſe ſtones which roll away under the feet of the traveller. About the middle of the mountain is a bold, grand chaſm, whoſe walls are perpendicular and often impending rocks, piled up in ſtrata. Small rills of water ooze out of crevices, or fall from precipices in drops, giving life to hundreds of plants and low

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ſhrubs in the chaſm. The ſummit of the mountain is nearly level, very barren, and bare of ſoil; ſeveral cavities, however, are filled with rain water, or contain a ſmall quantity of vegetable earth, from whence a few odoriferous plants draw their nouriſhment. Some antelopes, howling baboons, ſolitary vultures, and toads, are ſometimes to be met with on the mountain. The view from thence is very extenſive and pictureſque. The bay ſeems a ſmall pond or baſon, and the ſhips in it dwindled to little boats; the town under our feet, and the regular compartments of its gardens, look like the work of children."

Moſt accounts of this country that have been publiſhed mention a ſurpriſing phenomenon which is annually to be ſeen on the top of Table-hill from September to March; namely, a white cloud hovering on its top, and is reckoned the cauſe of thoſe terrible ſouth-eaſt winds with which the Cape is infeſted. This cloud, called by ſailors *The Devil's table-cloth*, is ſaid by ſome to appear at firſt no bigger than a barley-corn; then increaſes to the ſize of a walnut, and ſoon after covers the whole top of the mount. But, according to Mr Kolben, it is never leſs, even on its firſt appearance, than the ſize of a large ox; often bigger. It hangs in ſeveral fleeces over the Table-hill, and the Wind or Devil's-hill; which fleeces, at laſt uniting, form a large cloud that covers the ſummits of theſe two hills. After this has reſted for ſome time without change or motion, the wind burſts out ſuddenly from it with the utmoſt fury. The ſkirts of the cloud are white, but ſeem much more compact than the matter of common clouds; the upper parts are of a leaden colour. No rain falls from it, but ſometimes it diſcovers a great deal of humidity; at which times it is of a darker colour, and the wind iſſuing from it is broken, raging by fits of ſhort continuance. In its uſual ſtate, the wind keeps up its firſt fury unabated for one, two, three, or eight days; and ſometimes for a whole month together. The cloud ſeems all the while undiminiſhed, though little fleeces are from time to time detached from it, and hurried down the ſides of the hills, vaniſhing when they reach the bottom, ſo that during the ſtorm the cloud ſeems to be ſupplied with new matter. When the cloud begins to brighten up, theſe ſupplies fail, and the wind proportionably abates. At length, the cloud growing tranſparent, the wind ceaſes. During the continuance of theſe ſouth-eaſt winds, the Table-valley is torn by furious whirlwinds. If they blow warm, they are generally of ſhort duration; and in this caſe, the cloud ſoon diſappears. This wind rarely blows till after ſunſet, and never longer than till towards midnight, though the cloud remains, but then it is thin and clear: but when the wind blows cold, it is a ſure ſign that it will laſt for ſome time, an hour at noon and midnight excepted; when it ſeems to lie ſtill to recover itſelf, and then lets looſe its fury anew.

The Europeans at the Cape conſider the year as divided into two ſeaſons, which they term *monſoons*. The wet monſoon or winter, and the dry one or ſummer. The firſt begins with our ſpring in March; the latter with September, when our ſummer ends. In the ſummer monſoon reign the ſouth-eaſt winds already mentioned; which, though they clear and render the air more healthy, yet make it difficult for ſhips outward bound to enter Table-bay. In the bad ſeaſon, the Cape is much ſubject to fogs; and the north-weſt winds and rain make the inhabitants ſtay much at home. But there are frequent intermiſſions and many clear days till June and July; when it rains almoſt continually, and from thence till ſummer. The weather in winter is cold, raw, and unpleaſant; but never more rigorous than autumn in Germany. Water never freezes to above the thickneſs of half a crown; and as ſoon as the ſun appears, the ice is diſſolved. The Cape is rarely viſited by thunder and lightning, excepting a little near the turn of the ſeaſons, which never does any hurt. During the continuance of the ſouth-eaſt winds which rage in ſummer, the ſky is free of all clouds except that on the Table and Wind Hills already mentioned; but during the north-weſt winds, the air is thick, and loaded with heavy clouds big with rain. If the ſouth-eaſt winds ſhould ceaſe for any length of time, the air becomes ſickly by reaſon of the ſea-weeds driving aſhore and rotting; hence the Europeans are at ſuch times affected with head-achs and other diſorders: but, on the other hand, the violence of thoſe winds ſubjects them to inflammations of their eyes, &c.

The natives of this country are called *Hottentots*, in their own language; a word of which it is vain to inquire the meaning, ſince the language of this country can ſcarce be learned by any other nation. The Hottentot language is indeed ſaid to be a compoſition of the moſt ſtrange and diſagreeable ſounds, deemed by many the diſgrace of ſpeech, without human ſound or articulation, reſembling rather the noiſe of irritated turkies, the chattering of magpies, hooting of owls, and depending on extraordinary vibrations, inflexions, and claſhings of the tongue againſt the palate.—If this account is true, however, it is obvious, that all the relations we have concerning the religion, &c. of the Hottentots derived from themſelves, muſt fall to the ground, as nobody can pretend to underſtand a language in itſelf unintelligible. The manners and cuſtoms of thoſe people, however, are eaſily obſervable, whether they themſelves give the relation or not; and if their language is conformable to them, it is no doubt of a nature ſufficiently wonderful.

The Hottentots, according to the moſt authentic accounts, are, of all human creatures, the moſt naſty. Human urine, the excrements of beaſts, entrails, and garbage, ſoot, greaſe, &c. are their ſole delight, and even uſed as ſymbols of honour and dignity. As ſoon as a child is born, they rub it all over with freſh cow-dung; which when dried they rub off, and then waſh it with the juice of the Hottentot fig. When this juice has dried up, they rub the child over with ſheep's greaſe, or melted butter; and when it has well ſoaked, they ſprinkle on the powder of Buchu (the herb SPIRÆA), which now ſticks all over like a cruſt. When her time has expired, the mother in like manner purifies herſelf firſt with cow-dung, and then with greaſe and buchu; after which ſhe is reſtored to the embraces of her huſband, who muſt previouſly undergo a purification of the ſame kind. They are of an olive colour when born: but the parents take care to make their children as black as poſſible by a daily unction with a mixture of greaſe and ſoot; a ceremony which is continued during the reſt of their lives, and which makes them appear much blacker than they really are. As ſoon as the child is born, the women break down the bridge of the noſe with their thumbs, looking upon a high noſe as a great deformity; and hence it hath been pretty generally believed among Europeans, that the Hottentots are born with flat noſes.

Every male, when arrived at the age of eight or ten years, according to Hottentot law, ought to be deprived of the left teſticle; but in caſes where the parents are poor, this ceremony is deferred till they are able to anſwer the expence. The origin of a cuſtom ſo very extraordinary would no doubt afford entertainment to the curious; but nothing ſatisfactory hath been ſaid upon the ſubject. Moſt authors are of opinion, that this is done to make them run the ſwifter; and many of the natives themſelves aſſign the ſame reaſon: but Kolben was informed by ſome of the moſt intelligent Hottentots, that it has been a law among them from time immemorial, "that no man ſhould be allowed to have carnal knowledge of a woman, till deprived of his left teſticle." Should any marry without this neceſſary mutilation, both parties would lie at the mercy of the rulers, and the woman perhaps be torn in pieces by her own ſex; among whom it is a prevailing opinion, that a man with two teſticles conſtantly begets twins. This extraordinary ceremony is performed in the following manner. The patient being daubed over with the fat of a ſheep newly killed, lies on his back on the ground at full length, with his hands and feet tied. His friends lie upon him, in order to keep him from moving. The operator then, with a common table or caſe knife, laying hold of the left teſticle, makes an orifice in the ſcrotum about an inch and an half long. Thro' this orifice he ſqueezes out the teſticle in a moment, ties up the veſſels, thruſts in a little ball of the ſize of the teſticle, compoſed of ſheep's fat and ſeveral herbs pulveriſed. He then ſtitches up the wound with a thread made of a ſheep's ſinew, and a needle in the form of an awl. The bands of the patient being then unlooſed, the operator anoints him again with the warm fat of the ſheep, turning him ſometimes on his back and ſometimes on his belly, while the poor boy is ſweating and almoſt convulſed with pain. After this, he piſſes all over him, rubbing the precious liquor into his ſkin as well as he can; and the ceremony being thus ended, the patient crawls to a little hut raiſed for the purpoſe, and in two or three days becomes as well as ever.

The next eſſential ceremony is the receiving the youth into the ſociety of men. This is performed when they have arrived at the age of 18. Before this time they are confined to the tuition of their mothers, whom they conſtantly follow, and dare not, before the performance of the ceremony, converſe even with their own fathers. The appointed time being arrived, the inhabitants are aſſembled, and the men ſeated in a circle, and the candidate ordered to ſit down without upon his hams or heels, but in ſuch a manner as not to touch the ground by at leaſt three inches. The oldeſt man then riſes, and, having obtained conſent for the youth's admiſſion, ſteps up to him and acquaints him, that he muſt thenceforward forſake his mother, and the company of the women, with every childiſh amuſement, and learn to behave as a man, both in his words and actions. The candidate then, being previouſly bedaubed with greaſe and ſoot, ſquats down to receive the ſmoking inundation of urine, which the orator diſcharges all over him with great formality. The old men then congratulate him on the honour done him, and add the following benedictions, "Good luck attend thee;—Live to be old;—Increaſe and multiply;—May thy beard grow ſoon."

This ceremony is uſually followed by the young man's marriage. All overtures of the matrimonial kind among the Hottentots, are made by the father or neareſt relation of the man, to the father or neareſt relation of the woman. The father and his ſon wait on the woman's friends; and the lover is firſt employed in preparing and preſenting the company with tobacco. They all ſmoke, and nothing is ſaid about the matter till their heads become giddy with the fume: then the father opens the buſineſs to the woman's father, and demands her for his ſon. The other leaves the room to conſult with his wife; but quickly returns with a poſitive anſwer; which is ſeldom in the negative, unleſs in caſe of a prior engagement. If the young woman does not like the match which her parents have agreed to, ſhe has only one chance to avoid it; namely, to lie down with her lover on the ground, and play with him all night at pinching, tickling, and whipping. If ſhe conquers, ſhe fairly gets rid of him; but if he ſubdues her, which is generally the caſe, ſhe muſt marry him. After this the young fellow goes to the habitation of the bride, attended by all his relations and friends, male and female, driving before them one or more oxen, according to their wealth. They are received with great joy; and the oxen being killed, they beſmear themſelves plentifully with the fat, powdering themſelves thick all over with buchu, and the women paint their cheeks, forehead, and chin, with red chalk. This being done, they perform the wedding ceremony in the following manner. The men ſquat themſelves in a circle, in the centre of which the bridegroom is ſeated in the ſame poſture. At ſome little diſtance the women do the ſame round the bride. Then the prieſt, or maſter of religious ceremonies, enters the mens circle, and coming up to the bridegroom piſſes a little on him, who with his long nails (for the Hottentots never pare their nails) makes furrows in the greaſe and buchu with which he is covered, that the urine may penetrate the better. He then does the ſame kindneſs to the bride; returning from the one to the other, till his whole ſtock is exhauſted, pronouncing all the time ſhort bleſſings to the following purpoſe: "May you live happily together; may you have a ſon before the year's end; may he be a good huntſman and a warrior."

The Hottentots have an honourable order among them, conſiſting of ſuch as have ſingly encountered and ſlain a lion, tyger, leopard, elephant, rhinoceros, or elk. The hero, after his return from the exploit to the village, retires to his own hut, where he has not ſat long, till an old man, deputed by the inhabitants of the *kraal* or village, comes to invite him to receive the honours due to his merit. The champion riſes and follows his conductor to the middle of the village, where all the men are aſſembled and waiting his arrival. He there ſquats down on a mat prepared for him; while all the old men ſquat in a circle round him. The old deputy then marches up to him, and piſſes upon him from head to foot, pronouncing certain words. If the deputy is the hero's friend, he lays him under a deluge of water; for the more plentifully he is beſprinkled, the greater is the honour; and the urine is rubbed in by the hero himſelf with the greateſt eagerneſs. The deputy then lights a pipe of tobacco, which he circulates through the company till nothing but aſhes remain in the pipe. Theſe the deputy ſhakes on the new knight, who is congratulated on the high honour he has received and the ſervice he has done his country. After this he takes three days reſt, during which his wife is forbidden to come near him. On the third day he kills a ſheep, receives his wife again, and rejoices with his friends and neighbours; wearing ever after the bladder of the beaſt he has killed, faſtened to his hair, as a mark of honour. The Hottentots expreſs greater joy at the deſtruction of a tyger than of any other wild beaſt.

The dreſs of the Hottentots is perfectly agreeable to the naſtineſs of thoſe cuſtoms already deſcribed. The ſkin of a wild beaſt, or ſheep, prepared with cow-dung and greaſe, hangs like a mantle over the ſhoulders, high or low, open or cloſed, according to the ſeaſon of the year, or the cuſtoms of the tribe. The men, who have no covering but a compoſition of fat, ſoot, and dirt, in the moſt raging heats, wear cat or lamb-ſkin caps in cold and wet ſeaſons. The face and forepart of the neck are always bare; and, the pudenda excepted, which are covered with a kind of apron, they go naked from the hips downwards. Leather ſtockings, and ſandals cut out of the raw hides of oxen or elephants, are uſed occaſionally in driving their herds to paſture, or in paſſing ſands or rocks. A greaſy pouch hangs about their necks, with a knife, pipe, tobacco, and a ſmall piece of wood called *ſuſa*, burnt at both ends, as an amulet againſt witchcraft. Three ivory rings adorn the left arm; to which, on journeys, is faſtened a bag with proviſions. The *kirri* and *rackhum* ſticks (which they uſe in hunting) are in the right hand; and another is carried in the left, with the buſhy tail of a wild cat, fox, or other animal, faſtened to it for a handkerchief. The honquers or captains, who were formerly diſtinguiſhed only by fair ſkins of tygers or wild-cats, now appear at the head of the army, in councils, and on every ſolemn occaſion, with braſs crowns, and braſs-headed canes. Theſe ornaments were preſented by the Dutch to the chiefs and captains of the nations in alliance with them; and are now annexed to deſcend with, and are eſteemed an unalienable property and diſtinctive badge of their dignity.

Moſt writers have affirmed that the Hottentot women wear the guts of ſheep and other animals by way of ornament about their legs; but this is a miſtake. The girls from their infancy to about 12 years old, wear bulruſhes tied in rings about their legs from the knee down to the ankle. When they paſs that age, they change the matter of theſe rings, from bulruſhes to ſlips of ſheep and calf-ſkin, of the thickneſs of the little finger. They ſinge off the hair, and then turn inwards the ſide on which it grew. Some grown women have above 100 of theſe rings on the leg, ſo nicely wound about and fitted, that they look like one continued ſwathe, and by long wearing aſſume the hardneſs of wood. Theſe rings are kept from falling down by large wrappers of leather or ruſhes about the ankles; and ſerve both as an ornamental diſtinction to the ſex, and for preſerving the legs from being ſcratched or torn in the fields. Like other ſavages, the Hottentots are very fond of braſs buttons, bits of looking-glaſſes, &c. and ſome wear on their foreheads a ſmall plate of poliſhed iron in the ſhape of an half-moon.

The diet of the Hottentots is the fleſh and entrails of their cattle, and certain wild beaſts, with roots and fruits of different kinds. But, excepting at their public feaſts, they rarely kill any cattle for their own eating, unleſs in caſes of great neceſſity. Yet if any of their cows or ſheep die naturally, they make no ſcruple to eat them, and eſteem them as wholeſome food. If the men are not contented with the roots, fruits, or milk, which the women take care to provide, they go out a-hunting, or, if near the ſea, a-fiſhing. They always hunt in large companies. The entrails of cattle, or of ſuch wild beaſts as they kill for food, are looked upon as moſt exquiſite eating, after they have been boiled in beaſts blood mingled with milk. Sometimes they broil them; but in general they eat them half raw. In either caſe, they devour their victuals in a very furious and ravenous manner, without any regard to decency. They have no ſet meals; but eat as their appetite or humour directs, either by night or day. In fair weather, they eat in the open air; in wind or rain, in their huts. They have traditionary laws as to abſtaining from certain meats. Swines fleſh, and fiſh without ſcales, are prohibited to both ſexes: hares and rabbits are forbidden to the men, but not to the women: the pure blood of beaſts, and the fleſh of the mole, are forbidden to the women, but not to the men.

The naſtineſs of the Hottentots makes them ſwarm with lice, ſome of which are exceedingly big. Theſe laſt they eat, throwing away the unſizeable ones; and if they are aſked how they can devour ſuch deteſtable vermin, they plead the law of retaliation, and urge that it is no ſhame to eat thoſe who would eat them. The Europeans at the Cape have a ſort of field-ſhoes, cut out of the raw hide of an ox or ſtag, with the hairy ſide outwards. Theſe, when thrown away, the Hottentots gather and lay up againſt a rainy day, when their proviſions fall ſhort, and eat them heartily; firſt ſingeing off the hair, then ſoaking them in water, and laſtly broiling them on the fire.

Theſe are the cuſtoms which chiefly diſtinguiſh the Hottentots from all other people on earth; but beſides theſe, they have others in common with the generality of barbarous nations. If a woman is delivered of female twins, they generally deſtroy the worſt-favoured; or if the children are male and female, the latter periſhes, by being expoſed on the bough of a tree, or buried alive with the conſent of the whole village. Some of theſe deſerted infants have been found by the Europeans, and educated by them; yet it is ſaid, that, when arrived at the years of maturity, they always renounced the European manners, apparel, and religion, to conform to thoſe of their own people. After a youth is diſcharged from the tuition of his mother in the manner already mentioned, he may inſult, and even beat her, whenever he pleaſes; for which he receives applauſe inſtead of reproof. Nay, it is uſual for them to go and abuſe their mothers immediate-

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mediately after their being admitted into the order of men, to ſhew their contempt for the converſation of females. If the eldeſt ſon, or, in default of ſons, the next male relation, determines to get rid of his father, mother, or other relation, who are conſidered as ſuperannuated, and incapable of any uſeful domeſtic performance, the village is convoked, and informed of the condition and requeſt of the heir. Conſent is never refuſed; and a day is immediately appointed for the removal of the ſuperannuated man or woman. There is now no diſtinction of perſons; the wealthieſt man, or the captain of the village, muſt ſubmit as well as the meaneſt, and is compelled to ſurrender his whole eſtate to the claimant. The whole village accompany him to a lonely hut, where he is left with a ſmall quantity of proviſions ſet within his reach, where he ſoon periſhes, or is devoured by wild beaſts. Adultery among the Hottentots is always puniſhed with death: but they allow divorce, if the huſband can ſhew ſufficient cauſe for it; and of the ſufficiency of which the reſt of the village are the judges. In this caſe, the men may marry again, but the woman is not allowed to do ſo while her huſband lives. If a widow marries, ſhe cuts off a joint of her finger, beginning with the little one, for every huſband after the firſt.

In other reſpects, the Hottentots are the moſt lazy people in the world: they eſteem thinking a labour, and avoid both as capital plagues; paſſing three parts in four of their lives in the moſt ſhameful ſtupidity and idleneſs. Occaſionally, however, they are ſurpriſingly active. In ſwiftneſs, they are ſaid to ſurpaſs the fleeteſt horſe; and are famed for their dexterity in diſcharging their arrows, javelins, &c. Though unacquainted with agriculture and the qualities of tobacco before the arrival of the Europeans, they excel, and are conſulted by moſt of thoſe reſident in their country, concerning the management of lands and the choice of tobacco. Their mutual affection, liberality, and benevolence, extend to each other in the moſt friendly manner; and, naturally compaſſionating diſtreſs, they are extremely hoſpitable to ſtrangers of every nation. They are of good ſenſe and integrity in the execution of juſtice, and in chaſtity excel almoſt all other nations in the world.

Beſides the methods of fighting with bows and arrows, darts, &c. common to all barbarous nations, the Hottentots have a kind of oxen trained to war. Theſe they call *Bakkeleyers*, or fighting oxen; and the ſkill of the Hottentot generals is chiefly diſplayed by chooſing the moſt proper time and place for driving in the beaſts among the enemy. Theſe animals ſtamp, kick, and gore, with incredible fury; and, if well followed by the men, ſpeedily rout the enemy. A battle decides the war; for an Hottentot army once routed never rallies again. The conquerors triumph and purſue the enemy with aſtoniſhing ſhouts and exclamations. All priſoners are killed; and both armies bury their dead, which are never inſulted or plundered. Deſerters and ſpies are immediately put to death.

The Hottentots are very ſhy of entering upon any diſcourſe concerning their religion; whence it hath been doubted whether they have any at all. Kolben, however, aſſures us, that they believe in a God, the author of all things. This ſupreme power they call the *God of gods*; and ſay, "he is a good man, who does nobody any hurt, and from whom none need be apprehenſive of any, and that he lives far beyond the moon." But it does not appear, that they have any inſtitution of worſhip directly regarding this ſupreme deity. They excuſe themſelves when preſſed on this head, by a tradition, that their firſt parents ſo grievouſly offended this great God, that he curſed them and their poſterity with hardneſs of heart; ſo that they know little about him, and have leſs inclination to ſerve him. They adore the moon, by aſſembling at night in the fields, killing cattle, and offering milk and fleſh. This they do conſtantly at the full and change. They welcome her; and then invoke her for favourable weather, to grant them fodder for their cattle, &c. They alſo regard as a good deity an inſect of the beetle kind, peculiar to theſe countries. It is about the ſize of a child's little finger, the back green, the belly ſpeckled red and white, with two wings and two horns. Wherever they meet this animal, they pay it the higheſt honour and veneration. If it viſits a village, they aſſemble about it in troops as if a divinity had appeared among them; they kill a ſheep or two as a thank-offering, and eſteem it as an omen of the greateſt happineſs and proſperity. They believe its appearance expiates all their guilt. If the inſect lights upon a Hottentot, the perſon is looked upon as a ſaint, and ever after treated with uncommon reſpect. The village kills the fatteſt ox for a thank-offering; and the caul powdered with buchu, and twiſted like a rope, is put collar-wiſe about the ſaint's neck, and there muſt remain till it rots off. A ſort of veneration is alſo paid to deceaſed ſaints or heroes. They believe in an evil deity, whom they repreſent as a little, malicious, ill-natured being, a great enemy to Hottentots, and the author of all the miſchiefs which befal them in this world, beyond which he hath no power. They therefore worſhip and offer ſacrifices to him, in order to ſoften and bring him into better temper. Some of them even pretend, that they have ſeen him in the ſhape of a deformed, hairy, frightful monſter, dreſſed in white, with a head and feet like thoſe of a horſe. All ſudden pain, croſs accidents, and ſickneſs, are by the Hottentots aſcribed to witchcraft; ſo that charms and amulets are in high eſteem among them. They ſeem to have no notion of a future ſtate, either good or bad, after death, much leſs of a reſurrection; yet that they believe the immortality of the ſoul, ſeems evident from the following particulars. 1. They offer prayers and praiſes to the good Hottentots deceaſed. 2. They are apprehenſive of the return of departed ſpirits to moleſt them; for which reaſon they remove their village on the death of any of its inhabitants. 3. They believe it is in the power of wizards and witches to lay theſe ſpirits. But they ſeem to think theſe departed ſouls remain in or about thoſe places where the body was inhabited by them; for of a heaven or hell, rewards or puniſhments, they have not the leaſt notion.

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This appears to be the whole that can be collected concerning the Hottentot religion, and to which they are invincibly attached. If you attempt to reaſon with them, they hear you ſullenly, or quit you abruptly. They avoid, if poſſible, any religious ſubject. Some of them have pretended a belief of Chriſtianity: but when the motive was removed, they always returned to their former idolatry; and, in ſpite of all the endeavours of the Dutch miſſionaries at the Cape, they have never been able to make a ſingle convert.

Of the cape-town and country adjacent peopled by the Dutch, Mr Foſter gives the following account: "The town is neat and well built; looks white at a diſtance, and ſeems to riſe out of a deſart ſurrounded by broken maſſes of black and dreary mountains. The ſtorehouſes of the Dutch Eaſt-India company are all ſituated neareſt the water, and the private buildings lie beyond them in a gentle aſcent. The fort which commands the road, is on the eaſt ſide of the town, but ſeems not to be of great ſtrength; beſides which, there are ſeveral batteries on both ſides. The ſtreets in the town are broad, and regular; all the principal ones are planted with oaks: and ſome have in their middle a canal of running water, which, on account of its ſmall quantity, they are obliged to huſband by ſluices, ſo that parts of it are ſometimes entirely drained, and occaſion no very pleaſant ſmell. The national character of the Dutch ſtrongly manifeſts itſelf in this particular; their ſettlements being always ſupplied with canals, though reaſon and common ſenſe evidently prove their noxious influence on the health of the inhabitants, eſpecially at Batavia.

"The houſes are built of brick, and many of them are white-waſhed on the outſide. The rooms are in general lofty and ſpacious, and very airy, which the hot climate requires. There is but one church in the whole town; and that is extremely plain, and ſeems to be rather too ſmall for the congregation. That ſpirit of toleration, which has been ſo beneficial to the Dutch government at home, is not to be met with in their colonies. It is but very lately that they have ſuffered even the Lutherans to build churches at Batavia, and at this place; and at the preſent time, a clergyman of that perſuaſion is not tolerated at the Cape, but the inhabitants are obliged to content themſelves with the chaplains of Daniſh and Swediſh Eaſt-India-men, who give them a ſermon, and adminiſter the ſacrament once or twice a-year, and are very handſomely rewarded. The government and the inhabitants do not give themſelves the trouble to attend to a circumſtance of ſo little conſequence in their eyes as the religion of their ſlaves, who in general ſeem to have none at all. A few of them follow the Mahommedan rite; and weekly meet in a private houſe belonging to a free Mahommedan, in order to read or rather chaunt ſeveral prayers and chapters of the Khoran. As they have no prieſt among them, they cannot partake of any other acts of worſhip (A).

"The ſlaves belonging to the company, who amount to ſeveral hundreds, are lodged and boarded in a ſpacious houſe erected for that purpoſe, where they are likewiſe kept at work. Another great building ſerves as an hoſpital for the ſailors belonging to the Dutch Eaſt-India ſhips, which touch here, and commonly have prodigious numbers of ſick on board, on their voyage from Europe towards India. The vaſt number of men, ſometimes ſix, ſeven, or eight hundred, which theſe ſhips carry out to ſupply the military in India, the ſmall room to which they are confined, and the ſhort allowance of water and ſalt proviſion they receive, on a long voyage through the torrid zone, generally make conſiderable havock among them: it is therefore no uncommon circumſtance at the Cape, that a ſhip on her paſſage thither from Europe, loſes eighty or a hundred men, and ſends between two and three hundred others dangerouſly ill to the hoſpital. A fact no leſs deplorable than certain, is, that the ſmall expence and facility with which the *ziel-verkoopers* actually carry on their infamous trade of ſupplying the India company with recruits, makes them leſs attentive to the preſervation of health among theſe poor people. Nothing is more common, in this and other Dutch colonies, than to meet with ſoldiers in the company's ſervice, who, upon inquiry, acknowledge they have been kidnapped in Holland. There is an apothecary's ſhop belonging to the hoſpital, where the moſt neceſſary remedies are prepared, but no expenſive drugs are to be found in it; and the method of adminiſtering to all the patients indiſcriminately out of two or three huge bottles, full of different preparations, ſuffices to convince us, that the freſh air of the land, and the freſh proviſions here, contribute much more to the recovery of the ſick, than the ſkill of their phyſicians. Patients who are able to walk, are ordered to go up and down the ſtreets every fair morning: and all kinds of greens, pot-herbs, ſallads, and antiſcorbutics, are raiſed for their uſe, in an adjacent garden belonging to the company. Travellers have ſometimes praiſed and ſometimes depreciated this garden, according to the different points of view in which it has been conſidered. It is true, a few regular walks of indifferent oaks, encompaſſed with elm and myrtle hedges, are not objects engaging enough to thoſe who are uſed to admire the perfection of gardening in England, or who contemplate in Holland and France cypreſs, box, and yew-trees cut out into vaſes, ſtatues, and pyramids, or *charmilles* turned into pieces of architecture! But conſidering that the trees were planted in the beginning of this century, more for uſe than ornament; that they ſhelter the kitchen-herbs for the hoſpital, againſt the deſtructive violence of ſtorms; and that they form the only ſhady and airy walks, comfortable to voyagers and ſick perſons in this hot climate: I cannot wonder that ſome ſhould extol as "a delightful ſpot *," what others contemptuouſly call "*a friar's garden* †."

* Byron.
† Boug
ville.

"The governor depends immediately upon the Eaſt-India company, and has the rank of an *edele heer*, the title given to the members of the ſupreme council of Batavia. He preſides here over a council, conſiſting of a ſecond or deputy-governor, the fiſcal, the major (who commands the fort), the ſecretary, the treaſurer, the comptroller of proviſions, the comptroller of liquors, and the book-keeper; each of which has a branch of the company's commerce aſſigned to his

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(A) We would not be underſtood to throw an odium on the Dutch in particular, when it is well known that the negroes, who wear the chains of the Engliſh and French, are equally neglected: it was only intended to awaken a fellow-feeling towards an unhappy race of MEN, among the coloniſts of all nations; and to remind them, whilſt they enjoy, or *ſtrive* to enjoy, the ineſtimable bleſſing of LIBERTY, to exert themſelves in acts of humanity and kindneſs towards thoſe from whom they with-hold it, perhaps, without remorſe.

his care. This council has the whole management of the civil and military departments; but the deputy-governor preſides over another, named the *court of juſtice*, which tries all offences and crimes, and conſiſts of ſome of the members of the former; but no two relations can ſit and vote in the ſame council, to prevent the influence of parties.

"The income of the governor is very conſiderable; for, beſides a fixed appointment, and the uſe of houſes, gardens, proper furniture, and every thing that belongs to his table, he receives about 10 dollars for every leagre of wine which the company buy of the farmer, in order to be exported to Batavia. The company allows the ſum of 40 dollars for each leagre, of which the farmer receives but 24: what remains is ſhared between the governor, and ſecond or deputy; the former taking two-thirds, which ſometimes are ſaid to amount to 4000 dollars per annum. The deputy-governor has the direction of the company's whole commerce here, and ſigns all orders to the different departments under him, as well as the governor to others. He and the fiſcal have the rank of *upper koopman*. The fiſcal is at the head of the police, and ſees the penal laws put in execution: his income conſiſts of fines, and of the duties laid on certain articles of commerce; but if he be ſtrict in exacting them, he is univerſally deteſted. The ſound policy of the Dutch has likewiſe found it neceſſary to place the fiſcal as a check, to overawe the other officers of the company, that they may not counteract the intereſts of their maſters, or infringe the laws of the mother-country. He is, to that end, commonly well verſed in juridical affairs, and depends ſolely upon the mother-country. The major (at preſent Mr Von Prehn, who received us with great politeneſs) has the rank of *koopman* or merchant: this circumſtance ſurpriſes a ſtranger, who, in all other European ſtates, is uſed to ſee military honours confer diſtinction and precedence; and appears ſtill more ſingular to one who knows the contraſt in this particular between Holland and Ruſſia, where the idea of military rank is annexed to every place, even that of a profeſſor at the univerſity. The number of regular ſoldiers at this colony amounts to about 700; of which 400 form the garriſon of the fort, near the Cape-town. The inhabitants capable of bearing arms form a militia of 4000 men; of whom a conſiderable part may be aſſembled in a few hours, by means of ſignals made from alarm-places in different parts of the country. We may from hence make ſome eſtimate of the number of white people in this colony, which is at preſent ſo extenſive, that the diſtant ſettlements are above a month's journey from the Cape; but theſe remote parts lie ſometimes more than a day'sjourney from each other, are ſurrounded by various nations of Hottentots, and too frequently feel the want of protection from their own government at that diſtance. The ſlaves in this colony are at leaſt in the proportion of five or more to one white perſon. The principal inhabitants at the Cape have ſometimes from 20 to 30 ſlaves, which are in general treated with great lenity, and ſometimes become great favourites with their maſters, who give them very good cloathing, but oblige them to wear neither ſhoes nor ſtockings, reſerving theſe articles to themſelves. The ſlaves are chiefly brought from Madagaſcar, and a little veſſel annually goes from the Cape thither on that trade; there are, however, beſides them, a number of Malays and Bengaleſe, and ſome negroes. The coloniſts themſelves are for the greateſt part Germans, with ſome families of Dutch, and ſome of French Proteſtants. The character of the inhabitants of the town is mixed. The are induſtrious, but fond of good living, hoſpitable, and ſocial; though accuſtomed to hire their apartments to ſtrangers, for the time they touch at this ſettlement, and uſed to be complimented with rich preſents of ſtuffs, &c. by the officers of merchant ſhips. They have no great opportunities of acquiring knowledge, there being no public ſchools of note at the Cape; their young men are therefore commonly ſent to Holland for improvement, and their female education is too much neglected. A kind of diſlike to reading, and the want of public amuſements, make their converſation unintereſting, and too frequently turn it upon ſcandal, which is commonly carried to a degree of inveteracy peculiar to little towns. The French, Engliſh, Portugueſe, and Malay languages, are very commonly ſpoken, and many of the ladies have acquired them. This circumſtance, together with the accompliſhments of ſinging, dancing, and playing a tune on the lute, frequently united in an agreeable perſon, make amends for the want of refined manners and delicacy of ſentiment. There are, however, among the principal inhabitants, perſons of both ſexes, whoſe whole deportment, extenſive reading, and well-cultivated underſtanding would be admired and diſtinguiſhed even in Europe. Their circumſtances are in general eaſy, and often very affluent, on account of the cheap rate at which the neceſſaries of life are to be procured: but they ſeldom amaſs ſuch prodigious riches here as at Batavia; and I was told the greateſt private fortune at the Cape did not exceeed 100,000 dollars, or about 22,500 l. ſterling.

"The farmers in the country are very plain hoſpitable people; but thoſe who dwell in the remoteſt ſettlements ſeldom come to town, and are ſaid to be very ignorant; this may eaſily be conceived, becauſe they have no better company than Hottentots, their dwellings being often ſeveral days journey aſunder, which muſt in a great meaſure preclude all intercourſe. The vine is cultivated in plantations within the compaſs of a few days journey from the town; which were eſtabliſhed by the firſt coloniſts, and of which the ground was given in perpetual property to them and their heirs. The company at preſent never part with the property of the ground, but let the ſurface to the farmer for an annualrent, which, though extremely moderate, being only 25 dollars for 60 acres *, yet does not give ſufficient encouragement to plant vineyards. The diſtant ſettlements, therefore, chiefly raiſe corn and rear cattle; nay, many of the ſettlers entirely follow the latter branch of ruſtic employment, and ſome have very numerous flocks. We were told there were two farmers who had each 15,000 ſheep, and oxen in proportion; and ſeveral who poſſeſſed 6000 or 8000 ſheep, of which they drive great droves to town every year: but lions and buffaloes, and the fa-

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* Each acre of 666 ſquare Rhynland roods, the rood of 12 feet. The proportion of the Rhynland foot to the Engliſh, is about 116 to 120.

Hottentots.

tigue of the journey, deſtroy numbers of their cattle before they can bring them ſo far. They commonly take their families with them in large waggons covered with linen or leather, ſpread over hoops, and drawn by 8, 10, and ſometimes 12 pair of oxen. They bring butter, mutton-tallow, the fleſh and ſkins of ſea-cows (hippopotamus), together with lion and rhinoceros' ſkins, to ſell. They have ſeveral ſlaves, and commonly engage in their ſervice ſeveral Hottentots of the poorer ſort, and (as we were told) of the tribe called *Boſchemans*, or *Buſhmen*, who have no cattle of their own, but commonly ſubſiſt by hunting, or by committing depredations on their neighbours. The opulent farmers ſet up a young beginner by intruſting to his care a flock of 400 or 500 ſheep, which he leads to a diſtant ſpot, where he finds plenty of good graſs and water; the one-half of all the lambs which are yeaned fall to his ſhare, by which means he ſoon becomes as rich as his benefactor.

“ Though the Dutch company ſeem evidently to diſcourage all new ſettlers, by granting no lands in private property; yet the products of the country have of late years ſufficed not only to ſupply the iſles of France and Bourbon with corn, but likewiſe to furniſh the mother-country with ſeveral ſhip-loads. Theſe exports would certainly be made at an eaſier rate than at preſent, if the ſettlements did not extend ſo far into the country, from whence the products muſt be brought to the Table-bay by land-carriage, on roads which are almoſt impaſſable. The intermediate ſpaces of uncultivated land between the different ſettlements are very extenſive, and contain many ſpots fit for agriculture; but one of the chief reaſons why the coloniſts are ſo much divided and ſcattered throughout the country, is to be met with in another regulation of the company, which forbids every new ſettler to eſtabliſh himſelf within a mile of another. It is evident, that if this ſettlement were in the hands of the commonwealth, it would have attained to a great population, and a degree of opulence and ſplendor, of which it has not the leaſt hopes at preſent: but a private company of Eaſt-India merchants find their account much better in keeping all the landed property to themſelves, and tying down the coloniſt, leſt he ſhould become too great and powerful.

“ The wines made at the Cape are of the greateſt variety poſſible. The beſt, which is made at M. Vander Spy's plantation of Conſtantia, is ſpoken of in Europe, more by report than from real knowledge; 30 leagres (B) at the utmoſt are annually raiſed of this kind, and each leagre ſells for about 50l. on the ſpot. The vines from which it is made were originally brought from Shiraz in Perſia. Several other ſorts grow in the neighbourhood of that plantation, which produce a ſweet rich wine, that generally paſſes for genuine Conſtantia in Europe. French plants of burgundy, muſcade, and frontignan, have likewiſe been tried, and have ſucceeded extremely well, ſometimes producing wines ſuperior to thoſe of the original ſoil. An excellent dry wine, which has a ſlight agreeable tartneſs, is commonly drank in the principal families, and is made of Madeira vines tranſplanted to the Cape. Several low ſorts, not entirely diſagreeable, are raiſed in great plenty, and ſold at a very cheap rate; ſo that the ſailors of the Eaſt-India ſhips commonly indulge themſelves very plentifully in them whenever they come aſhore.

“ The products of the country ſupply with proviſions the ſhips of all nations which touch at the Cape. Corn, flour, biſcuit, ſalted beef, brandy, and wine, are to be had in abundance, and at moderate prices; and their freſh greens, fine fruits (C), good mutton and beef, are excellent reſtoratives to ſeamen who have made a long voyage.”

Hottinger || Houlieres.

HOTTINGER (John Henry), born at Zurich in Switzerland in 1620, profeſſed the Oriental languages at Leyden, and was eſteemed by all his learned colleagues. He was drowned, with part of his family, in the river Lemit, in the year 1667. He wrote a prodigious number of works; the principal of which are, 1. *Exercitationes Anti-Morinianæ de Pentateucho Samaritano*, quarto, in which he defends the Hebrew text againſt father Morin. 2. *Hiſtoria Orientalis*, quarto. 3. *Bibliothecarius quadripartitus*. 4. *Theſaurus Philologicus Sacræ Scripturæ*, quarto. 5. *Hiſtoria Eccleſiaſtica*. 6. *Promptuarium, ſive Bibliotheca Orientalis*, 4to. 7. *Diſſertationes miſcellaneæ*, &c.

HOTTONIA, WATER-VIOLET; a genus of the monogynia order, belonging to the pentandria claſs of plants.—There is but one ſpecies, viz. the paluſtris, with a naked ſtalk. It grows naturally in the ſtanding waters in many parts of England. The leaves, which are for the moſt part immerſed in water, are finely winged and flat like moſt of the ſea-plants; and at the bottom have long fibrous roots, which ſtrike into the mud: the flower-ſtalks riſe or five ſix inches above the water, and toward the top have two or three whorls of purple flowers, terminated by a ſmall cluſter of the ſame. Theſe flowers have the appearance of thoſe of the ſtock-gilliflower, ſo make a pretty appearance on the ſurface of the water.—It may be propagated in deep ſtanding waters, by procuring its ſeeds when they are ripe, from the places of their natural growth; which ſhould be immediately dropped into the water in thoſe places where they are deſigned to grow, and the ſpring following they will appear; and if they are not diſturbed, they will ſoon propagate themſelves in great plenty.—Cows eat this plant; ſwine refuſe it.

HOVEDEN (Roger de), born of an illuſtrious family, became chaplain to king Henry II. and left behind him two books of *Engliſh Annals*, carried on from the year 732, where Bede ended, to the 4th of king John, 1201. Sir H. Saville and Mr Selden reckon him among the moſt conſiderable hiſtorians who flouriſhed in the 11th and 12th centuries.

HOULIERES (Antoniette de), a French lady, whoſe poetry is highly eſteemed in France. Her works and thoſe of her daughter have been collected and printed together in two volumes. Moſt of the Idyls, particularly thoſe on ſheep and birds, ſurpaſs every thing of the kind in the French language: the thoughts and expreſſions are noble; and the ſtyle pure, flowing, and chaſte. Mademoiſelle des Houlieres carried the poetic prize in the French academy againſt Fontenelle. Both of theſe ladies were members

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(B) A leagre contains about 108 gallons, or a pipe.

(C) Their grapes and oranges are ſome of the beſt in the world.

bers of the academy of Ricovatri; the mother was alſo a member of the academy of Arles.—Thoſe who deſire to be more particularly acquainted with the hiſtory of Madam des Houlieres may conſult her life prefixed to her works in the Paris edition of 1747, 2 vols 12mo.

HOULSWORTHY, a large town of Devonſhire, ſeated between two branches of the river Tamer, having a good market for corn and proviſions. W. Long. 4. 42. N. Lat. 50. 50.

HOUND. See Canis, Blood-*Hound*, and Gre-*Hound*.

HOUR, in chronology, an aliquot part of a natural day, uſually a 24th, but ſometimes a 12th. The origin of the word *hora*, or ωρα, comes, according to ſome authors, from a ſurname of the ſun, the father of hours, whom the Egyptians call *Horus*. Others derive it from the Greek οριζειν, to *terminate, diſtinguiſh*, &c. Others from the word υρον, *urine;* holding, that Triſmegiſtus was the firſt that ſettled the diviſion of hours, which he did from obſervation of an animal conſecrated to Serapis, named *cynocephalus*, which makes water 12 times a-day, and as often in the night, at equal intervals.

An hour, with us, is a meaſure or quantity of time, equal to a 24th part of the natural day, or nycthemeron; or the duration of the 24th part of the earth's diurnal rotation. Fifteen degrees of the equator anſwer to an hour; though not preciſely, but near enough for common uſe. It is divided into 60 minutes; the minute into 60 ſeconds, &c.

The diviſion of the day into hours is very ancient: as is ſhewn by Kircher, *Oedip. Ægypt.* Tom. II. P. II. claſſ. VII. c. 8.: though the paſſages he quotes from Scripture do not prove it.—The moſt ancient hour is that of the 12th part of the day. Herodotus, lib. ii. obſerves, that the Greeks learnt from the Egyptians, among other things, the method of dividing the day into twelve parts.—The aſtronomers of Cathaya, &c. biſhop Beveridge obſerves, ſtill retain this diviſion. They call the hour, *chag;* and to each chag give a peculiar name, taken from ſome animal: The firſt is called *zeth*, "mouſe;" the ſecond, *chiu*, "bullock;" the third, *zem*, "leopard;" the fourth, *mau*, "hare;" the fifth, *chiu*, "crocodile, &c."

The diviſion of the day into 24 hours, was not known to the Romans before the firſt Punic war.—Till that time they only regulated their days by the riſing and ſetting of the ſun. They divided the 12 hours of their day into four, viz. *prime*, which commenced at ſix o'clock; *third*, at nine; *ſixth*, at twelve, and *none*, at three. They alſo divided the night into four watches, each containing three hours.

HOURS, Horæ, in the ancient mythology, were certain goddeſſes, the daughters of Jupiter and Themis; at firſt only three in number, Eunomina, Dice, and Irene; to which were afterwards added two more, Carpo and Thallote.—Homer makes them the door-keepers of heaven. Ovid allots them the employment of harneſſing the horſes of the ſun:

Jungere equos Titan velocibus imperat Horis.

Hours, *Horæ*, in the Romiſh church, are certain prayers performed at ſtated times of the day; as mattins, veſpers, lauds, &c.—The leſſer hours, are *prime, tierce, ſixth*, and *none*. They are called *hours*, or *canonical hours*, as being to be rehearſed at certain hours preſcribed by the canons of that church, in commemoration of the myſteries accompliſhed at thoſe hours. Theſe hours were anciently alſo called *courſe, curſus;* F. Mabillon has a diſſertation on them, entitled, *De Curſu Gallicano*.

The firſt conſtitution enjoining the obſervation of the canonical *hours*, is of the ninth century, being found in a capitular of Heito biſhop of Baſil directed to his curates, importing that the prieſts ſhall never be abſent at the canonical hours either by day or night.

HOUSE, a habitation, or place built with conveniencies for dwelling in. See Architecture.

House is alſo uſed for one of the eſtates of the kingdom aſſembled in parliament. Thus we ſay, the houſe of lords, the houſe of commons, &c. See Peers, Commons, &c.

House is alſo uſed for a noble family; or a race of illuſtrious perſons iſſued from the ſame ſtock. In this ſenſe we ſay, the houſe or family of the Stuarts, the Bourbons, the houſe of Hanover, of Auſtria, of Lorrain, of Savoy, &c.

Cheap, eaſy, and expeditious Method of conſtructing Houses, *which have been found to be very uſeful hoſpitals for the recovery of the ſick, and therefore may probably make very wholeſome places of reſidence for the healthy.*—The firſt thing to be done is to chooſe a dry and airy ſituation, on a gravelly or chalky ſoil if poſſible; upon this lay down the plan of your building, making one end of it face that quarter from whence the pureſt and healthieſt winds may be expected to blow, of a breadth that can be conveniently roofed. Then, if boarding does not come ſo cheap, drive ſtakes, at about ſix feet diſtance from each other, into the ground, ſo as to ſtand about ſix feet above it; and, interlacing them with wattles, coat the wattles on the ſide next the weather, with freſh ſtraw; and make the roof in the ſame manner, but thicker, or of thatch in the uſual way, with a hole at the very top of it, to open occaſionally. Let the end of the building facing the wholeſomeſt quarter lie open ſome feet back, ſo as to form a porch, where the convaleſcents may take the air without danger of any injury from the weather. A large chimney and kitchen grate may be erected at the other end. If the ſoil happens to be chalky or gravelly, you may hollow it four or five feet deep, within a foot or eighteen inches of the walls; but let the ſteps into this hollow lie far enough within the porch, that no water may get into it, and, if of chalk, the ſteps may not grow ſlippery in wet weather. From time to time open the vent-hole at the roof; by means of which all the unwoleſome infectious air, as being warmer, and conſequently lighter, than that which is pure and wholeſome, will be driven out by the ruſhing in of the freſh air: a purpoſe, which the little openings, that may be left in the ſides and roofs of ſuch rude and haſty buildings, will, even of themſelves, anſwer ſo well, as ſufficiently to compenſate any cold they may let in, even in the coldeſt months. Let the floor likewiſe be ſcraped three or four inches deep every five or ſix days, and what comes off removed to ſome diſtance. Halls of this kind, 50 feet long and 20 broad, coſt but a trifle to build; yet, with theſe precautions (even without the addition of clean ſtraw for every new patient to lie on, incloſed in clean waſhed ſacks fit for the purpoſe, which come infinitely cheaper than the bare cleaning of flock or even feather-beds, ſuppoſing it poſſible to clean ſuch beds), proved of infinitely more advantage in the recovery of ſick ſoldiers, than the low-roofed rooms of the farm-houſes of the Iſle of Wight, or even the better accommodations of Cariſbrooke caſtle in the ſame iſland, in which there periſhed four times the number of ſick that there did in theſe temporary receptacles; which were firſt thought of by doctor Prockleſby, on occaſion of ſome terrible infections from confined animal-effluvia.

Is it not ſurpriſing, that we have not availed ourſelves more of the above diſcovery in natural hiſtory, being, perhaps, the moſt important the moderns can boaſt of, in the moſt uſeful ſcience, viz. the ſuperior lightneſs of unwholeſome and infectious air! The upper ſaſhes in moſt houſes, even of thoſe who pretend to ſome knowledge in theſe matters, are generally immoveable, by means of which no part of the foul air above the level of the loweſt rail of the other ſaſh's greateſt riſe, can eſcape by the window; and, if it eſcapes by the doors, it is generally for want of a vent in the higheſt part of the roof, merely to accumulate in the upper ſtory of the houſe, and add to the infection, which the great quantities of old furniture uſually ſtored up there are of themſelves but too apt to create, when care is not frequently taken to open the windows of it. Thus, the chief benefit to be expected from lofty rooms is in a great meaſure loſt. Whereas, were the upper ſaſhes contrived to come down, all the air might be eaſily changed, and that almoſt inſenſibly, by letting them down an inch or two. Nay, the upper ſaſh might be often let entirely down with leſs danger or inconvenience from cold, than the lower thrown up the tenth part of an inch, though the doing of the former would be attended with infinitely more advantage to the health of the inhabitants than the latter. It is, perhaps, on this principle, that we are to account for the good health enjoyed by the poor who live crowded in damp cellars, and often with great numbers of rabbits, poultry, and even ſwine about them. Theſe cellars are open to the ſtreet, with doors reaching from the floor to the very ceiling, but never ſo cloſe at bottom or at top as to prevent a free circulation of air; in conſequence of which, that all-vivifying fluid, as faſt as it is ſpoiled by paſſing through the lungs of the inhabitants and their ſtock, or is infected by their inſenſible perſpiration, excrements, &c. is driven out and replaced by the freſh air.

HOUSE, in aſtrology, denotes the twelfth part of the heavens.

The diviſion of the heavens into houſes, is founded upon the pretended influence of the ſtars, when meeting in them, on all ſublunary bodies. Theſe influences are ſuppoſed to be good or bad; and to each of theſe houſes particular virtues are aſſigned, on which aſtrologers prepare and form a judgment of their horoſcopes. The horizon and meridian are two circles of the celeſtial houſes, which divide the heavens into four equal parts, each containing three houſes; ſix of which are above the horizon, and ſix below it; and ſix of theſe are called *eaſtern*, and ſix *weſtern houſes*.

A ſcheme or figure of the heavens is compoſed of 12 triangles, alſo called *houſes*, in which is marked the ſtars, ſigns, and planets, ſo included in each of theſe circles. Every planet has likewiſe two particular houſes, in which it is pretended that they exert their influence in the ſtrongeſt manner; but the ſun and moon have only one, the houſe of the former being Leo, and that of the latter Cancer.

The houſes in aſtrology have alſo names given them according to their qualities. The firſt is the houſe of life: this is the aſcendant, which extends five degrees above the horizon, and the reſt below it. The ſecond is the houſe of riches: the third, the houſe of brothers: the fourth, in the loweſt part of the heavens, is the houſe of relations, and the angle of the earth: the fifth, the houſe of children: the ſixth, the houſe of health: the ſeventh, the houſe of marriage, and the angle of the weſt: the eighth, the houſe of death: the ninth, the houſe of piety: the tenth, the houſe of offices: the eleventh, the houſe of friends: and the twelfth, the houſe of enemies.

Country-HOUSE, is the *villa* of the ancient Romans, the *quinta* of the Spaniards and Portugueſe, the *cloſerie* and *caſſine* of the French, and the *vigna* of the Italians.

It ought always to have wood and water near it; theſe being the principal beauties of a rural ſeat. The trees make a far better defence than hills, as they yield a cooling and healthy air, ſhade during the heat of ſummer, and very much break the ſeverities of the winter ſeaſon.

It ſhould not be ſituated too low, on account of the moiſture of the air; and, on the other hand, thoſe built on places expoſed to the winds are expenſive to keep in repair. In houſes not above two ſtories high, and upon a good foundation, the length of two bricks, or 18 inches, for the heading courſe, will be ſufficient for the ground-work of any common ſtructure; and ſix or ſeven courſes above the earth, to a water-table, where the thickneſs of the walls are abated, or taken in, on either ſide the thickneſs of a brick, *viz.* two inches and a quarter. But for large and high houſes of three, four, or five ſtories, with garrets, their walls ought to be three heading courſes of bricks, or 28 inches at leaſt, from the foundation to the firſt water-table; and at every a ſtory a water-table, or taking in, on the inſide, for the ſummers, girders, and joiſts to reſt upon, laid into the middle, or one quarter of the wall at leaſt, for the better bond. But as for the partition-wall, a brick and half will be ſufficiently thick; and for the upper ſtories, a brick length or nine inch brick will ſuffice.

HOUSE-*Breaking*, or *Robbing*, is the breaking into and robbing a houſe in the day-time; the ſame crime being termed BURGLARY, when done by night: both are felony, without benefit of clergy.

HOUSEHOLD, the whole of a family conſidered collectively, including the miſtreſs, children, and ſervants. But the houſehold of a ſovereign prince includes only the officers and domeſtics belonging to his palace.

The principal officers of his majeſty's houſehold are, the lord ſteward, lord chamberlain of the houſehold, the groom of the ſtole, the maſter of the great wardrobe,

robe, and the maſter of the horſe.

The civil government of the king's houſe is under the care of the lord ſteward of the king's houſehold; who, as he is the chief officer, all his commands are obſerved and obeyed. His authority extends over all the other officers and ſervants, except thoſe of his majeſty's chapel, chamber, and ſtable, and he is the judge of all crimes committed either within the court or the verge.

Under him are the treaſurer of the houſehold, the comptroller, cofferer, the maſter of the houſehold, the clerks of the green-cloth, and the officers and ſervants belonging to the accounting-houſe, the marſhalſea, the verge, the king's kitchen, the houſehold kitchen, the acatery, bake-houſe, pantry, buttery, cellar, paſtry, &c. Next to the lord ſteward is the lord chamberlain of the houſehold, who has under him the vice-chamberlain, the treaſurer, and comptroller of the chamber; 48 gentlemen of the privy chamber, 12 of whom wait quarterly, and two of them lie every night in the privy-chamber; the gentleman uſher, the grooms of the great chamber, the pages of the preſence-chamber; the mace-bearers, cup-bearers, carvers, muſicians, &c. See *Lord* CHAMBERLAIN *of the Houſehold.*

The groom of the ſtole has under him the 11 other lords of the bed-chamber, who wait weekly in the bed-chamber, and by turns lie there a-nights on a palſet-bed; and alſo the grooms of the bed-chamber, the pages of the bed-chamber and back-ſtairs, &c. See *Groom of the* STOLE.

The maſter or keeper of the great wardrobe has under him, a deputy, comptroller, clerk of the robes, bruſher, &c. and a number of tradeſmen and artificers, who are all ſworn ſervants to the king.

The maſter of the horſe has under his command the equerries, pages, footmen, grooms, coachmen, farriers, ſadlers, and all the other officers and tradeſmen employed in his majeſty's ſtables.

Next to the civil liſt of the king's court, is the military, conſiſting of the band of gentlemen penſioners, the yeomen of the guard, and the troops of the houſehold; of which the two firſt guard the king above ſtairs.

When the king dines in public, he is waited upon at table by his majeſty's cup-bearers, carvers, and gentlemen ſewers; the muſicians playing all the time. The dinner is brought up by the yeomen of the guard, and the gentlemen ſewers ſet the diſhes in order. The carvers cut for the king, and the cup-bearers ſerve him the drink with one knee on the ground, after he has firſt taſted it in the cover.

HOUSE *and Window Duty*, a branch of the king's extraordinary revenue *.—As early as the conqueſt mention is made in domeſday book of fumage or fugage, vulgarly called *ſmoke-farthings*; which were paid by cuſtom to the king for every chimney in the houſe. And we read that Edward the Black prince (ſoon after his ſucceſſes in France) in imitation of the Engliſh cuſtom, impoſed a tax of a florin upon every hearth in his French dominions. But the firſt parliamentary eſtabliſhment of it in England was by ſtatute 13 & 14 Car. II. c. 10. whereby an hereditary revenue of 2*ſ*. for every hearth, in all houſes paying to church and poor, was granted to the king for ever. And, by ſubſequent ſtatutes, for the more regular aſſeſſment of this tax, the conſtable and two other ſubſtantial inhabitants of the pariſh, to be appointed yearly, (or the ſurveyor appointed by the crown, together with ſuch conſtable or other public officer) were, once in every year, empowered to view the inſide of every houſe in the pariſh. But, upon the revolution, by ſtat 1. W. &. M. c. 10. hearth-money was declared to be "not only a great oppreſſion to the poorer ſort, but a badge of ſlavery upon the whole people, expoſing every man's houſe to be entered into and ſearched at pleaſure, by perſons unknown to him; and therefore, to erect a laſting monument of their majeſties goodneſs, in every houſe in the kingdom the duty of hearth-money was taken away and aboliſhed." This monument of goodneſs remains among us to this day: but the proſpect of it was ſomewhat darkened, when in ſix years afterwards, by ſtatute 7 W. III. c. 18. a tax was laid upon all houſes (except cottages) of 2*ſ*. now advanced to 3*ſ*. *per* houſe, and a tax alſo upon all windows, if they exceeded nine, in ſuch houſe. Which rates have been from time to time varied, being now extended to all windows exceeding ſix; and power is given to ſurveyors, appointed by the crown, to inſpect the outſide of houſes, and alſo to paſs through any houſe, two days in the year, into any court or yard to inſpect the windows there.

* See *Revenue.*

HOUSING, or HOUSE-*Line*, in the ſea-language, a ſmall line, formed of three fine ſtrands, or twiſts of hemp, ſmaller than rope-yarn. It is chiefly uſed to ſeize blocks into their ſtrops, to bind the corners of the ſails, or to faſten the bottom of a ſail to its bolt-rope, &c. See BOLT-*Rope.*

HOWARD (HENRY), earl of Surry, a ſoldier and a poet, the ſon and grandſon of two lord treaſurers, dukes of Norfolk, was born probably about the year 1520, and educated in Windſor caſtle, with young Fitzroy, earl of Richmond, natural ſon to king H. VIII. Wood ſays, from tradition, that he was ſome time a ſtudent at cardinal college, Oxford. In his youth he became enamoured of the Fair Geraldine, whom his ſonnets have immortalized. In 1532, Howard with his companion Richmond was at Paris, where they continued ſome time. The latter died in 1536; after which our young hero made a tour to Italy, and at Florence, like a true *enamorato*, publiſhed a challenge againſt all comers, whether Chriſtians, Jews, Saracens, Turks, or cannibals, in defence of the beauty of his fair Geraldine; and was victorious in the tournament inſtituted by the grand duke on the occaſion. The duke, we are told, was ſo charmed with his gallant exploits, that he would gladly have retained him at his court; but he rejected the invitation, being determined to maintain the ſuperlative beauty of his Geraldine, in all the principal cities in Italy. This romantic reſolution was however fruſtrated by the command of his ſovereign, Henry VIII. to return to England.

In 1540, he ſignalized himſelf in a tournament at Weſtminſter, againſt Sir John Dudley, Sir Thomas Seymour, and others. In 1542, he marched, under the command of his father, againſt the Scots; and in the ſame year was confined in Windſor caſtle for eating fleſh in Lent, contrary to the king's proclamation. In 1544, on the expedition to Boulogne in France, he was appointed field-marſhal of the Engliſh army; and after the taking of that town, in 1546, made captain-general of the king's forces in France. He was at this time knight of the garter. In the ſame year, attempting to intercept a convoy, he was defeated by the French, and ſoon after ſuperſeded in his command by the earl of Hertford.

Surry, after his return to England, conſcious of his former ſervices, and peeviſh under his diſgrace, could not help reflecting on the king and council. This was his firſt ſtep towards deſtruction. He had married Frances, the daughter of John earl of Oxford; and, after her death, is ſaid to have made love to the princeſs Mary. For this the Seymours, rivals of the Norfolk family, and now in favour with the king, accuſed him of aſpiring to the crown; adding, that he already preſumed to quarter part of the royal arms with his own: but, whatever might be the pretence, the cauſe of his ruin was the jealouſy and power of his enemies. In ſhort, the deſtruction of the Howards being determined, Surry, and his father the duke of Norfolk, were committed to the tower, in December 1546; and on the 13th of January following, Surry was tried at Guild-hall by a common jury, and beheaded on Tower-hill on the 19th day of the ſame month, nine days before the death of the king, who thus, that the meaſure of his crimes might be full, finiſhed his life with the murder of his beſt ſubject. The accuſations brought againſt this amiable and innocent young nobleman on his trial, were ſo extremely ridiculous, that one is aſtoniſhed how it was poſſible, even in the moſt deſpotic reign, to find a judge and jury ſo puſillanimouſly villanous as to carry on the farce of juſtice on the occaſion. We boaſt of our excellent conſtitution, and our trial by juries; but this example may teach us, that our conſtitution and our juries are not incompatible with deſpotic monarchy. He was firſt interred in the church of All-hallows, Barkin, near Tower-hill; and afterwards, in the reign of king James I. removed to Farmingham in Suffolk, by his ſon Henry earl of Northampton.

As to the character of this unfortunate earl, all our poets have ſung his praiſe. Mr Walpole begins his anecdotes of Surry with theſe words:—"We now emerge from the twilight of learning to an almoſt claſſic author, that ornament of a boiſterous, yet not unpoliſhed court, the earl of Surrey, celebrated by Drayton, Dryden, Fenton, Pope, illuſtrated by his own muſe, and lamented for his unhappy death: a man (as Sir Walter Raleigh ſays), no leſs valiant than learned, and of excellent hopes." Leland calls him the conſcript enrolled heir of Sir Thomas Wyatt, the elder, in his learning and other excellent qualities; and the author of *The Art of Engliſh Poetry* ſays, that the earl of Surrey, and Sir Thomas Wyatt, may be juſtly called the *reformers of our poetry and ſtyle.* His poems were publiſhed in 1557, 12mo; and in 1565, 1574, 1585, 1587, 8vo. Several of the ſonnets are by Sir Thomas Wyatt and others.

Howard (Charles), an able ſtateſman and experienced ſeaman, was the ſon of lord William Howard, baron of Effingham, and born in 1536. He ſerved under his father, who was lord high admiral of England, till the acceſſion of queen Elizabeth. In January 1573, he ſucceeded his father in his title and eſtate: after which he ſucceſſively became chamberlain of the houſehold, and knight of the garter; and, in 1585, was made lord high admiral, at that critical juncture when the Spaniards were ſending their armada, in their opinion, to the aſſured conqueſt of this kingdom. When he received intelligence of the approach of the Spaniſh fleet, and ſaw the prodigious conſequence it was to get out the few ſhips that were ready at Plymouth, he not only gave orders in every thing himſelf, but wrought alſo with his own hands, and the firſt night left the port with ſix ſhips. The next morning, though he had only 30 ſail, and thoſe the ſmalleſt of the fleet, he attacked the Spaniſh navy; but firſt diſpatched his brother-in-law, Sir Edward Hobby, to the queen, to deſire her to make the proper diſpoſition of her land-forces for the ſecurity of the coaſt, and to haſten as many ſhips as poſſible to his aſſiſtance. His valour was conſpicuouſly diſplayed in his repeated attacks of a ſuperior enemy. The coolneſs of his temper was no leſs conſpicuous; and it was owing to his magnanimity and prudence that the victory was ſo great. The queen expreſſed her ſenſe of his merit in the moſt honourable terms; and granted him a penſion for life. In 1596, he commanded in chief at ſea, as Eſſex did by land, the forces ſent againſt Spain, when his prudence and moderation were among the principal cauſes of the ſucceſs the Engliſh met with in that great and glorious enterprize; ſo that, upon his return the next year, he was advanced to the dignity of earl of Nottingham. The next eminent ſervice in which his Lordſhip was engaged was in 1599, when the Spaniards ſeemed to meditate a new invaſion. Her majeſty, who always placed her ſafety in being too quick for her enemies, drew together, in a fortnight's time, ſuch a fleet, and ſuch an army, as took away all appearance of ſucceſs from her foreign and domeſtic enemies; and ſhe gave the earl the ſole and ſupreme command of both the fleet and army, with the title of *lord lieutenant general of all England,* an office unknown in ſucceeding times. When age and infirmity had unfitted him for action, he reſigned his office, and ſpent the remaining part of his life in eaſe and retirement, till the time of his deceaſe, which happened in 1624, in the 87th year of his age.

HOWE (John), a learned Engliſh nonconformiſt divine born in 1630. He became miniſter of Great Torrington in Devonſhire, and was appointed houſehold chaplain to Cromwell; but ſeems to have been free from the fanaticiſm then in faſhion, as he offended Cromwell greatly by preaching againſt the notion of particular faith which the miniſters of his court were great advocates for. When Oliver died, he continued chaplain to Richard; and when Richard was depoſed, he returned to Torrington, where he continued till the act of uniformity took place and ſet him aſide. He afterwards ſettled at Utrecht, until the declaration for liberty of conſcience was publiſhed by king James II. under ſhelter of which he returned to London, where he died in 1705. He publiſhed a great number of ſermons and religious works, which have been reprinted together in one volume folio.

HOWE-*Iſland*, a ſmall iſland of the South Sea, diſcovered by Captain Wallis, called by the inhabitants of the Society-Iſland *Mopeha*; lies in S. Lat. 16. 46. and W. Long. 154. 8.

HOWEL (James), a voluminous writer of the 17th century, ſupported himſelf many years by writing and tranſlating of books. Though he had been a zealous loyaliſt, he afterwards flattered Cromwell; yet on the reſtoration he was made hiſtoriographer to the king, being the firſt in England who enjoyed that title. He died in 1666.

HOWITZ, a kind of mortar, mounted upon a field-carriage like a gun. The difference between a mortar and a howitz is, that the trunnions of the firſt are at the end, and at the middle in the laſt. The invention of howitzes is of much later date than mortars, for they really had their origin from them. The conſtructions of howitzes are as various and uncertain as thoſe of mortars, excepting the chambers, which are all cylindric. They are diſtinguiſhed by the diameter of the bore; for inſtance, a ten inch howitz is that the diameter of which is 10 inches; and ſo of the ſmaller ones.

HOY, a ſmall veſſel, chiefly uſed in coaſting, or carrying goods to or from a ſhip, in a road or bay, where the ordinary lighters cannot be managed with ſafety or convenience.

It would be very difficult to deſcribe, preciſely, the marks of diſtinction between this veſſel and ſome others of the ſame ſize, which are alſo rigged in the ſame manner; becauſe what is called a *hoy* in one place, would aſſume the name of a *ſloop* or *ſmack* in another; and even the people who navigate theſe veſſels, have, upon examination, very vague ideas of the marks by which they are diſtinguiſhed from thoſe abovementioned. In Holland, the hoy has two maſts; in England, it has but one, where the main-ſail is ſometimes extended by a boom, and ſometimes without it. Upon the whole, it may be defined a ſmall veſſel, uſually rigged as a ſloop, and employed for carrying paſſengers and luggage from one place to another, particularly on the ſea-coaſt.

Hoy, an iſland of Scotland, and one of the Orcades. It is about 10 miles long; and that part called *Waes* is fruitful and pretty populous, and is a good place for fiſhing.

HOYE, a town of Germany, in Weſtphalia, and capital of a county of the ſame name. It is ſeated on the river Weſer, and is ſubject to the elector of Hanover. E. Long. 9. 0. N. Lat. 53. 5.

HUAHINE, one of the Society-*Iſlands*, in the South Sea, ſituated in S. Lat. 16. 43. W. Lon. 150. 52. and is about ſeven or eight leagues in compaſs. Its ſurface is hilly and uneven, and it has a ſafe and convenient harbour. It was firſt diſcovered by Captain Cook in 1769. It is divided by a deep inlet into two peninſulas connected by an iſthmus, which is entirely overflowed at high water. From the appearance of its hills it may be concluded, that the country has at ſome period or other been the ſeat of a volcano. The ſummit of one of them had much the appearance of a crater, and a blackiſh ſpongy earth was ſeen upon one of its ſides, which ſeemed to be lava; and the rocks and clay every where had a burnt appearance. The iſland is plentifully ſupplied with water by many rivulets which deſcend from the mountains and broken rocks. The inhabitants are nearly as fair as Europeans; and their conduct is bolder than that of the inhabitants of the other Society Iſlands. They are a ſtout large-made people, ſome of the talleſt being ſix feet three inches in height; they are extremely indolent, and ſeem to have as little curioſity as fear. The dogs, however, in ſpite of their ſtupidity, are in great favour with all their women, "who could not have careſſed them (ſays Mr Forſter) with a more ridiculous affection if they had been European ladies of faſhion." Here was ſeen a middle-aged woman, whoſe breaſts were full of milk, offering them to a little puppy who had been trained up to ſuck them. The ſight diſguſted thoſe who ſaw it ſo much, that they could not forbear expreſſing their diſlike to it; but the woman ſmiled, and told them that ſhe allowed young pigs to do the ſame. It appeared afterwards that this woman had loſt her child. Some of the gentlemen were preſent at a dramatic entertainment on this iſland: the piece repreſented a girl running away from her parents; and ſeemed to be levelled at a female paſſenger who had come in Captain Cook's ſhip from O'Taheitee, and who happened to be preſent at the repreſentation. It made ſuch an impreſſion on the girl, that the gentlemen could ſcarce prevail upon her to ſee the piece out, or to refrain from tears while it was acting. It concluded with the reception ſhe was ſuppoſed to meet with from her friends, which was made out not to be a very agreeable one.—Theſe people introduce extempore pieces upon occaſion; and it is moſt probable that this was meant as a ſatire upon the girl abovementioned, and to diſcourage others from acting in the ſame manner.

HUBER (Ulric), one of the greateſt civilians in the 17th century, was born at Dockum in 1636. He became profeſſor of law at Franeker; and wrote, 1. A treatiſe *De jure civitatis*. 2. *Juriſpudentia Friſica*. 3. *Specimen philoſophiæ civilis*. 4. *Inſtitutiones hiſtoriæ civilis*; and ſeveral other works which are eſteemed. He died in 1694.

HUBERT (St), a town of the Netherlands, on the confines of Liege, with a very fine abbey, where they bring thoſe that are bit by mad animals to be cured. E. Long. 5. 25. N. Lat. 34. 32.

HUBNER (John), a learned geographer of Germany, taught geography at Leipſic and Hamburgh with extraordinary reputation; and died at Hamburgh in 1732, aged 63. His principal work is A Geographical treatiſe, printed at Baſil in 1746, in 6 vols 12mo.

HUDSON (Jeffery). See Dwarf.

Hudson (Henry), an eminent Engliſh navigator, who, about the beginning of the laſt century, undertook to find out a paſſage by the north-eaſt or north-weſt to Japan and China. For this purpoſe he was four times fitted out: he returned three times unſucceſsful; but in the laſt voyage, in 1610, being perſuaded that the great bay to which his name has been ſince given, muſt lead to the paſſage he ſought, he wintered there, to proſecute his diſcovery in the ſpring. But their diſtreſſes during the winter producing a mutiny among his men, when the ſpring arrived, they turned him, with his ſon and ſeven ſick men, adrift in his own ſhallop, and proceeded home with the ſhip. As Hudſon and his unhappy companions were never heard of afterward, it is to be ſuppoſed they all periſhed.

Hudson (John), a very learned Engliſh critic, born in 1662. He diſtinguiſhed himſelf by ſeveral valuable editions of Greek and Latin authors; and, in 1701, was elected head keeper of the Bodleian library at Oxford. In 1712, he was appointed principal of St Mary's Hall, through the intereſt of the famous Dr Ratcliffe: and it is ſaid that the univerſity

Hudſon's-Bay.

of Oxford is indebted for the moſt ample benefactions of that phyſician to Dr Hudſon's ſolicitations. He died in 1719, while he was preparing for publication a catalogue of the Bodleian library, which he had cauſed to be fairly tranſcribed in ſix folio volumes.

HUDSON's *Bay*, a large bay of North America, lying between 51 and 69 degrees of latitude, diſcovered in 1610 by Henry Hudſon. This intrepid mariner, in ſearching after a north-weſt paſſage to the South-ſeas, diſcovered three ſtreights, through which he hoped to find out a new way to Aſia by America. He ſailed boldly into the middle of the new gulph, and was preparing to explore all its parts, when his treacherous crew put him into the long-boat, with ſeven others, and left him, without either arms or proviſions, expoſed to all the dangers both of ſea and land. The barbarians, who refuſed him the neceſſaries of life, could not, however, rob him of the honour of the diſcovery; and the bay, which he firſt found out, will ever be called by his name.

Raynal.

The miſeries of the civil war which followed ſoon after, had, however, made the Engliſh forget this diſtant country, which had nothing to attract them. A ſucceſſion of more quiet times had not yet induced them to attend to it; when Groſeillers and Radiſſon, two French Canadians, having met with ſome diſcontent at home, informed the Engliſh, who were engaged in repairing the miſchiefs of diſcord by trade, of the profits ariſing from furs, and of their claim to the country that furniſhed them. Thoſe who propoſed this undertaking ſhewed ſo much ability, that they were intruſted with the execution of it; and the firſt eſtabliſhment they formed ſucceeded ſo well, that it ſurpaſſed their own hopes as well as their promiſes.

This ſucceſs alarmed the French; who were afraid, and with reaſon, that moſt of the fine furs which they got from the northern parts of Canada would be carried to Hudſon's bay. Their alarms were confirmed by the unanimous teſtimony of their *Coureurs de Bois*, who, ſince 1656, had been four times as far as the borders of the ſtreight. It would have been an eligible thing to have gone by the ſame road to attack the new colony; but the diſtance being thought too conſiderable, notwithſtanding the convenience of the rivers, it was at length determined that the expedition ſhould be made by ſea. The fate of it was truſted to Groſeillers and Radiſſon, who had been eaſily prevailed upon to renew their attachment to their country.

Theſe two bold and turbulent men ſailed from Quebec in 1682, in two veſſels ill equipped; and on their arrival, finding themſelves not ſtrong enough to attack the enemy, they were contented with erecting a fort in the neighbourhood of that they deſigned to have taken. From this time there began a rivalſhip between the two companies, one ſettled at Canada, the other in England, for the excluſive trade of the bay, which was conſtantly kept up by the diſputes it occaſioned; till at laſt, after each of their ſettlements had been frequently taken and recovered, all hoſtilities were terminated by the treaty of Utrecht, by which the whole was ceded to Great-Britain.

Hudſon's Bay, properly ſpeaking, is only a mart for trade. The ſeverity of the climate having deſtroyed all the corn ſown there at different times, has fruſtrated every hope of agriculture, and conſequently of population. Throughout the whole of this extenſive coaſt, there are not more than ninety or a hundred ſoldiers, or factors, who live in four bad forts, of which York-fort is the principal. Their buſineſs is to receive the furs brought by the neighbouring ſavages in exchange for merchandiſe, of which they have been taught the value and uſe.

Hudſon's-Bay.

Though theſe ſkins are much more valuable than thoſe which are found in countries not ſo far north, yet they are cheaper. The ſavages give 10 beaver-ſkins for a gun, two for a pound of powder, one for four pounds of lead, one for a hatchet, one for ſix knives, two for a pound of glaſs-beads, ſix for a cloth-coat, five for a petticoat, and one for a pound of ſnuff. Combs, looking-glaſſes, kettles, and brandy, ſell in proportion. As the beaver is the common meaſure of exchange, by another regulation as fraudulent as the firſt, two otters ſkins and three martins are required inſtead of one beaver. Beſides this oppreſſion, which is authoriſed, there is another which is at leaſt tolerated, by which the ſavages are conſtantly defrauded in the quality, quantity, and meaſure of what is given them, and by which they loſe about one third of the value.

From this regulated ſyſtem of impoſition, it is eaſy to gueſs that the commerce of Hudſon's bay is a monopoly. The capital of the company that is in poſſeſſion of it was originally no more than 10,565 *l.* and has been ſucceſſively increaſed to 104,146 *l.* This capital brings them in an annual return of forty or fifty thouſand ſkins of beavers or other animals, upon which they make ſo exorbitant a profit, that it excites the jealouſy and clamours of the nation. Two thirds of theſe beautiful furs are either conſumed in kind in the three kingdoms, or made uſe of in the national manufactures. The reſt are carried into Germany, where the nature of the climate makes them a valuable commodity.

This bay is about ten degrees in breadth: the entrance is ſix leagues broad; but is only to be attempted from the beginning of July to the end of September, and is even then rather dangerous. This danger ariſes from mountains of ice, ſome of which are ſaid to be from 15 to 18 hundred feet thick, and which, having been produced by winters of five or ſix years duration in little gulphs conſtantly filled with ſnow, are forced out of them by north-weſt winds, or by ſome other extraordinary cauſe. The beſt way of avoiding them is to keep as near as poſſible to the northern coaſt, which muſt neceſſarily be leſs obſtructed and moſt free, by the natural directions of both winds and currents.

The north-weſt wind, which blows almoſt conſtantly in winter, and very often in ſummer, frequently raiſes violent ſtorms within the bay itſelf, which is rendered ſtill more dangerous by the number of ſhoals that are found there. Happily, however, ſmall groups of iſlands are met with at different diſtances, which are of a ſufficient height to afford a ſhelter from the ſtorm. Beſide theſe ſmall archipelagoes, there are in many places large piles of bare rock. Except the alga marina, the bay produces as few vegetables as the other northern ſeas.

Throughout all the countries ſurrounding this bay, the ſun never riſes nor ſets without forming a great cone of light: this phenomenon is ſucceeded by the Aurora Borealis, which tinges the hemiſphere with coloured rays of ſuch a brilliancy, that the ſplendour of them is not effaced even by that of the full moon. Notwithſtanding this, there is ſeldom a bright ſky. In ſpring and autumn, the air is always filled with thick fogs, and in winter with an infinite number of ſmall icicles. Though the heats in ſummer are pretty conſiderable for ſix weeks or two months, there is ſeldom any thunder or lightning.

One of the effects of the extreme cold or ſnow that prevails in this climate, is that of turning thoſe animals white in winter which are naturally brown or grey. Nature has beſtowed upon them all, ſoft, long, and thick furs, the hair of which falls off as the weather grows milder. In moſt of theſe quadrupeds, the feet, the tail, the ears, and, generally ſpeaking, all thoſe parts in which the circulation is ſlower becauſe they are the moſt remote from the heart, are extremely ſhort. Wherever they happen to be ſomething longer, they are proportionably well covered. Under this gloomy ſky, all liquors become ſolid by freezing, and break the veſſels they are in. Even ſpirit of wine loſes its fluidity. It is not uncommon to ſee fragments of large rocks looſened and detached from the great maſs by the force of the froſt. All theſe phenomena, common enough during the whole winter, are much more terrible at the new and full moon, which in theſe regions has an influence upon the weather, the cauſes of which are not known.

In this frozen zone, iron, lead, copper, marble, and a ſubſtance reſembling ſea-coal, have been diſcovered. In other reſpects, the ſoil is extremely barren. Except the coaſts, which are for the moſt part marſhy, and produce a little graſs and ſome ſoft wood, the reſt of the country affords nothing but very high moſs, and a few weak ſhrubs very thinly ſcattered.

For an account of the inhabitants, ſee Greenland.

Hudson's-*River*, a large river of North America, which riſes on the eaſt of Lake Ontario, and running by Albany, and on the back of the ſouth part of New-England through part of New-York, falls into the bay of the ſea beyond the weſt end of Long-Iſland, and below the town of New-York.

HUE *and* Cry, in law, the purſuit of a perſon who has committed felony on the high way.—Of this cuſtom, which is of Britiſh origin, the following deduction is given by Mr Whitaker. "When it was requiſite for the Britons to call out their warriors into the field, they uſed a method that was particularly marked by its expeditiouſneſs and deciſiveneſs, and remains partially among us to this moment. They raiſed a cry, which was immediately caught up by others, and in an inſtant tranſmitted from mouth to mouth thro' all the region. And, as the notice paſſed along, the warriors ſnatched their arms, and hurried away to the rendezvous. We have a remarkable deſcription of the fact in Cæſar, and there ſee the alarm propagated in 16 or 17 hours through 160 miles in a line. And the ſame practice has been retained by the Highlanders to our own time. When the lord of a clan received intelligence of an enemy's approach, he immediately killed a goat with his own ſword, dipped the end of a half-burnt ſtick in the blood, and then gave it and the notice of the rendezvous to be carried to the next hamlet. The former ſymbolically threatened fire and ſword to all his followers that did not inſtantly repair to the latter. The notice was diſpatched from hamlet to hamlet with the utmoſt expedition. And in three or four hours the whole clan was in arms, and aſſembled at the place appointed. This was within theſe few years the ordinary mode by which the chieftains aſſembled their followers for war. The firſt perſon that received the notice, ſet out with it at full ſpeed, delivered it to the next that he met, who inſtantly ſet out on the ſame ſpeed, and handed it to a third. And, in the late rebellion of 1745, it was ſent by an unknown hand through the region of Braidalbin; and, flying as expeditiouſly as the Gallick ſignal in Cæſar, traverſed a tract of 32 miles in three hours. This quick method of giving a diffuſive alarm is even preſerved among ourſelves to the preſent day; but is applied, as it ſeems from Cæſar's account above to have been equally applied among the Celtæ, to the better purpoſes of civil polity. The *huteſium and clamour* of our laws, and the *hue and cry* of our own times, is a well-known and powerful proceſs for ſpreading the notice and continuing the purſuit of any fugitive felons. The cry, like the clamour of the Gauls or the ſummons of the Highlanders, is taken from town to town and from county to county; and a chain of communication is ſpeedily carried from one end of the kingdom to the other.

HUESCA, an ancient and conſiderable town of Spain, in the kingdom of Arragon, with a biſhop's ſee and an univerſity. It is ſeated on the Iſſuela in a ſoil producing excellent wine, in W. Long. 0. 13. N. Lat. 40. 2.

HUESCAR, or Guescar, a town of Spain in the kingdom of Granada, ſeated on a plain in W. Long. 1. 45. N. Lat. 37. 32.

HUESNE, or Huena, a ſmall iſland in the Baltic Sea, in the Sound, where was the famous obſervatory of Tycho Brahe. E. Long. 13. 5. N. Lat. 55. 54.

HUET (Peter Daniel), a very learned French writer, born at Caen in Normandy, on the 8th of February 1630. He diſcovered, from his infancy, a great inclination to the ſtudy of polite literature and the ſciences, and at firſt applied himſelf to the law; but Des Cartes's principles, and Bochart's ſacred geography, made him change his ſtudies for thoſe of philoſophy, mathematics, the languages, and antiquities. His admiration for Bochart made him deſirous of knowing him. He contracted a very ſtrict friendſhip with him, and accompanied that learned man to Sweden. Here Chriſtina would have engaged him in her ſervice; but he, ſenſible of her inconſtant temper, returned to France. All he brought with him was a copy of a MS. of Origen, which he tranſcribed at Stockholm. He refuſed ſeveral offers from Chriſtina after ſhe abdicated and went to Rome, and from Guſtavus her ſucceſſor. In 1670, Mr Boſſuet being appointed by the king preceptor to the dauphin, his majeſty choſe Mr Huet for his colleague, with the title of *ſub-preceptor to the prince*. It was he that formed the plan of the commentaries *in uſum Delphini*, and directed the execution. His ſentiments of piety determined him to enter into holy orders, which he did at the age of 46. Soon after this, he was preſented by the king to the abbey of Aunay; and in 1685 was nominated to the biſhopric of Soiſſons, which he exchanged for the ſee of Avranches. After governing that dioceſe ten years, he reſigned, and was made abbot of Fontenay near Caen. His love to his native place determined him to fix there. But lawſuits coming upon him, he retired to Paris, and lodged among the Jeſuits in the *Maiſon Profeſſe*, whom he had made heirs to his library. A ſevere diſtemper weakened his body extremely, but not the vivacity of his genius: he wrote his own life in a very elegant ſtyle; and died in 1721, aged 91. He was a man of very agreeable converſation; and of great probity, as well as immenſe erudition.—The following are the titles of his principal works. 1. *De Claris interpretibus, et de optimo genere interpretandi.* 2. An edition of Origen's commentaries on the holy Scriptures, in Greek and Latin. 3. A treatiſe on the origin of the Romans. 4. *Demonſtratio evangelica*, folio. 5. *Quæſtiones Alnetanæ de concordia rationis et fidei.* 6. Of the ſituation of the terreſtrial paradiſe, in French. 7. A hiſtory of the commerce and navigation of the ancients, which has been tranſlated into Engliſh. 8. *Commentarius de rebus ed eum pertinentibus.* 9. *Huetiana.* 10. Latin and Greek verſes, &c.

HUGHES (John), an ingenious and polite writer, was born in 1677. In the earlieſt parts of his youth he cultivated the ſiſter-arts, poetry, drawing, and muſic, in each of which he by turns made a conſiderable progreſs; but followed thoſe and his other ſtudies only as agreeable amuſements, under frequent confinement on account of his ill ſtate of health. The lord Chancellor Cowper made him ſecretary for the commiſſions of the peace without his knowledge, and diſtinguiſhed him with ſingular marks of his eſteem. He continued in the ſame employment under the earl of Macclesfield, and held it to the day of his death; which happened in 1719, the very night in which his tragedy, intitled *The ſiege of Damaſcus*, was firſt acted. He was then 42. He tranſlated Fontenelle's dialogues of the dead, Vertot's revolutions of Portugal, and the letters of Abelard and Eloiſa. He gave a very accurate edition of Spencer's works, with his life, a gloſſary, and remarks; and wrote ſeveral papers in the Tatler, Spectator, and Guardian. Mr Duncombe, who married his ſiſter, collected his poems and eſſays in 2 vols 12mo, in 1735.

HUGHLY, a town of Aſia, in the kingdom of Bengal, ſeated on the moſt weſterly branch of the river Ganges. It is of large extent, reaching about two miles along the river-ſide, and drives a great trade in all the commodities of that country; affording rich cargoes for 50 or 60 ſhips annually, beſides what is brought on carriages to the neighbouring towns. Saltpetre is brought hither from Patnia in veſſels above 50 yards long and five broad. The inhabitants are chiefly Indians; but there are alſo Portugueſe, Engliſh, and other Europeans. E. Long. 87. 55. N. Lat. 22. 0.

HUGO Capet, chief of the third race of the kings of France, being count of Paris and Orleans: he was raiſed to the throne for his military valour and public virtues in 987. See France, n° 27.

HUGUENOTS, a name given by way of contempt to the Calviniſts of France.

The name had its riſe in the year 1560; but authors are not agreed as to its origin. The moſt plauſible opinion, however, is that of Paſquier, who obſerves, that at Tours, the place where they were firſt thus denominated, the people had a notion, that an apparition or hobgoblin, called king *Hugon*, ſtrolled about the ſtreets in the night-time; from whence, as thoſe of the reformed religion met chiefly in the night to pray, &c. they called them *Huguenots*, that is, the diſciples of king Hugon.

HULK, on old ſhip of war, fitted with an apparatus, to fix or take out the maſts of his majeſty's ſhips, as occaſion requires. See Plate CLXI. fig. 7.

The maſt of this veſſel is extremely high, and withal properly ſtrengthened by *ſhrouds and ſtays*, in order to ſecure what are called the *ſheers*, which ſerve, as the arm of a crane, to hoiſt out or in the maſts of any ſhip lying alongſide. The ſheers are compoſed of ſeveral long maſts, whoſe heels reſt upon the ſide of the hulk, and having their heads declining outward from the perpendicular, ſo as to hang over the veſſel whoſe maſts are to be fixed or diſplaced. The tackles, which extend from the head of the maſt to the ſheer-heads, are intended to pull in the latter towards the maſthead, particularly when they are charged with the weight of a maſt after it is raiſed out of any ſhip, which is performed by ſtrong tackles depending from the ſheer-heads. The effort of theſe tackles is produced by two capſterns, fixed on the deck for this purpoſe.

Hulk, is alſo a name beſtowed on any old veſſel laid by as unfit for further ſervice. It is probably derived from the ολκαδες, or veſſels of burden, of the ancient Grecians.

HULL, in the ſea-language, is the main body of a ſhip, without either maſts, yards, ſails, or rigging. Thus, *to ſtrike a hull* in a ſtorm, is to take in her ſails, and to laſh the helm on the lee-ſide of the ſhip; and *to hull*, or *lie a-hull*, is ſaid of a ſhip whoſe ſails are thus taken in, and helm laſhed a-lee.

Hull, in geography. See Kingston *upon Hull*.

HUMAN, in general, is an appellation given to whatever relates to mankind: thus we ſay, the human ſoul, human body, human laws, &c.

HUMANITY, the peculiar nature of man, whereby he is diſtinguiſhed from all other beings.

Humanities, in the plural, ſignify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*; for teaching of which, there are profeſſors in the univerſities of Scotland, called *humaniſts*.

HUMBER, a river formed by the Trent, the Ouſe, and ſeveral other ſtreams united. It divides Yorkſhire from Lincolnſhire, and falls into the German Sea at Holderneſs.

HUME (David, eſq;), a late celebrated philoſopher and hiſtorian, was born in the ſouth part of Scotland on the 26th of April O. S. in the year 1711. Being the younger ſon of a country gentleman of good family, but no great fortune, his patrimony was of conſequence inſufficient to ſupport him. For this reaſon he was deſtined for the bar, and paſſed thro' his academical courſes in the univerſity of Edinburgh; but being more inclined to ſtudies of a different nature, he never put on the gown, nor even took the introductory ſteps neceſſary for that purpoſe. The writings of Locke and Berkeley had directed the attention of the generality of learned men towards metaphyſics; and Mr Hume having early applied himſelf to ſtudies of this kind, publiſhed in 1739 the two firſt volumes of his *Treatiſe of human nature*, and the third the following year. He had the mortification, however, to find his book generally decried; and to perceive, that the taſte for ſyſtematic writing was now on the decline. He therefore divided this treatiſe into ſeparate Eſſays and Diſſertations, which he afterwards publiſhed at different times with alterations and improvements.

In 1742, Mr Hume publiſhed two ſmall volumes, conſiſting of Eſſays moral, political, and literary. Theſe were better received than his former publication; but contributed little to his reputation as an author, and ſtill leſs to his profit; and his ſmall patrimony being now almoſt ſpent, he accepted an invitation from the marquis of Anandale to come and live with him in England. With this nobleman he ſtaid a twelvemonth, during which time his ſmall fortune was conſiderably increaſed. He then received an invitation from General St Clair, to attend him as a ſecretary to his expedition, which was at firſt meant againſt Canada, but afterwards ended in an excurſion againſt the coaſt of France. In 1747, he received an invitation from the general to attend him in the ſame ſtation in his military embaſſy to the courts of Vienna and Turin. He then wore the uniform of an officer; and was introduced at theſe courts as aid-de-camp to the general, along with Sir Harry Erſkine and captain Grant, afterwards general Grant. In 1749, he returned to Scotland, and lived two years with his brother at his country-houſe; where he compoſed the ſecond part of his eſſays, called *Political Diſcourſes*. And now the general approbation of his performances was indicated by a more extenſive ſale than formerly, and likewiſe by the numerous anſwers publiſhed by different perſons in order to counteract their ſuppoſed pernicious tendency. In 1752, were publiſhed at Edinburgh his Political Diſcourſes, the only work of his which was well received on its firſt appearance; and the ſame year, at London, his Inquiry concerning the Principles of Morals, which in his own opinion was incomparably the beſt of all his performances. This year alſo he was appointed librarian to the faculty of Advocates at Edinburgh; the principal advantage reſulting from which employment was, that he had by that means the command of a large library. He then formed the plan of writing the Hiſtory of England: but deeming the whole to be too extenſive, he confined his hiſtory to that of Britain under the houſe of Stuart. The book was almoſt univerſally decried on its firſt appearance, and ſoon after ſeemed to ſink in oblivion. Dr Herring, primate of England, and Dr Stone, primate of Ireland, were the only literati of the author's acquaintance who approved of the work, and ſent him meſſages not to be diſcouraged.

Notwithſtanding the approbation of theſe eminent men, however, Mr Hume's ſpirits were ſo much ſunk by his bad ſucceſs, that he had ſome thoughts of retiring to France, changing his name, and bidding adieu to his own country for ever; but his deſign was rendered impracticable by the breaking out of the war of 1755 between France and Britain. He then publiſhed his Natural Hiſtory of Religion: to which an anſwer was publiſhed, ſoon after its appearance, in the name of Dr Hurd, biſhop of Litchfield and Coventry; of which, however, he hath ſince diſclaimed being the ſole author. In 1756, the ſecond volume of the Hiſtory of the Stuarts was publiſhed, two years after the appearance of the firſt. This was better received, and helped to retrieve the character of the former volume. Three years after, his Hiſtory of the Houſe of Tudor made its appearance; which was almoſt as ill received as the Hiſtory of the Stuarts had been, the reign of Elizabeth being particularly obnoxious. The author, however, had now learned to deſpiſe popular clamours; and continued to finiſh at his leiſure the more early part of the Engliſh hiſtory, which was publiſhed in 1761, and was received with tolerable ſucceſs.

Mr Hume being now turned of fifty, and having obtained by the ſale of his books a competent and independent fortune, retired into his native country of Scotland, determined never more to ſet his foot out of it. From this reſolution, however, he was diverted by the earl of Hertford; whom he attended as ſecretary on his embaſſy to Paris in 1763. In 1765, the earl being appointed lord lieutenant of Ireland, Mr Hume was intruſted with the ſole management of the buſineſs of the ſtate till the arrival of the duke of Richmond towards the latter end of the year. In 1767, he returned to Edinburgh with a much larger income, procured to him by the earl of Hertford, than he formerly had; and now formed the ſame deſign he had formerly entertained, namely, of burying himſelf in his philoſophical retreat. In this, however, he was again diſappointed, by receiving an invitation from general Conway to be under ſecretary; and this invitation he was prevented from declining, both by the character of the perſon, and his connections with lord Hertford. In 1769, he returned to Edinburgh, poſſeſſed of L. 1000 a-year, healthy, and though ſomewhat ſtricken in years, yet having a proſpect of long enjoying his eaſe, and of ſeeing the increaſe of his reputation. Of his laſt illneſs and character, he himſelf gives the following account. "In ſpring 1775, I was ſtruck with a diſorder in my bowels; which at firſt gave me no alarm, but has ſince, as I apprehend it, become mortal and incurable. I now reckon upon a ſpeedy diſſolution. I have ſuffered very little pain from my diſorder; and what is more ſtrange, have, notwithſtanding the great decline of my perſon, never ſuffered a moment's abatement of my ſpirits; inſomuch, that were I to name the period of my life which I ſhould moſt chooſe to paſs over again, I might be tempted to point to this latter period. I poſſeſs the ſame ardour as ever in ſtudy, and the ſame gaiety in company. I conſider, beſides, that a man of ſixty-five, by dying, cuts off only a few years of infirmities; and though I ſee many ſymptoms of my literary reputation's breaking out at laſt with additional luſtre, I knew that I could have but few years to enjoy it. It is difficult to be more detached from life than I am at preſent.

"To conclude, hiſtorically, with my own character. I am, or rather was, (for that is the ſtyle I muſt now uſe in ſpeaking of myſelf, which emboldens me the more to ſpeak my ſentiments); I was, I ſay, a man of mild diſpoſitions, of command of temper, of an open, ſocial, and cheerful humour, capable of attachment, but little ſuſceptible of enmity, and of great moderation in all my paſſions. Even my love of literary fame, my ruling paſſion, never ſoured my temper, notwithſtanding my frequent diſappointments. My company was not unacceptable to the young and careleſs, as well as to the ſtudious and literary; and as I took a particular pleaſure in the company of modeſt women, I had no reaſon to be diſpleaſed with the reception I met with from them. In a word, though moſt men any wiſe eminent have found reaſon to complain of calumny, I never was touched, or even attacked, by her baleful tooth: and though I wantonly expoſed myſelf to the rage of both civil and religious factions, they ſeemed to be diſarmed in my behalf of their wonted fury. My friends never had occaſion to vindicate any one circumſtance of my character and conduct: not but that the zealots, we may well ſuppoſe, would have been glad to invent and propagate any ſtory to my diſadvantage, but they could never find any which they thought would wear the face of probability. I cannot ſay there is no vanity in making this funeral oration of myſelf, but I hope it is not a miſplaced one; and this is a matter of fact which is eaſily cleared and aſcertained."

His fears concerning the incurableneſs of his diſorder proved too true. He died on the 25th of Auguſt 1776; and was buried in the Calton church-yard, Edinburgh, where a monument is erected to his memory.

HUMERUS, in anatomy. See ANATOMY, n° 48.

Luxation of the HUMERUS. See SURGERY.

HUMIDITY, that quality in bodies whereby they are capable of wetting other bodies. This differs very much from fluidity; and ſeems to be merely a relative thing, depending on the congruity of the component particles of the liquor to the pores of ſuch particular bodies as it is capable of adhering to, penetrating a little into, or wetting. Thus, for inſtance, quickſilver is not a moiſt thing with regard to our hands or clothes; but may be called ſo in reference to gold, tin, or lead, to whoſe ſurfaces it will perfectly adhere, and render them ſoft and moiſt.

HUMILITY. See MORALS, n° 118.

HUMMING-BIRD. See TROCHILUS.

HUMOUR, in a general ſenſe, denotes much the ſame with liquid or fluid. See FLUID.

HUMOUR. See WIT.

HUMPHREY (Dr Laurence), a very learned Engliſh divine in the 16th century, who, during the perſecution under queen Mary, retired with other Proteſtant refugees to Zurich. He returned on the acceſſion of queen Elizabeth; and was made preſident of Magdalene college, Oxford, dean of Glouceſter, and then dean of Wincheſter. He was a great and general ſcholar, an able linguiſt, and a deep divine; and publiſhed, 1. *De religionis conſervatione et reformatione, deque primatu regum.* 2. *De ratione interpretandi auctores.* 3. *Optimates; ſive de nobilitate, ejuſque origine.* 4. Sermons, and other works. He died in 1590.

HUMULUS, the HOP; a genus of the pentandria order, belonging to the diœcia claſs of plants. There is only one ſpecies, viz. the lupulus, which is ſometimes found wild in hedges near houſes and gardens, but probably is not indigenous. The ſtalk is weak and climbing; it creeps up the ſupport in a ſpiral, aſcending always from the right hand to the left. The ſtalk and the leaves are rough to the touch: the upper leaves are heart-ſhaped, the lower ones divided into three lobes ſerrated on the edges, and grow in pairs on long footſtalks. The male flowers grow on a diſtinct plant on branched peduncles; the females on peduncles in pairs of the form of a *ſtrobilus* or cone, compoſed of large imbricated calyces containing each one or two ſeeds. For the culture and uſes of hops, ſee the article HOP.

HUNDRED, HUNDREDUM, or *Centuria*, a part or diviſion of a county; which was anciently ſo called from its containing an hundred families, or from its furniſhing an hundred able men for the king's wars. After king Alfred's dividing this kingdom into counties, and giving the government of each county to a ſheriff, theſe counties were divided into hundreds, of which the conſtable was the chief officer. The grants of hundreds were at firſt made by the king to particular perſons: but they are not now held by grant or preſcription, their juriſdiction being devolved to the county-court; a few of them only excepted, that have been by privilege annexed to the crown, or granted to ſome great ſubjects, and ſtill remain in the nature of a franchiſe.

HUNDRED-*Court*. This is only a larger COURT-*Baron*, being held for all the inhabitants of a particular hundred inſtead of a manor. The free ſuitors are here alſo the judges, and the ſteward the regiſtrar, as in the caſe of a court-baron. It is likewiſe no court of record; reſembling the former in all points, except that in point of territory it is of a greater juriſdiction. This is ſaid by Sir Edward Coke to have been derived out of the county-court for the eaſe of the people, that they might have juſtice done them at their own doors, without any charge or loſs of time: but its inſtitution was probably co-eval with that of hundreds themſelves, which were formerly obſerved to have been introduced tho' not invented by ALFRED, being derived from the polity of the ancient Germans. The *centeni*, we may remember, were the principal inhabitants of a diſtrict compoſed of different villages, originally in number an *hundred*, but afterwards only called by that name; and who probably gave the ſame denomination to the diſtrict out of which they were choſen. Cæſar ſpeaks poſitively of the judicial power exerciſed in *their* hundred-courts and courts-baron. "*Principes regionum, atque pagorum*," (which we may fairly conſtrue, the lords of hundreds and manors) "*inter ſuos jus dicunt, controverſiaſque minuunt.*" And Tacitus, who had examined their conſtitution ſtill more attentively, informs us not only of the authority of the lords, but that of the *centeni*, the hundredors, or jury; who were taken out of the common freeholders, and had themſelves a ſhare in the determination. "*Eliguntur in conciliis et principes, qui jura per pagos vicoſque reddunt: centeni ſingulis, ex plebe comites, conſilium ſimul et auctoritas, adſunt.*" This hundred-court was denominated *hæreda* in the Gothic conſtitution. But this court, as cauſes are equally liable to removal from hence, as from the common court-baron, and by the ſame writs, and may alſo be reviewed by writ of falſe judgment, is therefore fallen into equal diſuſe with regard to the trial of actions.

HUNGARY, a kingdom of Europe, the greateſt part of which was anciently called *Pannonia*. It had the name of *Hungary* from the Hunns, a Scythian or Tartar nation, who ſubdued it in the ninth century. It lies between the 18th and 22d degrees of eaſt long. and betwixt the 45th and 49th degrees of north lat. being bounded to the north by the Carpathian mountains, which ſeparate it from Poland; to the ſouth by Servia, and the river Drave, which ſeparates it from Sclavonia; to the weſt by Moravia, Auſtria, and Stiria; and to the eaſt by Walachia and Tranſylvania. It is about 240 miles in length, and 235 in breadth; and is divided into the Upper and Lower Hungary, the former being that part which lies towards the eaſt, and the latter that which lies towards the weſt.

The northern parts of the kingdom are mountainous and barren, but healthy; the ſouthern, on the contrary, are level, and exceeding fruitful, but not very healthy. The country along the Danube, from Preſburg to Belgrade, for upwards of 200 miles, is one continued plain, and no ſoil can be more fertile; but the air, by reaſon of the many ſwamps and moraſſes, is not ſo wholeſome as on the higher and drier grounds. Here are mines of gold, ſilver, copper, iron, lead, quickſilver, cinnabar, antimony, yellow orpiment, ſulphur, vitriol, marcaſite, ſalt native and factitious, ſaltpetre, magnets, aſbeſtos or ſtone-flax, marble of ſeveral colours, alabaſter, with diamonds, and all ſorts of precious ſtones. Corn is in ſuch plenty, that it is ſold for one ſixth of its price in England. Their grapes are large and luſcious; and their wines preferred to any in Europe. They have vaſt numbers of cattle and horſes, the latter moſtly mouſe-coloured, with buffaloes, deer, wild-fowl, game, and fiſh, and many ſpecies of wild beaſts, particulary chamois goats, bears, and lynxes. Of vegetables, beſides vines, and the common ſorts, here are tobacco, ſaffron, buck-wheat, millet, melons, and cheſnuts. Here alſo are excellent warm baths, and ſprings of various kinds and qualities. The chief mountains of Hungary are the Crapack or Carpathian, which is the general name for all thoſe that ſeparate this kingdom from Poland, Moravia, Sileſia, and ſome part of Auſtria. The ſides of moſt of them are covered with wood, and their tops with ſnow. The chief rivers are the Danube, the Drave, the Save, the Wag or Waag, the Gran, the Temes, the Raab, and Theiſs, all well ſtocked with fiſh. There are ſeveral lakes among the Carpathian mountains; and ſome alſo in the lowlands.

The inhabitants are a mixture of the deſcendants of the ancient Huns, Sclavonians, Camani, Germans, Walachians, Greeks, Jews, Turks, and a wandering people called *Zigduns*, ſaid to be of uncertain origin, but probably the ſame as thoſe we call *gypſies*. The Hungarians are ſaid to be of a ſanguine choleric temper, and ſomewhat fierce, cruel, proud, and revengeful. They have been always reputed good ſoldiers, being much more inclined to arms, martial exerciſes, and hunting, than to arts, learning, trade, or agriculture. The nobility affect great pomp and magnificence, and are much addicted to feaſting and carouſing. The men in general are ſtrong and well proportioned. They ſhave their beards, but leave whiſkers on the upper-lip; wearing fur caps on their heads, a cloſe-bodied coat girt with a ſaſh, with a ſhort cloak or mantle over all, ſo contrived as to be buckled under the arm, and leave the right hand at liberty. Their horſe are called *huſſars*, and their foot *heydukes*. The former wear a broad-ſword, or ſcymetar, and carry a hatchet or battle-ax. Their horſes are fleet, but not near ſo large as the German horſes, and therefore they ſtand up on their ſhort ſtirrups when they ſtrike. The heydukes uſually wear feathers in their caps, according to the number of the enemies they pretend to have killed. Both horſe and foot are an excellent militia, very good at a purſuit, or ravaging and plundering a country, but not equal to regular troops in a pitched battle. The women, when they go abroad, wear ſhort cloaks and a veil.

There are four languages ſpoken in this country, viz. the Hungarian, which, like the people, is of Scythian origin, and has little or no affinity with any European tongue; the German, Sclavonian, Wallachian, and Latin. The laſt is ſpoken, not only by the better ſort, but alſo by the common people, though very corruptly. The people called *Zigduns* have alſo a particular jargon.—Chriſtianity was planted in Hungary in the ninth and tenth centuries. In the ſixteenth the reformation made a great progreſs in it; but at preſent, though the Roman-catholics hardly make a fourth part of the inhabitants, their religion is predominant, the Proteſtants enjoying only a bare toleration. Beſides ſeveral ſects of Proteſtants, here are alſo great numbers of the Greek church and Jews; the laſt pay double taxes of all kinds. Beſides Jeſuits colleges and other convents, there are ſeveral univerſities for the Roman-catholics. The Lutherans alſo and Calviniſts have their gymnaſiums and ſchools, but under divers reſtrictions.

As to the traffic of this country, it is almoſt wholly in the hands of the Greeks and Jews. The exports conſiſt chiefly of wine, horſes, cattle, metals, minerals, ſaffron, wool, and leather. Hungary, in particular, furniſhes Auſtria, and other countries weſt of it, with vaſt droves of cattle, as well as variety of excellent wines, of which thoſe of Tockay are reckoned the beſt. The principal manufactures are thoſe of copper, braſs, iron, and other hard wares. Great quantities of braſs and iron are exported, wrought and unwrought.

Hungary at firſt, like moſt other countries, was divided into many little principalities and ſtates, which at length were united under one head, who had the title of *duke*. The laſt of theſe dukes was Geyſa: who, becoming a proſelyte to Chriſtianity, was baptized; after which he reſigned the government to his ſon Stephen, who took the title of *king*, *anno* 1000. But as the throne was filled by election, though generally out of the ſame family, the diſpoſal of the crown was diſputed between the Turkiſh and German emperors for near 200 years: but after the year 1527, when Ferdinand archduke of Auſtria was advanced to the throne, the Auſtrians found means to influence the elections in ſuch a manner, as to keep the crown in their family till 1687, when it was ſettled hereditarily on their heirs male; and now, in conſequence of an act made by the diet at Preſburg in 1723, in caſe of the failure of heirs-male, it is to deſcend to females. The ſtates of the kingdom conſiſt of the prelates, the barons, the gentry, and the royal towns. To the firſt claſs belong two archbiſhops, about a dozen biſhops, near as many abbots and provoſts, with the Pauline and Præmonſtratenſian Jeſuits. To the ſecond, the ſtadtholder or palatine, who repreſents the king; the court-judge; the ban or viceroy of Dalmatia, Croatia, and Sclavonia; the Stadtholder of Tranſilvania; the great treaſurer, the great cup-bearer, the ſteward of the houſhold, the maſter of the horſe, the lord chamberlain, the captain of the yeomen of the guards, and the grand-marſhal of the courts, who are ſtyled the great barons, together with the inferior bans or counts and barons. To the third claſs belong the gentry, ſome of whom have noble manors, and others only the privileges of nobles. To the fourth claſs belong the royal free cities, which are not ſubject to the counts, but hold immediately of the king. The gentry alſo, who hold of the archbiſhops and biſhops, have the ſame privileges as the Hungarian nobility. The common people are vaſſals to the lords, on whoſe lands they live, whether theſe lands belong to the crown, the clergy, nobility, or gentry.

The ordinary revenue of this kingdom is ſaid to exceed a million Sterling, ariſing from the mines, duties on cattle, royal demeſnes, ſalt-works, contributions, cuſtoms, &c. The fortifications and garriſons conſtantly maintained on the frontiers, againſt the Turks, are a great expence to the government. Hungary can eaſily bring into the field 100,000 men, regulars and militia; for there are 50,000 in actual pay, and the provinces furniſh the other 50,000 when they are wanted.

HUNGARY-*Water*, a diſtilled water prepared from the tops or flowers of roſemary; ſo denominated from a queen of Hungary, for whoſe uſe it was firſt made. See PHARMACY, n° 573.

HUNGER, an uneaſy ſenſation occaſioned by long abſtinence from food when the body is in a healthy ſtate.—Many ſpeculations and conjectures have been formed concerning the cauſe of this ſenſation, but none of them in any degree ſatisfactory. The moſt ingenious and plauſible is that of Dr Haller, viz. that as the liver is not then ſuſtained by the ſtomach and inteſtines, it deſcends by its own weight, and, principally by means of its middle ligament, pulls the diaphragm along with it. It is in that place, therefore, that we have this uneaſy ſenſation, and not at the ſuperior orifice of the ſtomach as is generally thought.—But if this was the caſe, an empty ſtomach ſhould always be accompanied with hunger, which does not hold in fact: becauſe, in certain diſeaſes, people will often faſt a long time without any ſenſation of hunger; and on the contrary, there are caſes where ſcarce any degree of repletion of the ſtomach and inteſtines can extinguiſh the deſire of food. See (the *Index* ſubjoined to) MEDICINE.

When animals die for want of food, their death is not directly the conſequence of hunger, *i. e.* it does not proceed from a deficiency of juices, but from a bad quality of them. The blood, being deprived of its uſual ſupplies of freſh chyle, contracts a putreſcent diſpoſition; from whence ariſes a fever of the putrid kind, and of a nature ſimilar to the jail or hoſpital fever.

Preſervatives againſt HUNGER *and Thirſt.* There were ſome compoſitions in vogue among the ancients, for averting the direful effects of hunger and thirſt; and were held by them to be extremely neceſſary in time of ſcarcity, long voyages, and warlike expeditions. Pliny ſays, that a ſmall portion of ſome things allays the hunger and thirſt, and preſerves ſtrength: ſuch as butter, cheeſe made of mare's milk, and liquorice. The American Indians uſe a compoſition of the juice of tobacco, with calcined ſhells of ſnails, cockles, oyſters, &c. which they make into pills, and dry in the ſhade. Whenever they go upon a long journey, and are likely to be deſtitute of proviſions by the way, they put one of theſe pills between the lower lip and the teeth, and by ſwallowing what they ſuck from it, feel neither hunger, thirſt, nor fatigue, for four or five days together.

The following compoſition is an extract from a manuſcript ſcholium on a book of Heron in the Vatican library; and one much to the ſame effect, with ſome others, may be ſeen in Philo's fifth book of Military Affairs. It was reputed an exceeding nutritive medicament, and alſo very effectual for baniſhing thirſt. Both the beſiegers of cities, and the beſieged, fed upon it, in time of extremity, and called it the *Epimenidian Compoſition*, from the ſea-onion, which was an ingredient in its compoſition. The proceſs is thus:

The ſea-onion being boiled, waſhed with water, and afterwards dried, it was cut into very thin ſlices, to which a fifth part of ſeſame was added, and a fifteenth of poppy; all which being mixed and worked up into a maſs with honey, the whole was divided into portions about the bigneſs of a walnut, whereof two in the day, taken morning and evening, were ſufficient to prevent hunger and thirſt.

There was another way of preparing it, by taking a pint of ſeſame, the ſame quantity of oil, and two quarts of unſhelled ſweet almonds; when the ſeſame was dried, and the almonds ground and ſifted, the ſea-onions were to be peeled and ſliced, the roots and leaves being cut off: then, pounding them in a mortar till reduced to a pap, an equal part of honey was to be added, and both worked up with the oil: afterwards all the ingredients were to be put into a pot on the fire, and ſtirred with a wooden ladle till thoroughly mixed. When the maſs acquired a ſolid conſiſtence, it was taken off the fire, and formed into lozenges; of which two only, as above, were very ſufficient for a day's ſubſiſtence.

Avicenna relates, that a perſon, ſetting out upon a journey, drank one pound of oil of violets, mixed with melted beef-ſuet; and afterwards continued faſting for ten days together, without the leaſt hunger. He ſays, that the oil of almonds and beef-ſuet will effect the ſame by their viſcidity. Hence it was that this celebrated phyſician, who knew things more by unqueſtionable experiments than by idle ſpeculations and conjectures, preſcribed the following compoſition, which in time of famine, by ſea or land, might be extremely ſerviceable:

"Take of ſweet almonds, unſhelled, one pound; the like quantity of melted beef-ſuet; of oil of violets, two ounces; a ſufficient quantity of mucilage; and of the roots of marſh-mallows, one ounce: let all together be brayed in a mortar, and made into boluſſes about the bigneſs of a common nut. They muſt be kept ſo as to prevent their melting by the heat of the ſun."—See alſo the article Gum-*Arabic*.

HUNNS, a fierce and ſavage nation, who formerly inhabited that part of Sarmatia bordering on the Paulus Mæotis and the Tanais, the ancient boundary between Europe and Aſia. Their country, as deſcribed by Procopius, lay north of mount Caucaſus, which, extending from the Euxine to the Caſpian Seas, parts Aſiatic Sarmatia from Colchis, Iberia, and Albania; lying on the iſthmus between the two ſeas abovementioned. Here they reſided, unknown to other nations, and themſelves ignorant of other countries, till the year 376. At this time, an hind purſued by the hunters, or, according to ſome authors, an ox ſtung by a gad-fly, having paſſed the marſh, was followed by ſome Huns to the other ſide, where they diſcovered a country much more agreeable than their own. On their return, having acquainted their countrymen with what they had ſeen, the whole nation paſſed the marſh, and, falling upon the Alans who dwelt on the banks of the Tanais, almoſt exterminated them. They next fell upon the Oſtrogoths, whom they drove out of their country, and forced to retire to the plains between the Boryſthenes and the Tanais, now known by the name of *Podolia*. Then attacking the Viſigoths, they obliged them to ſhelter themſelves in the moſt mountainous parts of their country; till at laſt, the Gothic nations finding it impoſſible to withſtand ſuch an inundation of barbarians, obtained leave from the emperor Valens to ſettle in Thrace.

The Huns thus became maſters of all the country between the Tanais and Danube in 376, where they continued quietly till the year 388, when great numbers of them were taken into the pay of Theodoſius I. but, in the mean time, a party of them, called the *Nephthalite* or *White Huns*, who had continued in Aſia, over-ran all Meſopotamia, and even laid ſiege to Edeſſa, where they were repulſed with great ſlaughter by the Romans. The European Huns frequently paſſed the Danube, committing the greateſt ravages in the weſtern empire; ſometimes they fell upon the eaſtern provinces, where they put all to fire and ſword. They were often defeated and repulſed by the Romans, but the empire was now too weak to ſubdue or confine them from making excurſions; ſo that they continued to make daily encroachments, and became every day more formidable than before. In 441, the Huns, under Attila, threatened the weſtern empire with total deſtruction. This monarch, having made himſelf maſter of all the northern countries from the confines of Perſia to the banks of the Rhine, invaded Mæſia, Thrace, and Illyricum; where he made ſuch progreſs, that the emperor, not thinking himſelf ſafe in Conſtantinople, withdrew into Aſia. Attila then broke into Gaul; where he took and deſtroyed ſeveral cities, maſſacring the inhabitants with the greateſt cruelty. At laſt he was driven out with great ſlaughter by Aetius the Roman general and Theodoric king of the Goths, and could never afterwards make any great progreſs. About the year 452 or 453 Attila died, and his kingdom was immediately ſplit into a number of ſmall ones by his numerous children, who waged perpetual war with each other. The Huns then ceaſed to be formidable, and became daily leſs able to cope with the other barbarous nations whom Attila had kept in ſubjection. Still, however, their dominion was conſiderable; and in the time of Charles the Great they were maſters of Tranſylvania, Walachia, Servia, Carniola, Carinthia, and the greater part of Auſtria, together with Boſnia, Sclavonia, and that part of Hungary which lies beyond the Danube. In the year 776, while Charles was in Saxony, two princes of the Huns, Caganus and Jugunus, ſent ambaſſadors to him, deſiring his friendſhip and alliance. Charles received them with extraordinary marks of friendſhip, and readily complied with their requeſt. However, they entered, not long after, into an alliance with Taſſila duke of Bavaria, who had revolted from Charles, and raiſed great diſturbances in Germany. Charles diſſembled his reſentment till he had entirely reduced Bavaria, when he reſolved to revenge himſelf on the Hunns for thoſe ſuccours they had underhand given to his enemy. Accordingly, he ordered levies to be made throughout his dominions; and having by that means aſſembled a very numerous army, he divided it into two bodies, one of which he commanded himſelf, and the other he committed to the care of his generals. The two armies entered the country of the Hunns at different places, ravaged their country far and near, burnt their villages, and took all their ſtrong holds. This he continued for eight years, till the people were almoſt totally extirpated; nor did the Hunns ever afterwards recover themſelves, or appear as a diſtinct nation.

There were two different nations that went by the name of *Hunns*; the Nephthalite or White Hunns, and the Sarmatian or Scythian Hunns. The former inhabited a rich country, bordering to the north on Perſia, and at a great diſtance from the Sarmatian or Scythian Hunns, with whom they had no intercourſe, nor the leaſt reſemblance either in their perſons or manners. They were a powerful nation, and often ſerved againſt the Romans in the Perſian armies; but, in the reign of the emperor Zeno, being provoked by Perozes king of Perſia laying claim to part of their country, they defeated the Perſians in two pitched battles, ſlew their king, over-ran all Perſia, and held it in ſubjection for the ſpace of two years, obliging Cabades, the ſon and ſucceſſor of Perozes, to pay them a yearly tribute. Theſe Hunns, called by the writers of thoſe times the *white Hunns*, did not wander, like the others, from place to place; but, contented with their own country, which ſupplied them with all neceſſaries, they lived under a regular government, ſubject to one prince, and ſeldom made inroads, unleſs provoked, either into the Perſian or Roman territories. They lived according to their own laws, and dealt uprightly with one another, as well as with the neighbouring people. Each of their great men uſed to chooſe 20 or more companions to enjoy with him his wealth, and partake of all his diverſions; but, upon his deceaſe, they were all buried with him in the ſame grave. This cuſtom ſavours of barbarity; but, in every other reſpect, the Nephthalite were a far more civilized nation than the Scythian Hunns, who, breaking

ing into the empire, filled moſt of the provinces of Europe with blood and ſlaughter.

The latter were, according to Ammianus Marcellinus, a ſavage people, exceeding in cruelty the moſt barbarous nations. They began to practiſe their cruelty, ſays Jornandes, upon their own children the very firſt day they come into the world, cutting and mangling the cheeks of their males, to prevent the growth of hair, which they muſt have looked upon, contrary to the ſentiments of other nations, as unbecoming and unmanly. They had, perhaps, in this practice another view, which Jornandes ſeems to inſinuate elſewhere, viz. to ſtrike terror into the enemy with their countenances, thus deformed and covered with ſcars. They had no other food but roots and raw meat, being quite unacquainted with the uſe of fire, and no houſes at all, not even huts; but lived conſtantly expoſed to the air in the woods, and on the mountains, where, from their infancy, they were inured to hunger, thirſt, and all manner of hardſhips: nay, they had ſuch an averſion to houſes, which they called the *ſepulchres of the living*, that, when they went into other countries, they could hardly be prevailed upon to come within the walls of any houſe, not thinking themſelves ſafe when ſhut up and covered. They uſed even to eat and ſleep on horſeback, ſcarce ever diſmounting; which, in all likelihood, induced Zoſimus to write, that the Hunns could not walk. They covered their nakedneſs with goats ſkins, or the ſkins of a ſort of mice ſewed together. Day and night were indifferent to them, as to buying, ſelling, eating, and drinking. They had no law, nor any kind of religion; but complied with their inclinations, whatever they prompted them to, without the leaſt reſtraint, or diſtinction between good and evil. In war, they began the battle with great fury, and an hideous noiſe: but, if they met with a vigorous oppoſition, their fury began to abate after the firſt onſet; and, when once put in diſorder, they never rallied, but fled in the utmoſt confuſion. They were quite unacquainted with the art of beſieging towns; and authors obſerve, that they never attacked the enemy's camp. They were a faithleſs nation, and thought themſelves no longer bound by the moſt ſolemn treaties, than they found their advantage in obſerving them. Hence we often find them, upon the leaſt proſpect of obtaining more advantageous conditions, breaking into the Roman empire, in defiance of the moſt ſolemn oaths and engagements. Several corps of Huns, after their coming into Europe, ſerved in the Roman armies againſt the Goths and other barbarous nations; nay, they were ready, for hire, to fight againſt each other, being blind to every other regard and conſideration.

HUNGERFORD, a town of Berkſhire, in England, ſeated on the river Kennet, in a low and watery ſoil, and noted for the beſt trouts and craw-fiſh in all England. W. Long. 1. 35. N. Lat. 26.

HUNNINGUEN, a town of Germany, in Alſace, and in Suntgaw, ſubject to the French; ſeated on the Rhine, and fortified by Vauban. E. Long. 11. 40. N. Lat. 47. 42.

HUNTING, the exerciſe or diverſion of purſuing four-footed beaſts of game. See the article GAME.

Four-footed beaſts are hunted in the fields, woods, and thickets, and that both with guns and greyhounds.

Birds, on the contrary, are either ſhot in the air, or taken with nets and other devices, which exerciſe is called *fowling*; or they are purſued and taken by birds of prey, which is called *hawking*. See the articles FOWLING, HAWKING, FALCONRY, SHOOTING, BIRD-*Catching*,, and DECOY.

The purſuing of four-footed beaſts, as badgers, deer, does, roebucks, foxes, hares, &c. properly termed *hunting*, is a noble exerciſe, ſerving not only to recreate the mind, but to ſtrengthen the limbs, whet the ſtomach, and cheer the ſpirits. However, all ſorts of weather are not proper for hunting; high winds and rain being great obſtacles to it. In the ſpring ſeaſon, this diverſion ſhould be taken in the night-time with nets; in the ſummer, the morning is the moſt proper time for it; and in the winter, it ſhould only be followed from nine in the morning till two in the afternoon. The general rule is, that you place yourſelf under the wind, where you deſign to wait for game.

F. de Launay, profeſſor of the French laws, has an expreſs treatiſe of hunting.—From thoſe words of God to Adam, Gen. i. 26, and 28. and to Noah, Gen. ix. 2, 3. hunting was conſidered as a right devolved or made over to man; and the following ages appear to have been of the ſame ſentiment. Accordingly we find, that among the more civilized nations, as the Perſians, Greeks, and Romans, it made one of their genteeler diverſions; and as to the wilder and more barbarous, it ſerved them with food and neceſſaries.—The Roman juriſprudence, which was formed on the manners of the firſt ages, made a law of it, and eſtabliſhed it as a maxim, that as the natural right of things which have no maſter belongs to the firſt poſſeſſor, wild beaſts, birds, and fiſhes, are the property of whomſoever can take them firſt.

But the northern nations of barbarians who over-ran the Roman empire, bringing with them a ſtronger taſte for the diverſion, and the people being now poſſeſſed of other and more eaſy means of ſubſiſtence from the lands and poſſeſſions of thoſe they had vanquiſhed, their chiefs and leaders began to appropriate the right of hunting, and, inſtead of a natural right, to make it a royal one.—Thus it continues to this day; the right of hunting, among us, belonging only to the king, and thoſe who derive it from him.

The hunting uſed by the ancients, was much like that now practiſed for the rein-deer; which is ſeldom hunted at force, or with hounds; but only drawn with a blood-hound, and foreſtalled with nets and engines. Thus did they with all beaſts; whence a dog is never commended by them for opening, before he has diſcovered where the beaſt lies. Hence, they were not in any manner curious as to the muſic of their hounds, or the compoſition of their kennel or pack, either for deepneſs, loudneſs, or ſweetneſs of cry, which is a principal point in the hunting of our days.—Their huntſmen, indeed, were accuſtomed to ſhout and make a great noiſe, as Virgil obſerves in the third of his Georgics: *Ingentem clamore premes ad retia cervum.* But that confuſion was only to bring the deer to the nets laid for him.

The Sicilian way of hunting had ſomething in it very extraordinary.—The nobles or gentry being informed which way a herd of deer paſſed, gave notice to one another, and appointed a meeting; every one bringing with him a croſs-bow or long-bow, and a bundle of ſtaves ſhod with iron, the heads bored, with a cord paſſing through them all: thus provided, they came to the herd, and, caſting themſelves about in a large ring, ſurrounded the deer.—Then, each taking his ſtand, unbound his faggot, ſet up his ſtake, and tied the end of the cord to that of his next neighbour, at the diſtance of ten foot from one another.—Then taking feathers, died in crimſon, and faſtened on a thread, they tied them to the cord; ſo that with the leaſt breath of wind, they would whirl round.—Which done, the perſons who kept the ſtands withdrew, and hid themſelves in the next covert. Then the chief ranger entering within the line with hounds to draw after the herd, rouſed the game with their cry; which flying towards the line, were turned off, and, ſtill gazing on the ſhaking and ſhining feathers, wandered about as if kept in with a real wall or pale. The ranger ſtill purſued, and calling every perſon by name, as he paſſed by their ſtand, commanded him to ſhoot the firſt, third, or ſixth, as he pleaſed; and if any of them miſſed, or ſingled out another than that aſſigned him, it was counted a grievous diſgrace. By ſuch means, as they paſſed by the ſeveral ſtations, the whole herd was killed by the ſeveral hands. *Pier. Hieroglyphic.* lib. vii. cap. 6.

The gentlemen and maſters of the ſport have invented a new ſet of terms which may be called the *hunting language*. The principal are thoſe which follow:

1. For beaſts as they are in company.—They ſay, a *herd* of harts, and all manner of deer. A *bey* of roes. A *ſounder* of ſwine. A *rout* of wolves. A *richeſs* of martens. A *brace* or *leaſh* of bucks, foxes, or hares. A *couple* of rabbits or coneys.

2. For their lodging.—A hart is ſaid to *harbour*. A buck *lodges*. A roe *beds*. A hare *ſeats* or *forms*. A coney *ſits*. A fox *kennels*. A marten *trees*. An otter *watches*. A badger *earths*. A boar *couches*.—Hence, to expreſs their diſlodging, they ſay, *Unharbour* the hart. *Rouſe* the buck. *Start* the hare. *Bolt* the coney. *Unkennel* the fox. *Tree* the marten. *Vent* the otter. *Dig* the badger. *Rear* the boar.

3. For their noiſe at rutting time.—A hart *belleth*. A buck *growns* or *troats*. A roe *bellows*. A hare *beats* or *taps*. An otter *whines*. A boar *freams*. A fox *barks*. A badger *ſhrieks*. A wolf *howls*. A goat *rattles*.

4. For their copulation.—A hart or buck goes to *rut*. A roe goes to *tourn*. A boar goes to *brim*. A hare or coney goes to *buck*. A fox goes to *clickitting*. A wolf goes to *match* or *make*. An otter *hunteth* for his kind.

5. For the footing and treading.—Of a hart, we ſay the *ſlot*. Of a buck, and all fallow-deer, the *view*. Of all deer, if on the graſs and ſcarce viſible, the *foiling*. Of a fox, the *print*; and of other the like vermin, the *footing*. Of an otter, the *marks*. Of a boar, the *track*. The hare, when in open field, is ſaid to *ſore*; when ſhe winds about to deceive the hounds, ſhe *doubles*; when ſhe beats on the hard highway, and her footing comes to be perceived, ſhe *pricketh*: in ſnow, it is called the *trace* of the hare.

6. The tail of a hart, buck, or other deer, is called the *ſingle*. That of a boar, the *wreath*. Of a fox, the *bruſh* or *drag*; and the tip at the end, the *chape*. Of a wolf, the *ſtern*. Of a hare and coney, the *ſcut*.

7. The ordure or excrement of a hart and all deer, is called *fewmets* or *fewmiſhing*. Of a hare, *crotiles* or *crotiſing*. Of a boar, *leſſes*. Of a fox, the *billiting*; and of other the like vermin, the *fuants*. Of an otter, the *ſpraints*.

8. As to the attire of deer, or parts thereof, thoſe of a ſtag, if perfect, are the *bur*, the *pearls*, the little *knobs* on it, the *beam*, the *gutters*, the *antler*, the *ſur-antler*, *royal*, *ſur-royal*, and all at top the *croches*. Of the buck, the *bur*, *beam*, *brow-antler*, *black-antler*, *advancer*, *palm*, and *ſpellers*. If the croches grow in the form of a man's hand, it is called a *palmed head*. Heads bearing not above three or four, and the croches placed aloft, all of one height, are called *crowned heads*. Heads having double croches, are called *forked heads*, becauſe the croches are planted on the top of the beam like forks.

9. They ſay, a *litter* of cubs, a *neſt* of rabbits, a ſquirrel's *dray*.

10. The terms uſed in reſpect of the dogs, &c. are as follow.—Of gre-hounds, two make a *brace*; of hounds, a *couple*. Of gre-hounds, three make a *leaſh*; of hounds, a *couple* and *half*.—They ſay, *let ſlip* a gre-hound; and, *caſt off* a hound. The ſtring wherein a gre-hound is led, is called a *leaſh*; and that of a hound, a *lyome*. The gre-hound has his *collar*, and the hound his *couples*. We ſay a *kennel* of hounds, and a *pack* of beagles.

HUNTING, as practiſed among us, is chiefly performed with dogs; of which we have various kinds, accommodated to the various kinds of game, as *hounds*, *gre-hounds*, *blood-hounds*, *terriers*, &c. See CANIS, HOUND, &c.

In the kennels or packs they generally rank them under the heads of *enterers*, *drivers*, *flyers*, *tyers*, &c.

On ſome occaſions, nets, ſpears, and inſtruments for digging the ground, are alſo required: nor is the hunting-horn to be omitted.

The uſual chaſes among us, are the *hart*, *buck*, *roe*, *hare*, *fox*, *badger*, and *otter*.—We ſhall here give ſomething of what relates to each thereof: firſt premiſing an explanation of ſome general terms and phraſes, more immediately uſed in the progreſs of the ſport itſelf; what belongs to the ſeveral ſorts of game in particular, being reſerved for the reſpective articles.

When the hounds then, being caſt off, and finding the ſcent of ſome game, begin to open and cry; they are ſaid to *challenge*. When they are too buſy ere the ſcent be good, they are ſaid to *babble*. When too buſy where the ſcent is good, to *bawl*. When they run it endwiſe orderly, holding in together merrily, and making it good, they are ſaid to be in *full cry*. When they run along without opening at all, it is called *running mute*.

When ſpaniels open in the ſtring, or a gre-hound in the courſe, they are ſaid to *lapſe*.

When beagles bark and cry at their prey, they are ſaid to *yearn*.

When the dogs hit the ſcent the contrary way, they are ſaid to *draw amiſs*.

When they take freſh ſcent, and quit the former chaſe for a new one, it is called *hunting change*.

When they *hunt* the game by the heel or track, they are ſaid to *hunt counter*.

When the chaſe goes off, and returns again, traverſing the ſame ground, it is called *hunting the foil*.

When the dogs run at a whole herd of deer, inſtead of a ſingle one, it is called *running riot*.

Dogs ſet in readineſs where the game is expected to come by, and caſt off after the other hounds are paſsed, are called a *relay*. If they be caſt off ere the other dogs be come up, it is called a *vauntlay*.

When, finding where the chaſe has been, they make a proffer to enter, but return, it is called a *blemiſh*.

A leſſon on the horn to encourage the hounds, is named a *call*, or a *recheat*. That blown at the death of a deer, is called the *mort*. The part belonging to the dogs of any chaſe they have killed, is the *reward*. They ſay, *take off* a deer's ſkin; *ſtrip* or *caſe* a hare, fox, and all ſorts of vermin; which is done by beginning at the ſnout, and turning the ſkin over the ears down to the tail.

HUNTING is practiſed in a different manner, and with different apparatus, according to the nature of the beaſts which are hunted, a deſcription of whom may be found under their reſpective articles, *infra*.

With regard to the ſeaſons, that for hart and buck-hunting begins a fortnight after midſummer, and laſts till Holy-rood day; that for the hind and doe, begins on Holy-rood day, and laſts till Candlemas; that for fox-hunting begins at Chriſtmas, and holds till Lady-day; that for roe-hunting begins at Michaelmas, and ends at Chriſtmas; hare-hunting commences at Michaelmas, and laſts till the end of February; and where the wolf and boar are hunted, the ſeaſon for each begins at Chriſtmas, the firſt ending at Lady-day, and the latter at the Purification.

When the ſportſmen have provided themſelves with nets, ſpears, and a hunting-horn to call the dogs together, and likewiſe with inſtruments for digging the ground, the following directions will be of uſe to them in the purſuit of each ſort of game.

Badger-HUNTING. In doing this, you muſt ſeek the earths and burrows where he lies, and in a clear moonſhine night go and ſtop all the burrows, except one or two, and therein place ſome ſacks, faſtened with drawing ſtrings, which may ſhut him in as ſoon as he ſtraineth the bag. Some uſe no more than to ſet a hoop in the mouth of the ſack, and ſo put it into the hole; and as ſoon as the badger is in the ſack and ſtraineth it, the ſack ſlippeth off the hoop and follows him into the earth, ſo he lies tumbling therein till he is taken. Theſe ſacks or bags being thus ſet, caſt off the hounds, beating about all the woods, coppices, hedges, and tufts, round about, for the compaſs of a mile or two; and what badgers are abroad, being alarmed by the hounds, will ſoon betake themſelves to their burrows: and, obſerve that he who is placed to watch the ſacks, muſt ſtand cloſe and upon a clear wind; otherwiſe the badger will diſcover him, and will immediately fly ſome other way into his burrow. But if the hounds can encounter him before he can take his ſanctuary, he will then ſtand at a bay like a boar, and make good ſport, grievouſly biting and clawing the dogs, for the manner of their fighting is lying on their backs, uſing both teeth and nails; and by blowing up their ſhins defend themſelves againſt all bites of the dogs, and blows of the men upon their noſes as aforeſaid. And for the better preſervation of your dogs, it is good to put broad collars about their necks made of greys ſkins.

When the badger perceives the terriers to begin to yearn him in his burrow, he will ſtop the hole betwixt him and the terriers, and if they ſtill continue baying, he will remove his couch into another chamber or part of the burrow, and ſo from one to another, barricading the way before them, as they retreat, until they can go no further. If you intend to dig the badger out of his burrow, you muſt be provided with the ſame tools as for digging out a fox; and beſides, you ſhould have a pail of water to refreſh the terriers, when they come out of the earth to take breath and cool themſelves. It will alſo be neceſſary to put collars of bells about the necks of your terriers, which making a noiſe may cauſe the badger to bolt out. The tools uſed for digging out of the badger, being troubleſome to be carried on mens backs, may be brought in a cart. In digging, you muſt conſider the ſituation of the ground, by which you may judge where the chief angles are; for elſe, inſtead of advancing the work, you will hinder it. In this order you may beſiege them in their holds, or caſtles; and may break their platforms, parapets, caſemates, and work to them with mines and countermines until you have overcome them.

Having taken a live and luſty badger, if you would make ſport, carry him home in a ſack and turn him out in your court-yard, or ſome other incloſed place, and there let him be hunted and worried to death by your hounds.

There are the following profits and advantages which accrue by killing this animal. Their fleſh, blood, and greaſe, though they are not good food, yet are very uſeful for phyſicians and apothecaries for oils, ointments, ſalves, and powders for ſhortneſs of breath, the cough of the lungs, for the ſtone, ſprained ſinews, colt-aches, &c. and the ſkin being well dreſſed, is very warm and good for old people who are troubled with paralytic diſtempers.

Buck-HUNTING. Here the ſame hounds and methods are uſed as in running the ſtag; and, indeed, he that can hunt a hart or ſtag well, will not hunt a buck ill.

In order to facilitate the chace, the game-keeper commonly ſelects a fat buck out of the herd, which he ſhoots in order to maim him, and then he is run down by the hounds.

As to the method of hunting the buck. The company generally go out very early for the benefit of the morning. Sometimes they have a deer ready lodged; if not, the coverts are drawn till one is rouſed: or ſometimes in a park a deer is pitched upon, and forced from the herd, then more hounds are laid on to run the chace. If you come to be at a fault, the old ſtaunch hounds are only to be relied upon till you recover him again: if he be ſunk, and the hounds thruſt him up, it is called an *imprime*, and the company all ſound a recheat; when he is run down, every one ſtrives to get in to prevent his being torn by the hounds, fallow-deer ſeldom or never ſtanding at bay.

He that firſt gets in, cries hoo-up, to give notice that he is down and blows a death. When the company are all come in, they paunch him, and reward the hounds; and generally the chief perſon of quality amongſt them *takes ſay*, that is, cuts his belly open, to ſee how fat he is. When this is done, every one has a chop at his neck; and the head being cut off, is ſhewed to the hounds, to encourage them to run only at male deer, which they ſee by the horns, and to teach them to bite only at the head: then the company all ſtanding in a ring, one blows a ſingle death; which being done, all blow a double recheat, and ſo conclude the chace with a general halloo of hoo-up, and depart the field to their ſeveral homes, or to the place of meeting; and the huntſman, or ſome other, hath the deer caſt croſs the buttocks of his horſe, and ſo carries him home.

Fox-Hunting makes a very pleaſant exerciſe, and is either above or below ground.

1. Above ground. To hunt a fox with hounds, you muſt draw about groves, thickets, and buſhes near villages. When you find one, it will be neceſſary to ſtop up his earth the night before you deſign to hunt, and that about midnight; at which time he is gone out to prey: this may be done by laying two white ſticks acroſs in his way, which he will imagine to be ſome gin or trap laid for him; or elſe they may be ſtopped up with black thorns and earth mixed together.

At firſt, only caſt off your ſure finders; and as the drag mends, add more as you dare truſt them. The hound firſt caſt off ſhould be old and ſtaunch; and when you hear ſuch a hound call on merrily, you may caſt off ſome others to him; and when they run it on the full cry, caſt off the reſt: thus you ſhall complete your paſtime. The words of comfort are the ſame which are uſed in other chaces. The hounds ſhould be left to kill the fox themſelves, and to worry and tear him as much as they pleaſe: ſome hounds will eat him with eagerneſs.

When he is dead, hang him at the end of a pike-ſtaff, and halloo in all your hounds to bay him: but reward them with nothing belonging to the fox; for it it not good, neither will the hounds in common eat it.

2. Under ground. In caſe a fox does ſo far eſcape as to earth, countrymen muſt be got together with ſhovels, ſpades, mattocks, pickaxes, &c. to dig him out, if they think the earth not too great. They make their earths as near as they can in ground that is hard to dig, as in clay, ſtony ground, or amongſt the roots of trees; and their earths have commonly but one hole, and that is ſtraight a long way in before you come at their couch. Sometimes craftily they take poſſeſſion of a badger's old burrow, which hath a variety of chambers, holes, and angles.

Now to facilitate this way of hunting the fox, the huntſman muſt be provided with one or two terriers to put into the earth after him, that is, to fix him into an angle; for the earth often conſiſts of many angles: the uſe of the terrier is to know where he lies; for as ſoon as he finds him, he continues baying or barking, ſo that which way the noiſe is heard that way dig to him. Your terriers muſt be garniſhed with bells hung in collars, to make the fox bolt the ſooner; beſides, the collars will be ſome ſmall defence to the terriers.

The inſtruments to dig withal are theſe: a ſharp-pointed ſpade, which ſerves to begin the trench where the ground is hardeſt and broader tools will not ſo well enter; the round hollowed ſpade, which is uſeful to dig among roots, having very ſharp edges; the broad flat ſpade to dig withal, when the trench has been pretty well opened, and the ground ſofter; mattocks and pickaxes to dig in hard ground, where a ſpade will do but little ſervice; the coal-rake to cleanſe the hole, and to keep it from ſtopping up; clamps, wherewith you may take either fox or badger out alive to make ſport with afterwards. And it would be very convenient to have a pail of water to refreſh your terriers with, after they are come out of the earth to take breath.

Hare-Hunting. As, of all chaces, the hare makes the greateſt paſtime, ſo it gives no little pleaſure to ſee the craft of this ſmall animal for her ſelf-preſervation. If it be rainy, the hare uſually takes to the high-ways; and if ſhe come to the ſide of a young grove, or ſpring, ſhe ſeldom enters, but ſquats down till the hounds have over-ſhot her; and then ſhe will return the very way ſhe came, for fear of the wet and dew that hangs on the boughs. In this caſe, the huntſman ought to ſtay an hundred paces before he comes to the wood-ſide, by which means he will perceive whether ſhe return as aforeſaid; which if ſhe do, he muſt halloo in his hounds, and call them back; and that preſently, that the hounds may not think it the counter ſhe came firſt.

The next thing that is to be obſerved, is the place where the hare ſits, and upon what wind ſhe makes her form, either upon the north or ſouth wind; ſhe will not willingly run into the wind, but run upon aſide, or down the wind; but if ſhe form in the water, it is a ſign ſhe is foul and meaſled: if you hunt ſuch a one, have a ſpecial regard all the day to the brook-ſides; for there, and near plaſhes, ſhe will make all her croſſings, doublings, &c.

Some hares have been ſo crafty, that as ſoon as they have heard the ſound of a horn, they would inſtantly ſtart out of their form, though it was at the diſtance of a quarter of a mile, and go and ſwim in ſome pool, and reſt upon ſome ruſh-bed in the midſt of it; and would not ſtir from thence till they have heard the ſound of the horn again, and then have ſtarted out again, ſwimming to land, and have ſtood up before the hounds four hours before they could kill them, ſwimming and uſing all ſubtilties and croſſings in the water. Nay, ſuch is the natural craft and ſubtilty of a hare, that ſometimes, after ſhe has been hunted three hours, ſhe will ſtart a freſh hare, and ſquat in the ſame form. Others having been hunted a conſiderable time, will creep under the door of a ſheep-cot, and hide themſelves among the ſheep; or, when they have been hard hunted, will run in among a flock of ſheep, and will by no means be gotten out from among them, till the hounds are coupled up, and the ſheep driven into their pens. Some of them (and that ſeems ſomewhat ſtrange,) will take the ground like a coney, and that is called *going to the vault*. Some hares will go up one ſide of the hedge, and come down the other, the thickneſs of the hedge being the only diſtance between the courſes. A hare that has been ſorely hunted, has got upon a quickſet hedge, and ran a good way upon the top thereof, and then leapt off upon the ground. And they will frequently betake themſelves to furz-buſhes, and will leap from one to the other, whereby the hounds are frequently in default.

Having found where a hare hath relieved in ſome paſture or corn-field, you muſt then conſider the ſeaſon of the year, and what weather it is: for if it be in the ſpring-time or ſummer, a hare will not then ſet in buſhes, becauſe they are frequently infeſted with piſmires, ſnakes, and adders; but will ſet in corn-fields, and open places. In the winter-time, they ſet near towns and villages, in tufts of thorns and brambles, eſpecially when the wind is northerly or ſoutherly. According to the ſeaſon and nature of the place where the hare is accuſtomed to ſit, there beat with your hounds, and ſtart her; which is much better ſport than trayling of her from her relief to her form.

After the hare has been ſtarted and is on foot, then ſtep in where you ſaw her paſs, and halloo in your hounds, until they have all undertaken it and go on with it in full cry: then recheat to them with your horn, following fair and ſoftly at firſt, making not too much noiſe either with horn or voice; for at the firſt, hounds are apt to overſhoot the chace through too much heat. But when they have run the ſpace of an hour, and you ſee the hounds are well in with it, and ſtick well upon it, then you may come in nearer with the hounds, becauſe by that time their heat will be cooled, and they will hunt more ſoberly. But above all things, mark the firſt doubling, which muſt be your direction for the whole day; for all the doublings that ſhe ſhall make afterwards will be like the former; and according to the policies that you ſhall ſee her uſe, and the place where you hunt, you muſt make your compaſſes great or little, long or ſhort, to help the defaults, always ſeeking the moiſteſt and moſt commodious places for the hounds to ſcent in.

To conclude: Thoſe who delight in hunting the hare, muſt riſe early, leſt they be deprived of the ſcent of her foot-ſteps.

Hart or Stag Hunting. Geſner, ſpeaking of hart-hunting, obſerves, that this wild, deceitful, and ſubtile beaſt frequently deceives its hunter, by windings and turnings. Wherefore, the prudent hunter muſt train his dogs with words of art, that he may be able to ſet them on and take them off again at pleaſure.

Firſt of all, he ſhould encompaſs the beaſt in her own layer, and ſo unharbour her in the view of the dogs, that ſo they may never loſe her ſlot or footing. Neither muſt he ſet upon every one, either of the herd or thoſe that wander ſolitary alone, or a little one; but partly by ſight, and partly by their footing and fumets, make a judgment of the game, and alſo obſerve the largeneſs of his layer.

The huntſman, having made theſe diſcoveries in order to the chace, takes off the couplings of the dogs; and ſome on horſeback, others on foot, follow the cry, with the greateſt art, obſervation, and ſpeed; remembering and intercepting him in his ſubtile turnings and headings; with all agility leaping hedges, gates, pales, ditches; neither fearing thorns, down hills, nor woods, but mounting freſh horſe, if the firſt tire. Follow the largeſt head of the whole herd, which muſt be ſingled out of the chace; which the dogs perceiving, muſt follow; not following any other. The dogs are animated to the ſport by the winding of horns, and the voices of the huntſmen. But ſometimes the crafty beaſt ſends forth his little ſquire to be ſacrificed to the dogs and hunters, inſtead of himſelf, lying cloſe the mean time. In this caſe, the huntſman muſt ſound a retreat, break off the dogs, and take them in, that is, leam them again, until they be brought to the fairer game; which riſeth with fear, yet ſtill ſtriveth by flight, until he be wearied and breathleſs. The nobles call the beaſt a *wiſe hart*, who, to avoid all his enemies, runneth into the greateſt herds, and ſo brings a cloud of error on the dogs, to obſtruct their farther purſuit; ſometimes alſo bearing ſome of the herd into his footings, that ſo he may the more eaſily eſcape, by amuſing the dogs. Afterwards he betakes himſelf to his heels again, ſtill running with the wind, not only for the ſake of refreſhment, but alſo becauſe by that means he can the more eaſily hear the voice of his purſuers whether they be far from him or near to him. But at laſt being again diſcovered by the hunters and ſagacious ſcent of the dogs, he flies into the herds of cattle, as cows, ſheep, &c. leaping on a cow or ox, laying the fore-parts of his body thereon, that ſo touching the earth only with his hinder feet, he may leave a very ſmall or no ſcent at all behind for the hounds to diſcern. But their uſual manner is, when they ſee themſelves hard beſet and every way intercepted, to make force at their enemy with their horns, who firſt comes upon him, unleſs they be prevented by ſpear or ſword. When the beaſt is ſlain, the huntſman with his horn windeth the fall of the beaſt; and then the whole company comes up, blowing their horns in triumph for ſuch a conqueſt; among whom, the ſkilfulleſt opens the beaſt, and rewards the hounds with what properly belongs to them, for their future encouragement; for which purpoſe the huntſmen dip bread in the ſkin and blood of the beaſt, to give to the hounds.

It is very dangerous to go in to a hart at bay; of which there are two ſorts, one on land and the other in water. Now if the hart be in a deep water, where you cannot well come at him, then couple up your dogs; for ſhould they continue long in the water, it would endanger their ſurbating or foundering. In this caſe, get a boat, and ſwim to him, with dagger drawn, or elſe with rope that has a nooſe, and throw it over his horns: for if the water be ſo deep that the hart ſwims, there is no danger in approaching him; otherwiſe you muſt be very cautious.

As to the land-bay, if a hart be burniſhed, then you muſt conſider the place; for if it be in a plain and open place, where there is no wood nor covert, it is dangerous and difficult to come in to him; but if he be on a hedge-ſide, or in a thicket, then, while the hart is ſtaring on the hounds, you may come ſoftly and covertly behind him, and cut his throat. If you miſs your aim, and the hart turn head upon you, then take refuge at ſome tree; and when the hart is at bay, couple up your hounds; and when you ſee the hart turn head to fly, gallop in roundly to him, and kill him with your ſword.

Directions at the Death of a Hart or Buck. The firſt ceremony, when the huntſman comes in to the death of a deer, is to cry "ware haunch," that the hounds may not break in to the deer; which being done, the next is the cutting his throat, and there blooding the youngeſt hounds, that they may the better love a deer, and learn to leap at his throat: then the mort having been blown, and all the company come in, the beſt perſon who hath not taken ſay before, is to take up the knife that the keeper or huntſman is to lay acroſs the belly of the deer, ſome holding by the fore-legs, and the keeper or huntſman drawing down the pizzle, the perſon who takes ſay, is to draw the edge of the knife leiſurely along the middle of the belly, beginning near the briſket, and drawing a little upon it, enough in the length and depth to diſcover how fat the deer is; then he that is to break up the deer, firſt ſlits the ſkin from the cutting of the throat downwards, making the arber, that ſo the ordure may not break forth, and then he paunches him, rewarding the hounds with it.

In the next place, he is to preſent the ſame perſon who took ſay, with a drawn hanger, to cut off the head of the deer. Which being done, and the hounds rewarded, the concluding ceremony is, if it be a ſtag, to blow a triple mort; and if a buck, a double one; and then all who have horns, blow a recheat in concert, and immediately a general whoop, whoop.

Otter-Hunting is performed with dogs, and alſo with a ſort of inſtruments called *otter-ſpears;* with which when they find themſelves wounded, they make to land, and fight with the dogs, and that moſt furiouſly, as if they were ſenſible that cold water would annoy their green wounds.

There is indeed craft to be uſed in hunting them; but they may be catched in ſnares under water, and by river-ſides: but great care muſt be taken, for they bite ſorely and venomouſly; and if they happen to remain long in the ſnare, they will not fail to get themſelves free by their teeth.

In hunting them, one man muſt be on one ſide of the river, and another on the other, both beating the banks with dogs; and the beaſt not being able to endure the water long, you will ſoon diſcover if there be an otter or not in that quarter; for he muſt come out to make his ſpraints, and in the night ſometimes to feed on graſs and herbs.

If any of the hounds finds out an otter, then view the ſoft grounds and moiſt places, to find out which way he bent his head: if you cannot diſcover this by the marks, you may partly perceive it by the ſpraints; and then follow the hounds, and lodge him as a hart or deer. But if you do not find him quickly, you may imagine he is gone to couch ſomewhere farther off from the river; for ſometimes they will go to feed a conſiderable way from the place of their reſt, chooſing rather to go up the river than down it. The perſons that go a-hunting otters, muſt carry their ſpears, to watch his vents, that being the chief advantage; and if they perceive him ſwimming under water, they muſt endeavour to ſtrike him with their ſpears, and if they miſs, muſt purſue him with the hounds, which, if they be good and perfectly entered, will go chanting and trailing along by the river ſide, and will beat every root of a tree, and oſier-bed, and tuft of bulruſhes; nay, they will ſometimes take water, and bait the beaſt, like a ſpaniel, by which means he will hardly eſcape.

Roe-buck Hunting is performed divers ways, and very eaſily in the woods.

When chaſed, they uſually run againſt the wind, becauſe the coolneſs of the air refreſhes them in their courſe; therefore the huntſmen place their dogs with the wind: they uſually, when hunted, firſt take a large ring, and afterwards hunt the hounds. They are alſo often taken by counterfeiting their voice, which a ſkilful huntſman knows how to do by means of a leaf in his mouth. When they are hunted, they turn much and often, and come back upon the dogs directly; and when they can no longer endure, they take ſoil, as the hart does, and will hang by a bough in ſuch a manner, that nothing of them ſhall appear above the water but their ſnout, and they will ſuffer the dogs to come juſt upon them before they will ſtir.

The veniſon of a roe-buck is never out of ſeaſon, being never fat, and therefore they are hunted at any time; only that ſome favour ought to be ſhown the doe while ſhe is big with fawn, and afterwards till her fawn is able to ſhift for himſelf; but ſome roe-does have been killed with five fawns in their bellies.

He is not called, by the ſkilful in the art of hunting, a *great* roe-buck, but a *fair roe-buck;* the herd of them is called a *bevy:* and if he hath not bevy-greaſe upon his tail, when he is broken up, he is more fit to be dog's meat than man's meat. The hounds muſt be rewarded with the bowels, the blood, and feet ſlit aſunder, and boiled all together; this is more properly called a *doſe* than a *reward*.

Hunting-*Match*. The firſt thing that is to be conſidered by one who deſigns to match his horſe for his own advantage, and his horſe's credit, is not to flatter himſelf with the opinion of his horſe, by fancying that he is a ſwift, when he is but a ſlow galloper; and that he is a whole-running-horſe (that is, that he will run four miles without a ſob at the height of his ſpeed) when he is not able to run two or three. Very probably ſome gentlemen are led into this error, by their being miſtaken in the ſpeed of their hounds, who, for want of trying them againſt other dogs that have been really fleet, have ſuppoſed their own to be ſo, when, in reality, they are but of a middling ſpeed: and becauſe their horſe, when trained, was able to follow them all day, and upon any hour, to command them upon deep as well as light earths, have therefore made a falſe concluſion, that their horſe is as ſwift as the beſt; but, upon trial againſt a horſe that has been rightly trained after hounds that were truly fleet, have bought their experience perhaps full dear. Therefore it is adviſable for all lovers of hunting to procure two or three couple of tried hounds, and once or twice a-week to follow after them at rain-ſcent; and when he is able to top them on all ſorts of earth, and to endure heats and colds ſtoutly, then he may better rely on his ſpeed and toughneſs.

That horſe which is able to perform a hare-chaſe of five or ſix miles briſkly and courageouſly, till his body be as it were bathed in ſweat; and then, after the hare has been killed, in a nipping froſty morning, can endure to ſtand till the ſweat be frozen on his back, ſo that he can endure to be pierced with the cold as well as the heat; and then, even in that extremity of cold, to ride another chaſe as briſkly and with as much courage as he did the former; that horſe which can thus endure heats and colds, is moſt valued by ſportſmen. Therefore, in order to make a judgment of the goodneſs of a horſe, obſerve him after the death of the firſt hare, if the chace has been any thing briſk: if, when he is cold, he ſhrinks up his body, and draws his legs up together, it is an infallible ſign of want of vigour and courage: the like may be done by the ſlackening of his girths after the firſt chace, and from the dulneſs of his teeth, and the dulneſs of his countenance, all which are true tokens of faintneſs and being tired; and ſuch a horſe is not to be relied on, in caſe of a wager.

Here it will not be improper to take notice of the way of making matches in former times, and the modern way of deciding wagers. The old way of trial was, by running ſo many train-ſcents after hounds, as was agreed upon between the parties concerned, and a bell-courſe, this being found not ſo uncertain, but more durable than hare-hunting; and the advantage conſiſted in having the trains led on earth moſt ſuitable to the qualifications of the horſes. But now others chuſe to hunt the hare till ſuch an hour, and then to run this wild-gooſe chace; a method of racing that takes its name from the manner of the flight of wild-geeſe, which is generally one after another; ſo the two horſes, after running of twelveſcore yards, had liberty, which horſe ſoever could get the leading, to ride what ground he pleaſed, the hindmoſt horſe being bound to follow him, within a certain diſtance agreed on by articles, or elſe to be whipped up by the triers or judges which rode by; and whichever horſe could diſtance the other, won the match.

But this chace, in itſelf very inhuman, was ſoon found to be a very deſtructive to good horſes, eſpecially when two good horſes were matched; for neither being able to diſtance the other, till both were ready to ſink under their riders through weakneſs, oftentimes the match was fain to be drawn and left undecided, though both the horſes were quite ſpoiled.

This brought up the cuſtom of train-ſcents, which afterwards was changed to three heats and a ſtraight courſe; and that the lovers of horſes might be encouraged to keep good ones, plates have been erected in many places in England. The fewer of theſe before you come to the courſe, if your horſe be fiery and mettled, the better; and the ſhorter the diſtance, the better. Alſo, above all things, be ſure to make your bargain to have the leading of the firſt train; and then make choice of ſuch grounds where your horſe may beſt ſhow his ſpeed, and the fleeteſt dogs you can procure: give your hounds as much law before you as your triers will allow, and then, making a looſe, try to win the match with a wind; but if you fail in this attempt, then bear your horſe, and ſave him for the courſe; but if your horſe be ſlow, but well-winded, and a true ſpurred nag, then the more train-ſcents you run before you come to the ſtraight courſe, the better. But here you ought to obſerve to gain the leading of the firſt train; which in this caſe you muſt lead upon ſuch deep earths, that it may not end near any light ground: for this is the rule received among horſemen, that the next train is to begin where the laſt ends, and the laſt train is to be ended at the ſtarting place of the courſe; therefore remember to end your laſt on deep earths, as well as the firſt.

HUNTINGDON, the county-town of Huntingdonſhire in England, ſeated upon an eaſy aſcent, on the north ſide of the river Ouſe. It was made a free borough by king John, conſiſting of a mayor, 12 aldermen, burgeſſes, &c. by whom the two members of parliament are choſen. It had anciently 15 pariſhes, and has now but two; in one of which, called *St John's*, Oliver Cromwell was born, in 1599. Here was formerly a caſtle, built by William the Conqueror, which afterwards belonged to David, a prince of Scotland, with the title of *earl;* but Henry VIII. gave it to George Haſtings, with the earldom annexed, in whoſe family it ſtill continues. It ſtands in the great north road; and has a bridge built of free-ſtone over the Ouſe, which is made navigable for ſmall veſſels as high as Bedford. It is the place where the aſſizes are kept, and where the county-jail ſtands. It has a good market-place, and ſeveral convenient inns, beſides a grammar-ſchool; and is very populous. W. Long. 0. 15. N. Lat. 52. 23.

HUNTINGDONSHIRE, a county of England, bounded on the ſouth by Bedfordſhire; on the weſt by Northamptonſhire, as alſo on the north; and by Cambridgeſhire on the eaſt. It is a good corn country; and abounds in paſtures, eſpecially on the eaſtern ſide, which is fenny. The reſt is diverſified by riſing hills and ſhady groves, and the river Ouſe waters the ſouthern part.

The air of this county is in moſt parts pleaſant and wholeſome, except among the fens and meres, though they are not ſo bad as the hundreds of Kent and Eſſex. The ſoil is fruitful, and produces great crops of corn, and the hilly parts afford a fit paſture for ſheep. They have great numbers of cattle; and plenty of water-fowl, fiſh, and turf for firing; which laſt is of great ſervice to the inhabitants, there being but little wood, though the whole county was a foreſt in the time of Henry II. The only river beſides the Ouſe is the Nen, which runs through Whittleſey Mere.

HU-QUANG, a province of the kingdom of China, in Aſia, which has a great river called *Yang*, and *Tſechiang*, which runs croſs it from eaſt to weſt. It is divided into the north and ſouth parts, the former of which contains eight cities of the firſt rank, and 60 of the ſecond and third; and the latter, ſeven of the firſt rank, and five of the ſecond and third. It is a flat, open country, watered every-where with brooks, lakes, and rivers, in which there are great numbers of fiſh. Here are plenty of wild-fowls; the fields nouriſh cattle without number, and the ſoil produces corn, and various kinds of fruits. There is gold found in the ſands of the rivers; and in the mines they have iron, tin, &c. In ſhort, there is ſuch a variety of all ſorts of commodities, that it is called *the magazine of the empire.*

HURA, the SAND-BOX-TREE; a genus of the monadelphia order, belonging to the monœcia claſs of plants. There is but one ſpecies, viz. the crepitans, a native of the Weſt-Indies. It riſes with a ſoft ligneous ſtem to the height of 24 feet, dividing into many branches, which abound with a milky juice, and have ſcars on their bark where the leaves have fallen off. The male-flowers come out from between the leaves upon foot-ſtalks three inches long; and are formed into a cloſe ſpike or column, lying over each other like the ſcales of fiſh. The female-flowers are ſituated at a diſtance from them; and have a long funnel-ſhaped tube ſpreading at the top, where it is cut into 12 reflexed parts. After the flower, the germen ſwells, and becomes a round compreſſed ligneous capſule, having 12 deep furrows, each being a diſtinct cell, containing one large round compreſſed ſeed. When the pods are ripe, they burſt with violence, and throw out their ſeeds to a conſiderable diſtance. It is propagated by ſeeds, raiſed on a hot-bed; and the plants muſt be conſtantly kept in a ſtove. The kernels are ſaid to be purgative, and ſometimes emetic.

HURDLES, in fortification, are made of twigs of willows or oſiers interwoven cloſe together, ſuſtained by long ſtakes. They are made in the figure of a long ſquare, the length being five or ſix feet, and the breadth three and an half. The cloſer they are wattled together, the better. They ſerve to render the batteries firm, or to conſolidate the paſſage over muddy ditches; or to cover traverſes and lodgements for the defence of the workmen againſt fire-works or ſtones thrown againſt them.

The Romans had a kind of military execution for mutineers, called *putting to death under the hurdle.* The manner of it was this: The criminal was laid at his length in a ſhallow water, under an hurdle, upon which was heaped ſtones, and ſo preſſed down till he was drowned.

HURDLES, in huſbandry, certain frames made either of ſplit timber, or of hazle-rods wattled together, to ſerve for gates in incloſures, or to make ſheep-folds, &c.

HURDS, or HORDS, of flax or hemp; the coarſer parts ſeparated in the dreſſings from the tear, or fine ſtuff. See FLAX.

HURL-BONE, in a horſe, a bone near the middle of the buttock, very apt to go out of its ſockets with a hurt or ſtrain.

HURON, a vaſt lake of North-America, ſituated between 84° and 89° W. Long. and between 43° and 46° of N. Lat. from whence the country contiguous to it is called *the country of the Hurons*, whoſe language is ſpoken over a great extent in the ſouthern parts of America.

HURRICANE, a general name for any violent ſtorm of wind; but which is commonly applied to thoſe ſtorms which happen in the warmer climates, and which greatly exceed the moſt violent ſtorms known in this country. The following deſcription of them is given in the *Account of the European ſettlements in America:* "It is in the rainy ſeaſon, principally in the month of Auguſt, more rarely in July and September, that they are aſſaulted by *hurricanes*, the moſt terrible calamity to which they are ſubject from the climate. This deſtroys, at one ſtroke, the labour of many years, and fruſtrates the moſt exalted hopes of the planter; and often juſt at the moment when he thinks himſelf out of the reach of fortune. It is a ſudden and violent ſtorm of wind, rain, thunder, and lightning; attended with a furious ſwelling of the ſea, and ſometimes with an earthquake; in ſhort, with every circumſtance which the elements can aſſemble that is terrible and deſtructive.

"Firſt, they ſee, as a prelude to the enſuing havock, whole fields of ſugar-canes whirled into the air, and ſcattered over the face of the country. The ſtrongeſt trees of the foreſt are torn up by the roots, and driven about like ſtubble. Their wind-mills are ſwept away in a moment. Their works, their fixtures, the ponderous copper-boilers and ſtills, of ſeveral hundred weight, are wrenched from the ground, and battered to pieces. Their houſes are no protection: the roofs are torn off at one blaſt, whilſt the rain, which in an hour riſes five feet, ruſhes in upon them with an irreſiſtible violence.

"There are ſigns, which the Indians of theſe iſlands taught our planters, by which they can prognoſticate the approach of a hurricane. It comes on either in the quarters, or at the full or change of the moon. If it will come on at the full moon, you being at the change, obſerve theſe ſigns. That day you will ſee the ſky very turbulent. You will obſerve the ſun more red than at other times. You will perceive a dead calm, and the hills clear of all thoſe clouds and miſts which uſually hover about them. In the clefts of the earth, and in the wells, you will hear a hollow rumbling ſound, like the ruſhing of a great wind. At night the ſtars ſeem much larger than uſual, and ſurrounded with a ſort of burs. The north-weſt ſky has a black and menacing look; and the ſea emits a ſtrong ſmell, and riſes into vaſt waves, often without any wind. The wind itſelf now forſakes its uſual ſteady eaſterly ſtream, and ſhifts about to the weſt; from whence it ſometimes blows, with intermiſſions, violently and irregularly, for about two hours at a time. You have the ſame ſigns at the full of the moon. The moon itſelf is ſurrounded with a great bur, and ſometimes the ſun has the ſame appearance."

Hurricanes produce a moſt dangerous agitation in the ſea, where the waves break and daſh againſt each other with aſtoniſhing fury. During their continuance, the veſſels which were anchored in the roads frequently cut their cables and put to ſea, where they drive at the mercy of the winds and waves, after having ſtruck their yards and top-maſts. Theſe deſtructive phænomena are now thought to ariſe from electricity, though the manner in which it acts in this caſe is by no means known. It ſeems probable, indeed, that not only hurricanes, but even the moſt gentle gales of wind, are produced by the action of the electric fluid; for which ſee the articles WIND, WHIRLWIND, &c.

HURST, HYRST, or HERST, are derived from the Saxon *hyrſt*, i. e. *a wood*, or *grove of trees*. There are many places in Kent, Suſſex, and Hampſhire, which begin and end with this ſyllable; and the reaſon may be, becauſe the great wood called *Andreſwald* extended through thoſe countries.

HURST-*Caſtle*, a fortreſs of Hampſhire in England, not far from Limington. It is ſeated on the extreme point of a neck of land which ſhoots into the ſea, towards the iſle of Wight, from which it is diſtant two miles.

HUSBAND, a man joined or contracted with a woman in marriage. See MARRIAGE.

HUSBANDRY, the buſineſs or employment of a farmer, or perſon who cultivates land. See AGRICULTURE.

HUSK, the ſame with what botaniſts call the *calix* or *cup* of a flower. See CALIX.

HUSO, in ichthyology. See ACCIPENSER.

HUSS (John), a celebrated divine and martyr, born at Huſſenitz in Bohemia, in 1376. He was liberally educated in the univerſity of Prague, and in in 1400 was made miniſter of the church of Bethlehem in that city. He adopted the opinions of Wickliffe, and preached with great zeal againſt the errors of the church of Rome; for which he was ſentenced to the ſtake by the council of Conſtance, in 1415. He was burned with much formality, after having been degraded; and his aſhes were thrown into the Rhine. His writings, which are numerous and learned, were collected into a body, on the invention of PRINTING.

HUSSARS, are the national cavalry of Hungary and Croatia. Their regimentals conſiſt in a rough furred cap, adorned with a cock's feather, (the officers either an eagle's, or a heron's;) a doublet, with a pair of breeches to which the ſtockings are faſtened, and yellow or red boots: beſides, they occaſionally wear a ſhort upper waiſtcoat edged with furs, and five rows of round metal-buttons; and in bad weather, a cloak. Their arms are a ſabre, carbine, and piſtols. They are irregular troops: hence, before beginning an attack, they lay themſelves ſo flat on the necks of their horſes, that it is hardly poſſible to diſcern their force; but, being come within piſtol-ſhot of the enemy, they raiſe themſelves with ſuch ſurpriſing quickneſs, and begin the fight with ſuch vivacity on every ſide, that, unleſs the enemy is accuſtomed to their method of engaging, it is very difficult for troops to preſerve their order. When a retreat is neceſſary, their horſes have ſo much fire, and are ſo indefatigable, their equipage ſo light, and themſelves ſuch excellent horſemen, that no other cavalry can pretend to follow them. They leap over ditches, and ſwim over rivers, with ſurpriſing facility. They never encamp, and conſequently are not burthened with any camp-equipage, ſaving a kettle and a hatchet to every ſix men. They always lie in the woods, out-houſes, or villages, in the front of the army. The emperor, queen of Hungary, and king of Pruſſia, have the greateſt number of troops under this name in their ſervice.

HUSSITES, the followers of John Huſs, who was burnt for hereſy. See HUSS.

It is evident in what the pretended hereſy of John Huſs and Jerome of Prague conſiſted, from the anſwer they made to the council, when they were admoniſhed to conform to the ſentiments of the church. "They were lovers (they ſaid) of the holy goſpel, and ſincere diſciples of Jeſus Chriſt: that the church of Rome, and all other churches in the world, were widely departed from the apoſtolical tradition; that the clergy ran after riches and pleaſures, lorded it over the people, affected the higheſt ſeats at entertainments, bred horſes and dogs; and the revenues of the church, which belonged to the poor members of Chriſt, were conſumed in vanity and wantonneſs: and that the prieſts were ignorant of the commands of God, or, if they did know them, paid but little regard to them." Undiſmayed by the fate of their leader, the Huſſites not only ſtuck to his doctrines, but, chooſing John Ziſca for their chief in Bohemia, they maintained a war for a long time againſt the emperor Sigiſmund with great ſucceſs; and Procopius Holy, another of their leaders, conducted them with equal courage. The Huſſites ſpread over all Bohemia and Hungary, and even Sileſia and Poland; and there are ſome remains of them ſtill ſubſiſting in all theſe parts. The followers of Huſs were alſo called *Calixtins*, *Taberites*, and *Bohemian Brethren*.

HUSTINGS (from the Saxon word *Huſtinge*, i. e. *concilium*, or *curia*), a court held in Guild-hall before the lord-mayor and aldermen of London, and reckoned the ſupreme court of the city. Here deeds may be inrolled, outlawries ſued out, and replevins and writs of error determined. In this court alſo is the election of aldermen, of the four members of parliament for the city, &c. This court is very ancient, as appears by the laws of Edward the Confeſſor. Some other cities have likewiſe had a court bearing the ſame name, as Wincheſter, York, &c.

HUSUM, a town of Denmark, in the duchy of Sleſwick, and capital of a bailiwick of the ſame name, with a ſtrong citadel, and a very handſome church. It is ſeated near the river Ow, on the German Sea; and is ſubject to the dukes of Holſtein-Gottorp. E. Long. 9. 5. N. Lat. 54. 55.

HUTCHESON (Dr Francis), a very elegant writer and excellent philoſopher, was the ſon of a diſſenting miniſter in the north of Ireland, and was born on the 8th of Auguſt 1694. He early diſcovered a ſuperior capacity; and having gone through a ſchool-education, began his courſe of philoſophy at an academy, whence he removed to the univerſity of Glaſgow, where he applied himſelf to all the parts of literature, in which his progreſs was ſuitable to his uncommon abilities.

He then returned to Ireland; and entering into the miniſtry, was juſt about to be ſettled in a ſmall congregation of diſſenters in the north of Ireland, when ſome gentlemen about Dublin, who knew his great abilities and virtues, invited him to take up a private academy there. He complied with the invitation, and met with much ſucceſs. He had been fixed but a ſhort time in Dublin, when his ſingular merits and accompliſhments made him generally known; and his acquaintance was ſought by men of all ranks, who had any taſte for literature, or any regard for learned men. The late lord viſcount Moleſworth is ſaid to have taken great pleaſure in his converſation, and to have aſſiſted him with his criticiſms and obſervations upon his "Inquiry into the ideas of beauty and virtue," before it came abroad. He received the ſame favour from Dr Synge, lord biſhop of Elphin, with whom he alſo lived in great friendſhip. The firſt edition of this performance came abroad without the author's name, but the merit of it would not ſuffer him to be long concealed. Such was the reputation of the work, and the ideas it had raiſed of the author, that lord Granville, who was then lord lieutenant of Ireland, ſent his private ſecretary to inquire at the bookſeller's for the author; and when he could not learn his name, he left a letter to be conveyed to him: in conſequence of which he ſoon became acquainted with his

Hutcheſon,
Hutchinſon

his excellency, and was treated by him, all the time he continued in his government, with diſtinguiſhing marks of familiarity and eſteem.

From this time his acquaintance began to be ſtill more courted by men of diſtinction either for ſtation or literature in Ireland. Archbiſhop King, the author of the celebrated book *De origine mali*, held him in great eſteem; and the friendſhip of that prelate was of great uſe to him in ſcreening him from two ſeveral attempts made to proſecute him, for daring to take upon him the education of youth, without having qualified himſelf by ſubſcribing the eccleſiaſtical canons, and obtaining a licence from the biſhop. He had alſo a large ſhare in the eſteem of the primate Bolter, who through his influence made a donation to the univerſity of Glaſgow of a yearly fund for an exhibitioner to be bred to any of the learned profeſſions. A few years after his "Inquiry into the ideas of Beauty and Virtue," his "Treatiſe on the Paſſions" was publiſhed: both theſe works have been often reprinted; and always admired, both for the ſentiment and language, even by thoſe who have not aſſented to the philoſophy of them, nor allowed it to have any foundation in nature. About this time he wrote ſome philoſophical papers, accounting for laughter, in a different way from Hobbes, and more honourable to human nature: which papers were publiſhed in the collection called *Hibernicus's Letters*.

After he had taught in a private academy at Dublin for ſeven or eight years with great reputation and ſucceſs, he was called, in the year 1729, to Scotland, to be a profeſſor of philoſophy in the univerſity of Glaſgow. Several young gentlemen came along with him from the academy, and his high reputation drew many more thither both from England and Ireland. Here he ſpent the remainder of his life in a manner highly honourable to himſelf, and ornamental to the univerſity of which he was a member. His whole time was divided between his ſtudies and the duties of his office; except what he allotted to friendſhip and ſociety. A firm conſtitution and a pretty uniform ſtate of good health, except ſome few ſlight attacks of the gout, ſeemed to promiſe a longer life; yet he did not exceed the 53d year of his age. He was married, ſoon after his ſettlement in Dublin, to Mrs Mary Wilſon a gentleman's daughter in the county of Langford; by whom he left behind him one ſon, Francis Hutcheſon, doctor of medicine. By this gentleman was publiſhed, from the original manuſcript of his father, "A Syſtem of Moral Philoſophy, in three books, by Francis Hutcheſon, LL.D. at Glaſgow, 1755," in two volumes, 4to.

HUTCHINSON (John), a philoſophical writer, whoſe notions have made no inconſiderable noiſe in the world, was born in 1674. He ſerved the duke of Somerſet in the capacity of ſteward; and in the courſe of his travels from place to place employed himſelf in collecting foſſils: we are told, that the large and noble collection bequeathed by Dr Woodward to the univerſity of Cambridge, was actually made by him, and even unfairly obtained from him. When he left the duke's ſervice to indulge his ſtudies with more freedom, the duke, then maſter of the horſe to George I. made him his riding ſurveyor, a kind of ſinecure place of 200 l. a-year with a good houſe in the Meuſe. In 1724 he publiſhed the firſt part of *Moſes's Principia*, in which he ridiculed Dr Woodward's Natural Hiſtory of the Earth, and exploded the doctrine of gravitation eſtabliſhed in Newton's Principia: in 1727, he publiſhed the ſecond part of *Moſes's Principia*, containing the principles of the Scripture philoſophy. From this time to his death, he publiſhed a volume every year or two, which, with the MSS. he left behind, were publiſhed in 1748, in 12 vols. 8vo. On the Monday before his death, Dr Mead urged him to be bled; ſaying pleaſantly, "I will ſoon ſend you to *Moſes*," meaning to his ſtudies: but Mr Hutchinſon taking it in the literal ſenſe, anſwered in a muttering tone, "I believe, doctor, you will;" and was ſo diſpleaſed, that he diſmiſſed him for another phyſician; but died a few days after, Auguſt 28th 1737. Singular as his notions are, they are not without ſome defenders, who have obtained the appellation of *Hutchinſonians*.

Huy
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Hyacinth.

HUY, a town of the Netherlands in the biſhopric of Liege, and capital of Condraſs. It is advantageouſly ſeated on the river Maeſe, over which there is a bridge. E. Long. 10. 22. N. Lat. 52. 31.

HUYGENS (Chriſtian), one of the greateſt mathematicians and aſtronomers of the 17th century, was the ſon of Conſtantine Huygens, lord of Zuylichem, who had ſerved three ſucceſſive princes of Orange in the quality of ſecretary; and was born at the Hague, in 1629. He diſcovered from his infancy an extraordinary fondneſs for the mathematics; in a little time made a great progreſs in them; and perfected himſelf in thoſe ſtudies under the famous profeſſor Schooten, at Leyden. In 1649, he went to Holſtein and Denmark, in the retinue of Henry count of Naſſau; and was extremely deſirous of going to Sweden, in order to ſee Des Cartes, but the count's ſhort ſtay in Denmark would not permit him. He travelled into France and England; was, in 1663, made a member of the Royal Society; and, upon his return into France, M. Colbert, being informed of his merit, ſettled a conſiderable penſion upon him to engage him to fix at Paris; to which Mr Huygens conſented, and ſtaid there from the year 1666 to 1681, where he was admitted a member of the Academy of Sciences. He loved a quiet and ſtudious manner of life, and frequently retired into the country to avoid interruption, but did not contract that moroſeneſs which is ſo frequently the effect of ſolitude and retirement. He was the firſt who diſcovered Saturn's ring, and a third ſatellite belonging to that planet, which had hitherto eſcaped the eyes of aſtronomers. He diſcovered the means of rendering clocks exact, by applying the pendulum, and rendering all its vibrations equal by the cycloid. He brought teleſcopes to perfection, made many other uſeful diſcoveries, and died at the Hague in 1695. He was the author of ſeveral excellent works. The principal of theſe are contained in two collections; the firſt of which was printed at Leyden in 1682, in quarto, under the title of *Opera varia;* and the ſecond at Amſterdam in 1728, in two volumes quarto, intitled *Opera reliqua*.

HYACINTH, in natural hiſtory, a genus of pellucid gems, whoſe colour is red with an admixture of yellow.

The hyacinth, though leſs ſtriking to the eye than any other red gems, is not without its beauty in the fineſt ſpecimens. It is found of various ſizes, from that of a pin's head to the third of an inch in diameter. Like common cryſtal, it is ſometimes found columnar, and ſometimes in a peeble-form; and is always hardeſt and brighteſt in the larger maſſes.

Its colour is a dull or deadiſh red, with an admixture of yellow in it; and this mixed colour is found in all the variety of tints that a prevalence of the red or of the yellow in different degrees is capable of giving it.

Our jewellers allow all thoſe gems to be hyacinths or jacinths, that are of a due hardneſs with this mixed colour; and as they are of very different beauty and value in their ſeveral degrees and mixture of colours, they divide them into four kinds; three of which they call *hyacinths*, but the fourth, very improperly, a *ruby*. 1. When the ſtone is in its moſt perfect ſtate, and of a pure and bright flame-colour, neither the red nor the yellow prevailing, in this ſtate they call it *hyacintha la belle*. 2. When it has an over-proportion of the red, and that of a duſkier colour than the fine high red in the former; and the yellow that appears in a faint degree in it is not a fine, bright, and clear, but a duſky browniſh yellow; then they call it the *ſaffron hyacinth*. 3. Such ſtones as are of a dead whitiſh yellow, with a very ſmall proportion of red in them, they call *amber-hyacinths*. And, 4. When the ſtone is of a fine deep red, blended with a duſky and very deep yellow, they call it a *rubacelle*. But though the over-proportion of a ſtrong red in this gem has made people refer it to the claſs of rubies, its evident mixture of yellow ſhews that it truly belongs to the hyacinths.

The hyacinth la belle is found both in the Eaſt and Weſt Indies. The oriental are the harder, but the American are often equal to them in colour. The rubacelle is found only in the Eaſt Indies, and is generally brought over among the rubies; but it is of little value: the other varieties are found in Sileſia and Bohemia.

HYACINTHUS, HYACINTH; a genus of the monogynia order, belonging to the hexandria claſs of plants. There are ſix ſpecies; of which the moſt remarkable is the orientalis, or eaſtern hyacinth. Of this there are a great number of varieties, amounting to ſome hundreds, each of which differs from the reſt in ſome reſpect or other. This plant hath a large, purpliſh, bulbous root, ſending up ſeveral narrow erect leaves eight or ten inches long; the flower-ſtalk is upright, robuſt, and ſucculent, from 10 to 15 inches in height; adorned upward with many large funnel or bell-ſhaped flowers, ſwelling at the baſe, and cut half way into ſix parts; collected into a large pyramidal ſpike of different colours in the varieties; flowering in April or May.

Theſe plants are cultivated with the greateſt ſucceſs in Holland, from whence great numbers are annually imported into Britain. Each variety is by the floriſts diſtinguiſhed either by the name of the place where firſt raiſed, or the perſon who raiſed them, or the names of illuſtrious perſonages, as of kings, generals, poets, and celebrated ancient hiſtorians, gods, goddeſſes, &c. They are ſold by all the ſeed-dealers. The prices are from three pence per root to five or ten pounds or more; and ſome varieties are in ſuch high eſteem among the floriſts, that 20 or 30 *l*. will be given for a ſingle bulb. They are hardy, and will proſper any where, though the fine kinds require a little ſhelter during the winter. They may be propagated either by ſeeds or off-ſets from the roots.

The properties of a good oriental hyacinth are, a ſtem perfectly upright, of moderate length, and ſo ſtrong and well-proportioned that it will ſuſtain the weight of the florets without bending: the florets ſhould be large, ſwelling below, expanded above, and numerous, 10 or 15 at leaſt, but are often 20 or 30 in number; and ſhould be placed equally round the ſtem, the pedicles on which they grow longer below than above, diminiſhing gradually in length upward in ſuch a manner as to repreſent a pyramid, and each pedicle ſufficiently ſtrong to ſupport the florets without drooping. The curious in theſe plants are careful never to plant the fine ſorts two years together in the ſame bed of earth; for by planting them every year in a freſh bed, the beauty of the flowers is greatly improved.

HYADES, in aſtronomy, are ſeven ſtars in the bull's head, famous among the poets for the bringing of rain. Whence their name Υαδες, from the Greek, υειν, "to rain." The principal of them is in the left eye, by the Arabs called *aldebaran*.

The poets feign them the daughters of Atlas and Pleone. Their brother Hyas being torn to pieces by a lioneſs, they wept his death with ſuch vehemence, that the gods, in compaſſion to them, tranſlated them into heaven, and placed them in the bull's forehead, where they continue to weep; this conſtellation being ſuppoſed to preſage rain. Others repreſent the Hyades as Bachus's nurſes; and the ſame with the Dodonides, who fearing the reſentment of Juno, and flying from the cruelty of king Lycurgus, were tranſlated by Jupiter into heaven.

HYBERNACULUM, in botany, WINTER-QUARTERS; defined by Linnæus to be part of the plant which defends the embryo herb from injuries during the ſeverities of the winter. See BULBUS and GEMMA.

HYBLA (anc. geog.) or MEGARA, which laſt name it took from the Megareans, who led thither a colony; called alſo *Hybla Parva*, and *Galeotis*. In Strabo's time Megara was extinct, but the name *Hybla* remained on account of its excellent honey named from it. It was ſituated on the eaſt coaſt of Sicily between Syracuſe and the Leontines. *Galeotæ*, and *Megarenſes*; the names of the people, who were of a prophetic ſpirit, being the deſcendants of Galeus the ſon of Apollo. *Hyblæus* the epithet.—The *Hyblæi colles*, ſmall eminences at the ſprings of the Alabus near this place, were famous for their variety of flowers, eſpecially thyme; the honey gathered from which was by the ancients reckoned the beſt in the world, excepting that of Hymettus in Attica. By the moderns it was called *Mel Paſſi*, for the ſame reaſon, namely, on account of its excellent honey, and extraordinary fertility, till it was overwhelmed by the lava of Ætna; and having then become totally barren, its name was changed to *Mal Paſſi*. In a ſecond eruption, by a ſhower of aſhes from the mountain, it ſoon reaſſumed its ancient beauty and fertility; and for many years was called *Bel Paſſi*:

Paſſi: and laſt of all, in the year 1669, it was again laid under an ocean of fire, and reduced to the moſt wretched ſterility; ſince which time it is again known by the appellation of *Mal Paſſi*. However, the lava in its courſe over this beautiful country has left ſeveral little iſlands or hillocks, juſt ſufficient to ſhew what it formerly was. Theſe make a ſingular appearance in all the bloom of the moſt luxuriant vegetation, ſurrounded and rendered almoſt inacceſſible by large fields of black and rugged lava.

Hybla-*Major*, (anc. geog.) was ſituated in the tract lying between mount Ætna and the river Symethus. In Pauſanias's time deſolate.

Hybla-*Minor*, or *Heræa*, (anc. geog.) an inland town of Sicily, ſituated between the rivers Oanus and Herminius; now Ragusa.

HYBRIDA planta, a monſtrous production of two different ſpecies of plants, analogous to a mule among animals. The ſeeds of hybrid plants will not propagate.

HYÆNA, in zoology. See Canis.

HYÆNIUS lapis, in natural hiſtory, the name of a ſtone ſaid to be found in the eyes of the Hyæna. Pliny tells us, that thoſe creatures were in old times hunted and deſtroyed for the ſake of theſe ſtones, and that it was ſuppoſed they gave a man the gift of prophecy by being put under his tongue.

HYDATIDES, in medicine, little tranſparent veſicles or bladders full of water, ſometimes found ſolitary, and ſometimes in cluſters upon the liver, and various other parts, eſpecially in hydropical caſes.

HYDATOSCOPIA, called alſo hydromancy, a kind of divination or method of foretelling future events by water.

HYDE (Edward), earl of Clarendon, and lord high chancellor of England, was deſcended from an ancient family in Cheſhire, and born at Dinton near Hindon, in Wiltſhire, in 1608. He was entered of Magdalen-hall Oxford, where, in 1625, he took the degree of A. B. and afterward ſtudied the law in the Middle-Temple. In the parliament which begun at Weſtminſter April 10. 1640, he ſerved for Wotton-Baſſet in Wiltſhire. But that parliament being ſoon after diſſolved, he was choſen for Saltaſh in Cornwall in the long parliament. His abilities were much taken notice of, and he was employed in ſeveral committees to examine into divers grievances; but at laſt being diſſatisfied with the proceedings in the parliament, he retired to the king, and was made chancellor of the exchequer, a privy-counſellor, and knight. Upon the declining of the king's cauſe, he went to France, where, after the death of king Charles I. he was ſworn of the privy-council to Charles II. In 1649, he and the lord Cottington were ſent ambaſſadors extraordinary into Spain, and in 1657 he was conſtituted lord high chancellor of England. The year before the reſtoration, the duke of York falling in love with Mrs Anne Hyde, the lord chancellor's eldeſt daughter, reſolved to marry her, which he performed; but carefully concealed it, both from the king and chancellor. Upon the reſtoration, he was choſen chancellor of the univerſity of Oxford; and ſoon after created baron of Hindon, in Wiltſhire, viſcount Cornbury in Oxfordſhire, and earl of Clarendon in Wiltſhire; and, on the death of Henry lord Falkland, was made lord lieutenant of Oxfordſhire. He took care neither to load the king's prerogative, nor encroach upon the liberties of the people; and therefore would not ſet aſide the petition of right, nor endeavour to raiſe the ſtar-chamber or high-commiſſion courts again: nor did he attempt to repeal the bill for triennial parliaments; and when he might have obtained two millions for a ſtanding revenue, he aſked but one million two hundred thouſand pounds *per annum*, which he thought would ſtill put the king upon the neceſſity of having recourſe to his parliament. In this juſt conduct he is ſaid to have been influenced by the following incident, which happened ſome years before. When he firſt began to grow eminent in the law, he went down to viſit his father in Wiltſhire; who, one day as they were walking in the fields together, obſerved to him, that men of his profeſſion were apt to ſtretch the prerogative too far, and to injure liberty; but charged him, if ever he came to any eminence in his profeſſion, never to ſacrifice the laws and liberty of his country to his own intereſt or the will of his prince: he repeated his advice twice; and immediately falling into a fit of an apoplexy, died in a few hours: and this circumſtance had a laſting influence upon him. In 1662, he oppoſed a propoſal for the king's marriage with the infanta of Portugal, and the ſale of Dunkirk: however, the following year, articles of high treaſon were exhibited againſt him by the earl of Briſtol; but they were rejected by the houſe of lords. In 1664, he oppoſed the war with Holland. In Auguſt 1667, he was removed from his poſt of lord chancellor; and in November following impeached of high treaſon and other crimes and miſdemeanors by the houſe of commons: upon which he retired into France, when a bill was paſſed for baniſhing him from the king's dominions. See Britain, n° 211, 217. He reſided at Rouen in Normandy; and dying there in 1674, his body was brought to England and interred in Weſtminſter-abbey. He wrote, 1. A hiſtory of the rebellion, 3 vols folio, and 6 vols octavo; a ſecond part of which was lately bequeathed to the public by his lordſhip's deſcendant the late lord Hyde and Cornbury. 2. A letter to the duke of York, and another to the ducheſs of York, upon occaſion of their embracing the Romiſh religion. 3. An anſwer to Hobbes's Leviathan. 4. A hiſtory of the rebellion and civil wars in Ireland, octavo; and ſome other works.

The reverend Mr Granger, in his Biographical Hiſtory of England, obſerves, that "the virtue of the earl of Clarendon was of too ſtubborn a nature for the age of Charles II. Could he have been content, (ſays he,) to have enſlaved millions, he might have been more a monarch than an unprincely king. But he did not only look upon himſelf as the guardian of the laws and liberties of his country, but had alſo a pride in his nature that was above vice; and choſe rather to be a victim himſelf, than to ſacrifice his integrity. He had only one part to act, which was that of an honeſt man. His enemies allowed themſelves a much greater latitude; they loaded him with calumnies, blamed him even for their own errors and miſconduct, and helped to ruin him by ſuch buffooneries as he deſpiſed. He was a much greater, perhaps a much happier, man, alone and in exile, than Charles the Second upon his throne."

And the following character of this nobleman is given by Mr Walpole. "Sir Edward Hyde, (ſays he), who oppoſed an arbitrary court, and embraced the party of an afflicted one, muſt be allowed to have acted conſcientiouſly. A better proof was his behaviour on the reſtoration, when the torrent of an infatuated nation intreated the king and his miniſter to be abſolute. Had Clarendon ſought nothing but power, his power had never ceaſed. A corrupted court and a blinded populace were leſs the cauſes of the chancellor's fall, than an ungrateful king, who could not pardon his lordſhip's having refuſed to accept for him the ſlavery of his country. Like Juſtice herſelf, he held the balance between the neceſſary power of the ſupreme magiſtrate, and the intereſts of the people. This never-dying obligation his cotemporaries were taught to overlook and clamour againſt, till they removed the only man who, if he could, would have corrected his maſter's evil government. Almoſt every virtue of a miniſter made his character venerable. As an hiſtorian, he ſeems more exceptionable. His majeſty and eloquence, his power of painting characters, his knowledge of his ſubject, rank him in the firſt claſs of writers; yet he has both great and little faults. Of the latter, his ſtories of ghoſts and omens are not to be defended. His capital fault is his whole work being a laboured juſtification of king Charles. If he relates faults, ſome palliating epithet always ſlides in, and he has the art of breaking his darkeſt ſhades with gleams of light that take off all impreſſion of horror. One may pronounce on my lord Clarendon, in his double capacity of ſtateſman and hiſtorian, that he acted for liberty, but wrote for prerogative."

Hyde (Dr Thomas), profeſſor of Arabic at Oxford, and one of the moſt learned writers of the 17th century, was born in 1636; and ſtudied firſt at Cambridge, and afterwards at Oxford. Before he was 18 years of age, he was ſent from Cambridge to London to aſſiſt Mr Brian Walton in the great work of the Polyglot Bible; and about that period undertook to tranſcribe the Perſian Pentateuch out of the Hebrew characters, which archbiſhop Uſher, who well knew the difficulty of the undertaking, pronounced to be an impoſſible taſk to a native Perſian. After he had happily ſucceeded in this, he aſſiſted in correcting ſeveral parts of Mr Walton's work, for which he was perfectly qualified. He was made archdeacon of Glouceſter, canon of Chriſt-church, head keeper of the Bodleian library, and profeſſor both of Hebrew and Arabic, in the univerſity of Oxford. He was interpreter and ſecretary of the Oriental languages, during the reigns of Charles II. James II. and William III.; and was perfectly qualified to fill this poſt, as he could converſe in the languages which he underſtood. There never was an Engliſhman in his ſituation of life who made ſo great a progreſs; but his mind was ſo engroſſed by his beloved ſtudies, that he is ſaid to have been but ill qualified to appear to any advantage in common converſation. Of all his learned works, (the very catalogue of which, as obſerved by Anth. Wood, is a curioſity), his *Religio Veterum Perſarum* is the moſt celebrated. Dr Gregory Sharpe, the late learned and ingenious maſter of the temple, has collected ſeveral of his pieces formerly printed, and republiſhed them, with ſome additional diſſertations, and his life prefixed, in two elegant volumes quarto. This great man died on the 18th of February, 1702. Among his other works are, 1. A Latin tranſlation of Ulug Beig's obſervations on the longitude and latitude of the fixed ſtars; and, 2. A catalogue of the printed books in the Bodleian library.

HYDNUM, in botany; a genus of fungi, belonging to the cryptogamia claſs of plants. It is of the horizontal kind, echinated or beſet with ſharp-pointed fibres on its under part. One of the ſpecies, named the *imbricatum*, is a native of Britain, and is found in woods. It hath a convex hat, tiled, ſtanding on a ſmooth pillar, of a pale fleſh-colour, with white prickles. It is eaten in Italy, and is ſaid to be of a very delicate taſte.

HYDRA, in fabulous hiſtory, a ſerpent in the Marſh of Lerna, in Peloponneſus, repreſented by the poets with many heads, one of which being cut off, another immediately ſuceeded in its place, unleſs the wound was inſtantly cauterized. Hercules attacked this monſter; and having cauſed Iolaus to hew down wood for flaming brands, as he cut off the heads he applied the brands to the wounds, by which means he deſtroyed the Hydra.

Hydra, in aſtronomy. See there, n° 206.

HYDRAGOGUES, among phyſicians, remedies which evacuate a large quantity of water in dropſies. The word is formed of υδωρ *water*, and αγειν to *draw* or *lead*; but the application of the term proceeds upon a miſtaken ſuppoſition, that every purgative had ſome particular humour which it would evacuate, and which could not be evacuated by any other. It is now, however, diſcovered, that all ſtrong purgatives will prove *hydragogues*, if given in large quantity, or in weak conſtitutions. The principal medicines recommended as hydragogues, are the juice of elder, the root of iris, ſoldanella, mechoacan, jalap, &c.

HYDRANGEA, in botany; a genus of the digynia order, belonging to the decandria claſs of plants. There is but one ſpecies, viz. the arboreſcens, a native of North America, from whence it hath lately been brought to Europe, and is preſerved in gardens, more for the ſake of variety than beauty. It riſes about three feet high; and hath many ſoft pithy ſtalks, garniſhed with two oblong heart-ſhaped leaves placed oppoſite. The flowers are produced at the top of the ſtalks in a corymbus. They are white, compoſed of five petals with ten ſtamina ſurrounding the ſtyle. It is eaſily propagated by parting the roots; the beſt time for which is the end of October. The plants thrive beſt in a moiſt ſoil, and require to be ſheltered from ſevere froſts.

HYDRAULICS, the ſcience of the motion of fluids, and the conſtruction of all kinds of inſtruments and machines relating thereto. See **Hydrostatics**, chap. iv.

HYDRENTEROCELE, in ſurgery, a ſpecies of hernia, wherein the inteſtines deſcend into the ſcrotum, together with a quantity of water.

HYDROCELE, in ſurgery, denotes any hernia ariſing from water; but is particularly uſed for ſuch a one of the ſcrotum, which ſometimes grows to the ſize of one's head, without pain, but exceeding troubleſome to the patient. See **Surgery**.

HYDROCEPHALUS, a preternatural diſtenſion of the head to an uncommon ſize by a ſtagnation and extravaſation of the lymph; which, when collected in the inſide of the cranium, is then termed *internal;* as that collected on the outſide is termed *external.* See (the *Index* ſubjoined to) MEDICINE.

HYDROCHARIS, the LITTLE WATER-LILY; a genus of the decandria order, belonging to the diœcia claſs of plants. There is only one ſpecies, a native of Britain, growing in ſlow ſtreams and wet ditches. It hath kidney-ſhaped leaves, thick, ſmooth, and of a browniſh green colour, with white bloſſoms. There is a variety with double flowers of a very ſweet ſmell.

HYDROCOTYLE, WATER-NAVELWORT; a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſeveral ſpecies, none of which are ever cultivated in gardens. One of them, a native of Britain, growing in marſhy grounds, is ſuppoſed by the farmers to occaſion the rot in ſheep. The leaves have central leaf-ſtalks, with about five flowers in a rundle; the petals are of a reddiſh white.

HYDROGRAPHY, the art of meaſuring and deſcribing the ſea, rivers, canals, lakes, &c.—With regard to the ſea, it gives an account of its tides, counter-tides, ſoundings, bays, gulphs, creeks, &c.; as alſo of the rocks, ſhelves, ſands, ſhallows, promontories, harbours; the diſtance and bearing of one port from another; with every thing that is remarkable, whether out at ſea or on the coaſt.

HYDROMANCY, a method of divination by water, practiſed by the ancients. See DIVINATION, n° 7.

HYDROMEL, honey diluted in nearly an equal weight of water. When this liquor has not fermented, it is called *ſimple hydromel*; and when it has undergone the ſpirituous fermentation, it is called the *vinous hydromel*, or *mead*.

Honey, like all ſaccharine ſubſtances, vegetable or animal, is ſuſceptible of fermentation in general, and particularly of the ſpirituous fermentation. To induce this fermentation, nothing is neceſſary but to dilute it ſufficiently in water, and to leave this liquor expoſed to a convenient degree of heat. To make good vinous hydromel or mead, the whiteſt, pureſt, and beſt-taſted honey muſt be choſen; and this muſt be put into a kettle with more than its weight of water: a part of this liquor muſt be evaporated by boiling, and the liquor ſcummed, till its conſiſtence is ſuch that a freſh egg ſhall be ſupported upon its ſurface without ſinking more than half its thickneſs into the liquor; then the liquor is to be ſtrained and poured through a funnel into a barrel: this barrel, which ought to be nearly full, muſt be expoſed to a heat as equable as is poſſible, from 20 to 27 or 28 degrees of Mr Reaumur's thermometer, taking care that the bung-hole be ſlightly covered, but not cloſed. The phenomena of the ſpirituous fermentation will appear in this liquor, and will ſubſiſt during two or three months, according to the degree of heat; after which they will diminiſh and ceaſe. During this fermentation, the barrel muſt be filled up occaſionally with more of the ſame kind of liquor of honey, ſome of which ought to be kept apart on purpoſe to replace the liquor which flows out of the barrel in froth. When the fermentation ceaſes, and the liquor has become very vinous, the barrel is then to be put in a cellar and well cloſed. A year afterwards the mead will be fit to be put into bottles.

The vinous hydromel or mead is an agreeable kind of wine: nevertheleſs it retains long a taſte of honey, which is unpleaſing to ſome perſons; but this taſte it is ſaid to loſe entirely by being kept a very long time.

The ſpirituous fermentation of honey, as alſo that of ſugar, and of the moſt of vinous liquors, when it is very ſaccharine, is generally more difficultly effected, requires more heat, and continues longer than that of ordinary wines made from the juice of grapes; and theſe vinous liquors always preſerve a ſaccharine taſte, which ſhews that a part only of them is become ſpirituous.

HYDROMETER, an inſtrument to meaſure the gravity, denſity, velocity, force, &c. of water and other fluids. See HYDROSTATICS, n° 13.

HYDROMPHALUS, in medicine and ſurgery, a tumour in the navel, ariſing from a collection of water.

HYDROPHANÆ, in natural hiſtory: A genus of ſemi-pellucid gems, compoſed of cryſtal and earth; the latter ingredient being in large proportion, and mixed imperfectly, as in the chalcedony; and giving a general cloudineſs or miſtineſs to the ſtone; but of ſuch an imperfect and irregular admixture, as not to be capable of a poliſh like the chalcedony; and appearing of a duſky and foul ſurface till thrown into water, in which they become lucid and in ſome degree tranſparent, either in part or totally; alſo changing their colour, which returns to them on their being taken out of the water. To this genus belongs the oculus beli of authors, or whitiſh grey hydrophanes variegated with yellow, and with a black central nucleus; and the oculus mundi, or lapis mutabilis, which is likewiſe a whitiſh grey kind without veins.

HYDROPHOBIA, an averſion or dread of water: a terrible ſymptom of the *rabies canina;* and which has likewiſe been found to take in violent inflammations of the ſtomach and in hyſteric fits. See (the *Index* ſubjoined to) MEDICINE.

HYDROPHYLACIA, a word uſed by Kircher and ſome others who have written in the ſame ſyſtem, to expreſs thoſe great reſervoirs of water which he places in the Alps and other mountains for the ſupply of rivers which run through the ſeveral lower countries. This he makes to be one of the great uſes of mountains in the œconomy of the univerſe.

HYDROPHYLLUM, WATER-LEAF; a genus of the monogynia order, belonging to the pentandria claſs of plants. There is only one ſpecies, viz. the Virginianum, or water-leaf of Morinus. It grows naturally in Canada and many other parts of America on moiſt ſpongy ground. The root is compoſed of many ſtrong fleſhy fibres, from which ariſe many leaves with footſtalks five or ſix inches long, jagged into three, five, or ſeven lobes, almoſt to the midrib, indented on their edges. The flowers are produced in looſe cluſters hanging downward, are bell-ſhaped, and of a dirty white colour. It may be propagated by parting the roots; which ought to be done in autumn, that the plants may be well rooted before ſpring, otherwiſe they will require a great deal of water.

HYDROPS, in medicine, the ſame with DROPSY.

HYDROSCOPE, an inſtrument anciently uſed for the meaſuring of time.

The hydroſcope was a kind of water-clock, conſiſting

ing of a cylindrical tube, conical at bottom: the cylinder was graduated, or marked out with diviſions, to which the top of the water becoming ſucceſſively contiguous, as it trickled out at the vertex of the cone, pointed out the hour. See HYDROSTATICS, nº 41, 42.

HYDROSTATICS;

A SCIENCE which treats of the weight, motion, and equilibria of liquid bodies. Under this head, not only accounts of the nature and properties of fluids in general are introduced, and the laws by which they act; but alſo the art of weighing ſolid bodies in fluids, in order to diſcover their ſpecific gravities.

SECT. I. *Of* FLUIDS *in general.*

1 Fluid defined, &c.

SIR Iſaac Newton's definition of a fluid is, That it is a body yielding to any force impreſſed, and which hath its parts very eaſily moved one among another. See FLUIDITY.

This definition ſuppoſes the motion ſpoken of produced by a partial preſſure; for in the caſe of an incompreſſible fluid, it is demonſtrated by Dr Keil, that under a total or an equal preſſure, it would be impoſſible that the yielding body ſhould move.

The original and conſtituent parts of fluids are by the moderns conceived to be particles ſmall, ſmooth, hard, and ſpherical: according to which opinion, every particle is of itſelf a ſolid, or a fixed body; and, when conſidered ſingly, is no fluid, but becomes ſo only by being joined with other particles of the ſame kind. From this definition, it hath been concluded by ſome philoſophers, that ſome ſubſtances, ſuch as mercury, are eſſentially fluid, on account of the particular configuration of their particles; but later diſcoveries have evinced the fallacy of this opinion, and that fluidity is truly to be reckoned an effect of heat. See FLUIDITY.

That fluids have vacuities, will appear upon mixing ſalt with water, a certain quantity whereof will be diſſolved, and thereby imbibed, without enlarging the dimenſions. A fluid's becoming more buoyant, is a certain proof that its ſpecific gravity is increaſed, and of conſequence that many of its vacuities are thereby filled: after which it may ſtill receive a certain quantity of other diſſoluble bodies, the particles whereof are adapted to the vacancies remaining, without adding any thing to its bulk, though the abſolute weight of the whole fluid be thereby increaſed.

This might be demonſtrated, by weighing a phial of rain-water critically, with a nice balance: pour this water into a cup, and add ſalt to it; refund of the clear liquor what will again fill the phial; an increaſe of weight will be found under the ſame dimenſions, from a repletion, as has been ſaid, of the vacuities of the freſh water with ſaline particles.

And as fluids have vacuities, or are not perfectly denſe; it is alſo probable, that they are compounded of ſmall ſpheres of different diameters, whoſe interſtices may be ſucceſſively filled with apt materials for that purpoſe: and the ſmaller theſe interſtices are, the greater will the gravity of the fluid always be.

For inſtance, ſuppoſe a barrel be filled with bullets in the moſt compact manner, a great many ſmall-ſhot may afterwards be placed in the interſtices of thoſe balls; the vacuities of the ſhot may then be repleniſhed with a certain quantity of ſea-ſand; the interſtices of the grains of the ſand may again be filled with water; and thus may the weight of the barrel be greatly augmented, without increaſing the general bulk.—Now this being true with regard to ſolids, is applicable alſo to fluids. For inſtance, river-water will diſſolve a certain quantity of ſalt; after which it will receive a certain quantity of ſugar; and after that, a certain quantity of alum, and perhaps other diſſoluble bodies, and not increaſe its firſt dimenſions.

2 Its nature and properties.

The more perfect a fluid is, the more eaſily will it yield to all impreſſions, and the more eaſily will the parts unite and coaleſce when ſeparated. A perfect fluid is that whoſe parts are put into motion by the *leaſt* force imaginable: an imperfect one is that whoſe parts yield to a *ſmall* force, not the *leaſt*. It is probable, that in nature there is no perfect fluid, the element of fire perhaps excepted; ſince we ſee that the mutual attraction of the parts of all the fluids, ſubject to our experiments, renders them coheſive in ſome degree; and the more they cling together, the leſs perfect their fluidity is. If, for inſtance, a glaſs be filled with water above the brim, it will viſibly riſe to a convex ſurface, which, was it a perfect fluid, free from either tenacity or coheſion, would be impoſſible.

Mercury, the moſt perfect fluid we know, is not exempt from this attraction; for, ſhould the bottom of a flat glaſs, having a gentle riſing toward the middle, be covered thin with quickſilver, a little motion of the machine will cauſe the fluid ſoon to ſeparate from the middle, and lie round it like a ring, having edges of a conſiderable thickneſs.

But if a like quantity thereof be poured into a golden cup, it will, on the contrary, appear higher conſiderably on the ſides than in the middle. Which may proceed in part, perhaps, from the gold's being of great denſity, and therefore capable of exerting thereon a greater degree of attraction than other metals. Probably too it may happen from its having pores of an apter diſpoſition and magnitude to receive the minute mercurial particles, than thoſe of iron and ſome other metals; and therefore the attraction of coheſion in this experiment may obtain alſo: and every one knows how eaſily theſe two bodies incorporate, and make a perfect *amalgama*. But the reaſon commonly given for the two phænomena is, that mercury, in the firſt caſe, attracts itſelf more than it does glaſs; and, in the laſt caſe, mercury attracts gold more than it does itſelf.

Sir Iſaac Newton held all matter to be originally homogeneous; and that from the different modifications and texture of it alone, all bodies receive their various ſtructure, compoſition, and form. In his definition of a fluid, he ſeems to imply, that he thought fluids to be compoſed of primary ſolids; and, in the beginning of his *Principia*, he ſpeaks of ſand and powders as of imperfect fluids.

3 lorentine xperiment.

Borrelli has demonſtrated, that the conſtituent parts of fluids are not fluid, but conſiſtent bodies; and that the elements of all bodies are perfectly firm and hard. The incompreſſibility of water, proved by the Florentine experiment, is a ſufficient evidence alſo, that each primary particle or ſpherule thereof is a perfect and impenetrable ſolid. Mr Locke too, in his *Eſſay on Human Underſtanding*, admits this to be ſo.

This famous experiment was firſt attempted by the great lord Verulam, who incloſed a quantity of water in lead, and found that it inclined rather to make its way through the pores of the metal, than be reduced into leſs compaſs by any force that could be applied. The academics of Florence made this experiment afterwards more accurately with a globe of ſilver, as being a metal leſs yielding and ductile than gold. This being filled with water, and well cloſed, they found, by hammering gently thereon, that the ſphericity of the globe was altered to a leſs capacious figure (as might geometrically be proved); but a part of the water always like dew came through its ſides before this could be obtained. This has been attempted by Sir Iſaac Newton, and ſo many competent judges, on gold and ſeveral other metals ſince, with equal ſucceſs, that we do not hold any fluid in its natural ſtate, except the air, to be either compreſſible or elaſtic.—In ſome experiments by Mr Canton, it hath been obſerved, that water is more or leſs compreſſed according to the different conſtitution of the atmoſphere; whence it hath been concluded that the Florentine experiment was erroneous: but it will not follow, that water can be compreſſed by any artificial force, becauſe nature hath a method of compreſſing it; any more than that ſolid metal can be compreſſed artificially, though we know that very ſlight degrees of heat and cold will expand or contract its dimenſions. See WATER.

SECT. II. *Of the Gravity and Preſſure of Fluids.*

4 ds preſs uch ard as nward.

ALL bodies, both fluid and ſolid, preſs downwards by the force of gravity: but fluids have this wonderful property, that their preſſure upwards and ſidewiſe is equal to their preſſure downwards; and this is always in proportion to their perpendicular height, without any regard to their quantity: for, as each particle is quite free to move, it will move towards that part or ſide on which the preſſure is leaſt. And hence, no particle or quantity of a fluid can be at reſt, till it is every way equally preſſed.

To ſhew by experiment that fluids preſs upward as well as downward, let A B be a long upright tube filled with water near to its top; and CD a ſmall tube open at both ends, and immerſed into the water in the large one: if the immerſion be quick, you will ſee the water riſe in the ſmall tube to the ſame height that it ſtands in the great one, or until the ſurfaces of the water in both are on the ſame level: which ſhews that the water is preſſed upward into the ſmall tube by the weight of what is in the great one; otherwiſe it could never riſe therein, contrary to its natural gravity; unleſs the diameter of the bore were ſo ſmall, that the atttraction of the tube would raiſe the water; which will never happen, if the tube be as wide as that in a common barometer. And, as the water riſes no higher in the ſmall tube than till its ſurface be on a level with the ſurface of the water in the great one, this ſhews that the preſſure is not in proportion to the quantity of water in the great tube, but in proportion to its perpendicular height therein: for there is much more water in the great tube all around the ſmall one, than what is raiſed to the ſame height in the ſmall one as it ſtands in the great.

Take out the ſmall tube, and let the water run out of it; then it will be filled with air. Stop its upper end with the cork C, and it will be full of air all below the cork: this done, plunge it again to the bottom of the water in the great tube, and you will ſee the water riſe up in it to the height E. Which ſhews that the air is a body, otherwiſe it could not hinder the water from riſing up to the ſame height as it did before, namely, to A; and in ſo doing, it drove the air out at the top; but now the air is confined by the cork *C:* And it alſo ſhews that the air is a compreſſible body; for if it were not ſo, a drop of water could not enter into the tube.

Fig. 31

The preſſure of fluids being equal in all directions, it follows, that the ſides of a veſſel are as much preſſed by a fluid in it, all around in any given ring of points, as the fluid below that ring is preſſed by the weight of all that ſtands above it. Hence the preſſure upon every point in the ſides, immediately above the bottom, is equal to the preſſure upon every point of the bottom.—To ſhew this by experiment, let a hole be made at *e* in the ſide of the tube AB cloſe by the bottom; and another hole of the ſame ſize in the bottom at *C*; then pour your water into the tube, keeping it full as long as you chooſe the holes ſhould run, and have two baſons ready to receive the water that runs through the two holes, until you think there is an enough in each baſon; and you will find by meaſuring the quantities, that they are equal. Which ſhews that the water run with equal ſpeed through both holes; which it could not have done, if it had not been equally preſſed through them both. For, if a hole of the ſame ſize be made in the ſide of the tube, as about *f*, and if all three are permitted to run together, you will find that the quantity run through the hole at *f* is much leſs than what has run in the ſame time thro' either of the holes C or *e*.

In the ſame figure, let the tube be re-curved from the bottom at C into the ſhape DE, and the hole at C be ſtopt with a cork. Then, pour water into the tube to any height, as A*g*, and it will ſpout up in a jet EFG, nearly as high as it is kept in the tube AB, by continuing to pour in as much there as runs thro' the hole E; which will be the caſe whilſt the ſurface A*g* keeps at the ſame height. And if a little ball of cork G be laid upon the top of the jet, it will be ſupported thereby, and dance upon it. The reaſon why the jet riſes not quite ſo high as the ſurface of the water A*g*, is owing to the reſiſtance it meets with in the open air: for, if a tube either great or ſmall, was ſcrewed upon the pipe at E, the water would riſe in it until the ſurfaces of the water in both tubes were on the ſame level; as will be ſhewn by the next experiment.

5 The hydroſtatic paradox.

Any quantity of a fluid, how ſmall ſoever, may be made to balance and ſupport any quantity, how great ſoever. This is deſervedly termed *the hydroſtatical paradox;* which we ſhall firſt ſhew by an experiment, and then account for it upon the principle above mentioned, namely, that *the preſſure of fluids is directly as their perpendicular height, without any regard to their quantity*.

Plate CLII. fig. 4.

Let a ſmall glaſs tube DCG, open at both ends, and bended at B, be joined to the end of a great one AI at *cd*, where the great one is alſo open; ſo that theſe tubes in their openings may freely communicate with each other. Then pour water through a ſmall necked funnel into the ſmall tube at H; this water will run through the joining of the tubes at *cd*, and riſe up into the great tube; and if you continue pouring until the ſurface of the water comes to any part, as A, in the great tube, and then leave off, you will ſee that the ſurface of the water in the ſmall tube will be juſt as high at D; ſo that the perpendicular altitude of the water will be the ſame in both tubes, however ſmall the one be in proportion to the other. This ſhews, that the ſmall column DCG balances and ſupports the great column A*cd*; which it could not do if their preſſures were not equal againſt one another in the recurved bottom at B.—If the ſmall tube be made longer, and inclined in the ſituation GEF, the ſurface of the water in it will ſtand at F, on the ſame level with the ſurface A in the great tube: that is, the water will have the ſame perpendicular height in both tubes, although the column in the ſmall tube is longer than that in the great one; the former being oblique, and the latter perpendicular.

Since then the preſſure of fluids is directly as their perpendicular heights, without any regard to their quantities, it appears, that whatever the figure or ſize of veſſels be, if they are of equal heights, and if the areas of their bottoms are equal, the preſſures of equal heights of water are equal upon the bottoms of theſe veſſels; even though the one ſhould hold a thouſand or ten thouſand times as much water as would fill the other. To confirm this part of the hydroſtatical paradox by an experiment, let two veſſels be prepared of equal heights, but very unequal contents, ſuch as AB fig. 5. and AB in fig. 6. Let each veſſel be open at both ends, and their bottoms D *d*, D *d* be of equal widths. Let a braſs bottom CC be exactly fitted to each veſſel, not to go into it, but for it to ſtand upon; and let a piece of wet leather be put between each veſſel and its braſs bottom, for the ſake of cloſeneſs. Join each bottom to its veſſel by a hinge D, ſo that it may open like the lid of a box; and let each bottom be kept up to its veſſel by equal weights E and E hung to lines which go over the pulleys F and F (whoſe blocks are fixed to the ſides of the veſſels at *f*) and the lines tied to hooks at *d* and *d*, fixed in braſs bottoms oppoſite to the hinges D and D. Things being thus prepared and fitted, hold the veſſel AB (fig. 6.) upright in your hands over a baſon on a table, and cauſe water to be poured into the veſſel ſlowly, till the preſſure of the water bears down its bottom at the ſide *d*, and raiſes the weight E; and then part of the water will run out at *d*. Mark the height at which the ſurface H of the water ſtood in the veſſel, when the bottom began to give way at *d*; and then, holding up the other veſſel AB (fig. 5.) in the ſame manner, cauſe water to be poured into it at H; and you will ſee, that when the water riſes to A in this veſſel, juſt as high as it did in the former, its bottom will alſo give way at *d*, and it will loſe part of the water.

Fig. 5, 6.

The natural reaſon of this ſurpriſing phenomenon is, that ſince all parts of a fluid at equal depths below the ſurface are equally preſſed in all manner of directions, the water immediately below the fixed part B*f* (fig. 5.) will be preſſed as much upward againſt its lower ſurface within the veſſel, by the action of the column A*g*, as it would be by a column of the ſame height, and of any diameter whatever; (as was evident by the experiment with the tube, fig. 4.) and therefore, ſince action and reaction are equal and contrary to each other, the water immediately below the ſurface B*f* will be preſſed as much downward by it, as if it was immediately touched and preſſed by a column of the height *g* A, and of the diameter B*f*: and therefore, the water in the cavity BD *df* will be preſſed as much downward upon its bottom CC, as the bottom of the other veſſel (fig. 6.) is preſſed by all the water above it.

Fig. 5.

To illuſtrate this a little farther, let a hole be made at *f* in the fixed top B*f*, and let a tube G be put into it; then, if water be poured into the tube A, it will (after filling the cavity B *d*) riſe up into the tube G, until it comes to a level with that in the tube A; which is manifeſtly owing to the preſſure of the water in the tube A, upon that in the cavity of the veſſel below it. Conſequently, that part of the top B*f*, in which the hole is now made, would, if corked up, be preſſed upward with a force equal to the whole weight of all the water which is ſupported in the tube G: and the ſame thing would hold at *g*, if a hole were made there. And ſo, if the whole cover or top B*f* were full of holes, and had tubes as high as the middle one A*g* put into them, the water in each tube would riſe to the ſame height as it is kept in the tube A, by pouring more into it, to make up the deficiency that it ſuſtains by ſupplying the others, until they are all full; and then the water in the tube A would ſupport equal heights of water in all the reſt of the tubes. Or, if all the tubes except A, or any other one, were taken away, and a large tube equal in diameter to the whole top B*f* were placed upon it and cemented to it, and then if water were poured into the tube that was left in either of the holes, it would aſcend through all the reſt of the holes, until it filled the large tube to the ſame height that it ſtands in the ſmall one, after a ſufficient quantity had been poured into it: which ſhews, that the top B*f* was preſſed upward by the water under it, and before any hole was made in it, with a force equal that wherewith it is now preſſed downward by the weight of all the water above it in the great tube. And therefore, the reaction of the fixed top B*f* muſt be as great, in preſſing the water downward upon the bottom CC, as the whole preſſure of the water in the great tube would have been, if the top had been taken away, and the water in that tube left to preſs directly upon the water in the cavity BD*df*.

Perhaps the beſt machine in the world for demonſtrating the upward preſſure of fluids, is the hydroſtatic bellows, which conſiſts of two thick oval boards AB, EF, each about 16 inches broad, and 18 inches long: the ſides are of leather, joined very cloſe to the top and bottom by ſtrong nails. CD is a pipe ſcrewed into a piece of braſs on the top-board at C. Let ſome water be poured into the pipe at D, which will run into the bellows, and ſeparate the boards a little. Then lay three weights, each weighing 100 pounds, upon the upper board; and pour more water into the pipe, which will run into the bellows, and raiſe up the board with all the weights upon it; and if the pipe be kept full, until the weights are raiſed as high as the leather which covers the bellows will allow them, the water will remain in the pipe, and ſupport all the weights, even though it ſhould weigh no more than a quarter of a pound, and they 300 pounds: nor will all their force be able to cauſe them to deſcend and force the water out at the top of the pipe.

The reaſon of this will be made evident, by conſidering what has been already ſaid of the reſult of the preſſure of fluids of equal heights without any regard to their quantity. For, if a hole be made in the upper board, and a tube be put into it, the water will riſe in the tube to the ſame height that it does in the pipe; and would riſe as high (by ſupplying the pipe) in as many tubes as the board could contain holes. Now, ſuppoſe only one hole to be made in any part of the board, of an equal diameter with the bore of the pipe, and that the pipe holds juſt a quarter of a pound of water; if a perſons claps his finger upon the hole, and the pipe be filled with water, he will find his finger to be preſſed upward with a force equal to a quarter of a pound. And as the ſame preſſure is equal upon all equal parts of the board, each part, whoſe area is equal to the area of the hole, will be preſſed upward with a force equal to that of a quarter of a pound: the ſum of all which preſſures againſt the under ſide of an oval board 16 inches broad, and 18 inches long, will amount to 300 pounds; and therefore ſo much weight will be raiſed up and ſupported by a quarter of a pound of water in the pipe.

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Hence, if a man ſtands upon the upper board, and blows into the bellows through the pipe, he will raiſe himſelf upward upon the board: and the ſmaller the bore of the pipe is, the eaſier he will be able to raiſe himſelf. And then, by clapping his finger upon the top of the pipe, he can ſupport himſelf as long as he pleaſes; provided the bellows be air-tight, ſo as not to loſe what is blown into it.

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Upon this principle of the upward preſſure of fluids, a piece of lead may be made to ſwim in water, by immerſing it to a proper depth, and keeping the water from getting above it. Let CD be a glaſs tube, open at both ends; and EFG a flat piece of lead, exactly fitted to the lower end of the tube, not to go within it, but for it to ſtand upon; with a wet leather between the lead and the tube, to make cloſe work. Let this leaden bottom be half an inch thick, and held cloſe to the tube by pulling the packthread IHL upward at L with one hand, whilſt the tube is held in the other by the upper end C. In this ſituation, let the tube be immerſed in water in the glaſs veſſel AB, to the depth of ſix inches below the ſurface of the water at K; and then, the leaden bottom EFG will be plunged to the depth of ſomewhat more than eleven times its own thickneſs: holding the tube at that depth, you may let go the thread at L; and the lead will not fall from the tube, but will be kept to it by the upward preſſure of the water below it occaſioned by the height of the water at K above the level of the lead. For as lead is 11.33 times as heavy as its bulk of water, and is in this experiment immerſed to a depth ſomewhat more than 11.33 times its thickneſs, and no water getting into the tube between it and the lead, the column of water E*abc*G below the lead is preſſed upward againſt it by the water KDEGL all around the tube; which water being a little more than 11.33 times as high as the lead is thick, is ſufficient to balance and ſupport the lead at the depth KE. If a little water be poured into the tube upon the lead, it will increaſe the weight upon the column of water under the lead, and cauſe the lead to fall from the tube to the bottom of the glaſs veſſel, where it will lie in the ſituation *b d*. Or, if the tube be raiſed a little in the water, the lead will fall by its own weight, which will then be too great for the preſſure of the water around the tube upon the column of water below it. But the following method of making an extremely heavy body float upon water is more elegant. Take a long glaſs tube, open at both ends; ſtopping the lower end with a finger, pour in ſome quickſilver at the other end, ſo as to take up about half an inch in the tube below. Immerſe this tube, with the finger ſtill at the bottom, in a deep glaſs veſſel filled with water; and when the lower end of the tube is about ſeven inches below the ſurface, take away the finger from it, and then you will ſee the quickſilver not ſink into the veſſel, but remain ſuſpended upon the tube, and floating, if we may ſo expreſs it, upon the water in the glaſs-veſſel.

9
How light wood may be made to lie at the bottom of water.

In the ſame manner as an heavy body was made to ſwim on water, by taking away the upward preſſure; ſo may a light body, like wood, be made to remain ſunk at the bottom, by depriving it of all preſſure from below: for if two equal pieces of wood be planed, ſurface to ſurface, ſo that no water can get between them, and then one of them (*c d*) be cemented to the inſide of the veſſel's bottom; then the other being placed upon this, and, while the veſſel is filling, being kept down by a ſtick; when the ſtick is removed and the veſſel full, the upper piece of wood will not riſe from the lower one, but continue ſunk under water, though it is actually much lighter than water; for as there is no reſiſtance to its under ſurface to drive it upward, while its upper ſurface is ſtrongly preſſed down, it muſt neceſſarily remain at the bottom.

SECT. III. *Of the Specific Gravity of Bodies.*

10
Of ſpecific gravity.

WHEN an unſpongy or ſolid body ſinks in a veſſel of water, it removes a body of water equal to its own bulk, out of the place to which it deſcends. If, for inſtance, a copper ball is let drop into a glaſs of water, we well know, that if it ſinks, it will take up as much room as a globe of water equal to itſelf in ſize took up before.

Let us ſuppoſe, that this watery globe removed by the ball were frozen into a ſolid ſubſtance, and weighed in a ſcale againſt the copper ball: now the copper ball being more in weight than the globe, it is evident that it will ſink its own ſcale, and drive up the oppoſite, as all heavier bodies do when weighed againſt lighter; if, on the contrary, the copper ball be lighter than the water globe, the ball will riſe. Again, then, let us ſuppoſe the copper ball going to be immerſed in water; and that, in order to deſcend, it muſt diſplace a globe of water equal to itſelf in bulk. If the copper ball be heavier than the globe, its preſſure will overcome the other's reſiſtance, and it will ſink to the bottom; but if the watery globe be heavier, its preſſure upwards will be greater than that of the ball downward, and the ball will riſe or ſwim. In a word, in proportion as the ball is heavier than the ſimilar bulk of water, it will deſcend with greater force; in proportion as it is lighter, it will be raiſed more to the ſurface.

From all this we may deduce one general rule, which will meaſure the force with which any ſolid body tends to ſwim or ſink in water; namely, *Every body immerſed in water, loſes juſt as much of its weight as equals the weight of an equal bulk of water.* Thus, for inſtance, if the body be two ounces, and an equal bulk of water be one ounce, the body when plunged will ſink towards the bottom of the water with a weight of one ounce. If, on the contrary, the ſolid body be but one ounce, and the weight of an equal bulk of water be two ounces; the ſolid, when plunged, will remove but one ounce, that is, half as much water as is equal to its own bulk: ſo that, conſequently, it cannot deſcend; for to do that, it muſt remove a quantity of water equal to its own bulk. Again, if the ſolid be too ounces, and the equal bulk of water two ounces, the ſolid, wherever it is plunged, will neither riſe nor ſink, but remain ſuſpended at any depth.

Thus we ſee the reaſon why ſome bodies ſwim in water, and others ſink. Bodies of large bulk and little weight, like cork or feathers, muſt neceſſarily ſwim, becauſe an equal bulk of water is heavier than they; bodies of little bulk but great weight, like lead or gold, muſt ſink, becauſe they are heavier than an equal bulk of water. The bulk and the weight of any body conſidered together, is called its *ſpecific gravity;* and the proportion of both in any body is eaſily found by water. A body of little bulk and great weight, readily ſinks in water, and it is ſaid to have ſpecific gravity; a body of great bulk and little weight, loſes almoſt all its weight in water, and therefore is ſaid to have but little ſpecific gravity. A woolpack has actually greater real gravity, or weighs more in air, than a cannon ball; but for all that, a cannon ball may have more ſpecific gravity, and weigh more than the woolpack, in water. *Denſity* is a general term that means the ſame thing; *ſpecific gravity* is only a relative term, uſed when ſolids are weighed in fluids, or fluids in fluids.

As every ſolid ſinks more readily in water, in proportion as its ſpecific gravity is great, or as it contains greater weight under a ſmaller bulk, it will follow, that the ſame body may very often have different ſpecific gravities, and that it will ſink at one time and ſwim at another. Thus a man, when he happens to fall alive into the water, ſinks to the bottom; for the ſpecific gravity of his body is then greater than that of water: but if, by being drowned, he lies at the bottom for ſome days, his body ſwells by putrefaction, which diſunites its parts; thus its ſpecific gravity becomes leſs than that of water, and he floats upon the ſurface.

11 How to diſcover adulterations in metals.

Several more important uſes are the reſult of our being able exactly to determine the ſpecific gravities of bodies. We can, by weighing metals in water, diſcover their adulterations or mixtures with greater exactneſs than by any other means whatſoever. By this means, the counterfeit coin, which may be offered us as gold, will be very eaſily diſtinguiſhed, and known to be a baſer metal. For inſtance, if we are offered a braſs counter for a guinea, and we ſuſpect it; ſuppoſe, to clear our ſuſpicions, we weigh it in the uſual manner againſt a real guinea in the oppoſite ſcale, and it is of the exact weight, yet ſtill we ſuſpect it; What is to be done? To melt or deſtroy the figure of the coin would be inconvenient and improper: a much better and more accurate method remains. We have only to weigh a real guinea in water, and we ſhall thus find that it loſes but a nineteenth part of its weight in the balance: We then weigh the braſs counter in water, and we actually find it loſes an eighth part of its weight by being weighed in this manner. This at once demonſtrates, that the coin is made of a baſe metal, and not gold; for as gold is the heavieſt of all metals, it will loſe leſs of its weight by being weighed in water than any other.

This method Archimedes firſt made uſe of to detect a fraud with regard to the crown of Hiero king of Syracuſe. Hiero had employed a goldſmith to make him a crown, and furniſhed him with a certain weight of gold for that purpoſe; the crown was made, the weight was the ſame as before, but ſtill the king ſuſpected that there was an adulteration in the metal. Archimedes was applied to; who, as the ſtory goes, was for ſome time unable to detect the impoſition. It happened, however, one day as the philoſopher was ſtepping into a bath, that he took notice the water roſe in the bath in proportion to the part of his body immerſed. From this accident he received a hint; wherewith he was ſo tranſported, that he jumped out of the bath, and ran naked about the ſtreets of Syracuſe, crying in a wild manner, *I have found it! I have found it!*—In conſequence of this ſpeculation, he made two maſſes of the juſt weight of the crown; one of gold, the other of ſilver. Theſe he ſeverally let down carefully into a veſſel of water, wherein the riſe of the fluid might eaſily be determined by meaſure. Being of different ſpecific gravities, they were conſequently of different magnitudes, and on immerſion took up the room of different quantities of water; by comparing whereof with their abſolute gravities in the air, he became fully maſter of the relation, in point of weight, each of theſe metals had to water, and conſequently to each other. He then ſerved the crown in like manner; and by comparing his obſervations, he at length detected the cheat, and fairly aſſigned the quantities of gold and ſilver contained in the crown reſpectively.

12 The hy ſtatic ba lance.

Upon this difference in the weight of bodies in open air and water, the hydroſtatic balance has been formed; which differs very little from a common balance, but that it hath an hook at the bottom of one ſcale, on which the weight we want to try may be hung by an horſe-hair, and thus ſuſpended in water, without wetting the ſcale from whence it hangs. Firſt, the weight of the body we want to try is balanced againſt the parcel or weight in open air; then the body is ſuſpended by the hook and horſe-hair at the bottom of the ſcale in water, which we well know will make it lighter, and deſtroy the balance. We then can know how much lighter it will be, by the quantity of the weights we take from the ſcale to make it equipoiſe; and of conſequence we thus preciſely can find out its ſpecific gravity compared to water (A). This is the moſt exact

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(A) This is the common hydroſtatic balance. The reader will ſee an improved apparatus at *Hydroſtatic* BALANCE, in the order of the alphabet.

exact and infallible method of knowing the genuineneſs of metals, and the different mixtures with which they may be adulterated, and it will anſwer for all ſuch bodies as can be weighed in water. As for thoſe things that cannot be thus weighed, ſuch as quickſilver, ſmall ſparks of diamond, and ſuch like, as they cannot be ſuſpended by an horſe-hair, they muſt be put into a glaſs-bucket, the weight of which is already known: this, with the quickſilver, muſt be balanced by weights in the oppoſite ſcale, as before, then immerſed, and the quantity of weights to be taken from the oppoſite ſcale will ſhew the ſpecific gravity of the bucket and the quickſilver together: the ſpecific gravity of the bucket is already known; and of conſequence the ſpecific gravity of the quickſilver, or any other ſimilar ſubſtance, will be what remains.

As we can thus diſcover the ſpecific gravity of different ſolids by plunging them in the ſame fluid, ſo we can diſcover the ſpecific gravity of different fluids, by plunging the ſame ſolid body into them; for in proportion as the fluid is light, ſo much will it diminiſh the weight of the body weighed in it. Thus we may know that ſpirit of wine has leſs ſpecific gravity than water, becauſe a ſolid that will ſwim in water will ſink in ſpirit; on the contrary, we may know that ſpirit of nitre has greater ſpecific gravity than water, becauſe a ſolid that will ſink in water will ſwim upon the ſpirit of nitre. Upon this principle is made that ſimple inſtrument called an *hydrometer*, which ſerves to meaſure the lightneſs or weight of different fluids. For that liquors weigh very differently from each other is found by experience. Suppoſe we take a glaſs-veſſel which is divided into two parts, communicating with each other by a ſmall opening of a line and an half diameter. Let the lower part be filled up to the diviſion with red wine, then let the upper part be filled with water. As the red-wine is lighter than water, we ſhall ſee it in a ſhort time riſing like a ſmall thread up through the water, and diffuſing itſelf upon the ſurface, till at length we ſhall find the wine and water have changed their places; the water will be ſeen in the lower half, and the wine in the upper half, of the veſſel. Or take a ſmall bottle AB, the neck of which muſt be very narrow, the mouth not more than $\frac{1}{5}$ of an inch wide; and have a glaſs-veſſel CD, whoſe height exceeds that of the bottle about two inches. With a ſmall funnel fill the bottle quite full of red-wine, and place it in the veſſel CD, which is to be full of water. The wine will preſently come out of the bottle, and riſe in form of a ſmall column to the ſurface of the water; and at the ſame time the water, entering the bottle, will ſupply the place of the wine; for water being ſpecifically heavier than wine, muſt hold the loweſt place, while the other naturally riſes to the top. A ſimilar effect will be produced if the bottle be filled with water, and the veſſel with wine: for the bottle being placed in the veſſel in an inverted poſition, the water will deſcend to the bottom of the veſſel, and the wine will mount into the bottle.

13 The hydro- eter.

late LIV. g. 7.

In the ſame manner we may pour four different liquors, of different weights, into any glaſs-veſſel, and they ſhall all ſtand ſeparate and unmixed with each other. Thus, if we take mercury, oil of tartar, ſpirit of wine, and ſpirit of turpentine, ſhake them together in a glaſs, and then let them ſettle a few minutes, each ſhall ſtand in its proper place, mercury at the bottom, oil of tartar next, ſpirit of wine, and then ſpirit of turpentine above all. Thus we ſee liquors are of very different denſities; and this difference it is that the hydrometer is adapted to compare. In general, all vinous ſpirits are lighter than water; and the leſs they contain of water, the lighter they are. The hydrometer, therefore, will inform us how far they are genuine, by ſhewing us their lightneſs; for in pure ſpirit of wine it ſinks leſs than in that which is mixed with a ſmall quantity of water.

The hydrometer ſhould be made of copper: for ivory imbibes ſpirituous liquors, and thereby alters their gravity; and glaſs requires an attention that is incompatible with expedition. The moſt ſimple hydrometer conſiſts of a copper ball B *b*, to which is ſoldered a braſs wire AB, one quarter of an inch thick. The upper part of this wire being filed flat, is marked *proof*, at *m*, fig. 2. becauſe it ſinks exactly to that mark in proof-ſpirits. There are two other marks at A and B, fig. 1. to ſhew whether the liquor be one-tenth above or below proof, according as the hydrometer ſinks to A, or emerges to B, when a braſs weight, as C or K, is ſcrewed to its bottom *c*. There are other weights to ſcrew on, which ſhew the ſpecific gravity of different fluids, quite down to common water.

Plate CLIV. fig. 1.

The round part of the wire above the ball may be marked ſo as to repreſent river-water when it ſinks to RW, fig. 2. the weight which anſwers to that water being then ſcrewed on; and when put into ſpring-water, mineral-water, ſea-water, and water of ſalt ſprings, it will gradually riſe to the marks SP, MI, SE, SA. On the contrary, when it is put into Briſtol water, rain-water, port-wine, and mountain-wine, it will ſucceſſively ſink to the marks *br*, *ra*, *po*, *mo*. Inſtruments of this kind are ſometimes called *areometers*.

There is another ſort of hydrometer that is calculated to aſcertain the ſpecific gravity of fluids to the greateſt preciſion poſſible, and which conſiſts of a large hollow ball B, fig. 3. with a ſmaller ball *b* ſcrewed on to its bottom, partly filled with mercury or ſmall ſhot, in order to render it but little ſpecifically lighter than water. The larger ball has alſo a ſhort neck at C, into which is ſcrewed the graduated braſs-wire AC, which, by a ſmall weight at A, cauſes the body of the inſtrument to deſcend in the fluid, with part of the ſtem.

When this inſtrument is ſwimming in the liquor contained in the jar ILMK, the part of the fluid diſplaced by it will be equal in bulk to the part of the inſtrument under water, and equal in weight to the whole inſtrument. Now, ſuppoſe the weight of the whole to be four thouſand grains, it is then evident we can by this mean compare the different dimenſions of four thouſand grains of ſeveral ſorts of fluids. For if the weight at A be ſuch as will cauſe the ball to ſink in rain-water till its ſurface come to the middle point of the ſtem 20; and after that, if it be immerſed in common ſpring-water, and the ſurface be obſerved to ſtand at one-tenth of an inch below the middle point 20; it is apparent, that the ſame weight of each water differs only in bulk by the magnitude of one-tenth of an inch in the ſtem.

Now, ſuppoſe the ſtem to be ten inches long, and to weigh a hundred grains, then every tenth of an inch will

Specific gravities.

will weigh one grain: and as the ſtem is of braſs, which is about eight times heavier than water, the ſame bulk of water will be equal to one-eighth of a grain, and conſequently to the one-eighth of one four-thouſandth part, that is, one thirty-two thouſandth part of the whole bulk. This inſtrument is capable of ſtill greater preciſion, by making the ſtem or neck conſiſt of a flat thin ſlip of braſs, inſtead of one that is cylindrical: for by this means we increaſe the ſurface, which is the moſt requiſite circumſtance, and diminiſh the ſolidity, which neceſſarily renders the inſtrument ſtill more accurate.

To adapt this inſtrument to all purpoſes, there ſhould be two ſtems, to ſcrew on and off, in a ſmall hole at *a*. One ſtem ſhould be a ſmooth thin ſlip of braſs, or rather ſteel, like a watch-ſpring ſet ſtraight, ſimilar to that we have juſt now mentioned; on one ſide of which is to be the ſeveral marks or diviſions to which it will ſink in different ſorts of water, as rain, river, ſpring, ſea, and ſalt-ſpring waters, &c.; and on the other ſide you may mark the diviſions to which it ſinks in various lighter fluids, as hot Bath water, Briſtol water, Lincomb water, Cheltenham water, port-wine, mountain, madeira, and other ſorts of wines. But here the weight at A on the top muſt be a little leſs than before when it was uſed for heavier waters.

But in trying the ſtrength of the ſpirituous liquors, a common cylindric ſtem will do beſt, becauſe of its ſtrength and ſteadineſs: and this ought to be ſo contrived, that, when immerſed in what is called proof-ſpirit, the ſurface of the ſpirit may be upon the middle point 20; which is eaſily done by duly adjuſting the ſmall weight A on the top, and making the ſtem of ſuch a length, that, when immerſed in water, it may juſt cover the ball and riſe to *a*; but, when immerſed in pure ſpirit, it may riſe to the top A. Then, by dividing the upper and lower parts *a* 20 and A 20, into ten equal parts each, when the inſtrument is immerſed into any ſort of ſpirituous liquor, it will immediately ſhow how much it is above or below proof.

Proof-ſpirit conſiſts of half water and half pure ſpirit, that is, ſuch as, when poured on gun-powder, and ſet on fire, will burn all away; and permits the powder to take fire and flaſh, as in open air. But if the ſpirit be not ſo highly rectified, there will remain ſome water, which will make the powder wet, and unfit to take fire. Proof-ſpirit of any kind weighs ſeven pounds twelve ounces per gallon.

The common method of ſhaking the ſpirits in a phial, and raiſing a head of bubbles, to judge by their manner of riſing or breaking whether the ſpirit be proof, or near it, is very fallacious. There is no way ſo certain, and at the ſame time ſo eaſy and expeditious, as this by the hydrometer.

Yet, after all, we are not entirely to depend, and with geometrical certainty rely, upon either the hydrometer or the hydroſtatic balance; for there are ſome natural inconveniencies that diſturb the exactneſs with which they diſcover the ſpecific gravities of different bodies. Thus, if the weather be hotter at one time than another, all fluids will ſwell, and conſequently they will be lighter than when the weather is cold: the air itſelf is at one time heavier than at another, and will buoy up bodies weighed in it; they will therefore appear lighter, and will of conſequence ſeem heavier in water. In ſhort, there are many cauſes that would prevent us from making tables of the ſpecific gravities of bodies, if rigorous exactneſs were only expected; for the individuals of every kind of ſubſtance differ from each other, gold from gold, and water from water. In ſuch tables, therefore, all that is expected is to come as near the exact weight as we can; and from an inſpection into ſeveral, we may make an average near the truth. Thus, Muſchenbroek's table makes the ſpecific gravity of rain-water to be nearly eighteen times and an half leſs than that of a guinea; whereas our Engliſh tables make it to be but ſeventeen times and an half, nearly, leſs than the ſame. But though there may be ſome minute variation in all our tables, yet they in general may ſerve to conduct us with ſufficient accuracy.

Specific gravities.

In conſtructing tables of ſpecific gravities with accuracy, the gravity of water muſt be repreſented by unity or 1.000, where three ciphers are added, to give room for expreſſing the ratios of other gravities in decimal parts, as in the following table.

14 Table of ſpecific gravities.

A TABLE of the SPECIFIC GRAVITIES of ſeveral ſolid and fluid bodies.

A cubic inch of	Troy weight. oz.	pw.	gr.	Avoirdu. oz.	drams.	Comparative weight.
Very fine gold	10	7	3.83	1	5.80	19.637
Standard gold	9	19	6.44	10	14.90	18.888
Guinea gold	9	7	17.18	10	4.76	17.793
Moidore gold	9	0	19.84	9	14.71	17.140
Quickſilver - -	7	7	11.61	8	1.45	14.019
Lead - -	5	19	17.55	6	9.08	11.325
Fine ſilver -	5	16	23.23	6	6.66	11.087
Standard Silver	5	11	3.36	6	1.54	10.535
Copper - -	4	13	7.04	5	1.89	8.843
Plate-braſs -	4	4	9.60	4	10.09	8.000
Steel - - -	4	2	20.12	4	8.70	7.852
Iron - - -	4	0	15.20	4	6.77	7.645
Block-tin -	3	17	5.68	4	3.79	7.321
Spelter - -	3	14	12.86	4	1.42	7.065
Lead ore - -	3	11	17.76	3	14.96	6.800
Glaſs of antimony	2	15	16.89	3	0.89	5.280
German antimony	2	2	4.80	2	5.04	4.000
Copper ore -	2	1	11.83	2	4.43	3.775
Diamond - -	1	15	20.88	1	15.48	3.400
Clear glaſs -	1	13	5.58	1	13.16	3.150
Lapis lazuli -	1	12	5.27	1	12.27	3.054
Welch aſbeſtos	1	10	17.57	1	10.97	2.913
White marble	1	8	13.41	1	9.06	2.707
Black ditto -	1	8	12.65	1	9.02	2.704
Rock cryſtal	1	8	1.00	1	8.61	2.658
Green glaſs -	1	7	15.38	1	8.26	2.620
Cornelian ſtone	1	7	1.21	1	7.73	2.568
Flint - -	1	6	10.63	1	7.53	2.542
Hard paving-ſtone	1	5	22.87	1	6.77	2.460
Live ſulphur -	1	1	2.40	1	2.52	2.000
Nitre - -	1	0	1.08	1	1.59	1.900
Alabaſter - -	0	19	18.74	1	1.35	1.875
Dry ivory -	0	19	6.09	1	0.89	1.825
Brimſtone -	0	18	23.76	1	0.66	1.800
Alum - -	0	17	21.92	0	15.72	1.714
Ebony - -	0	11	18.82	0	10.34	1.117

The Table concluded.

A cubic inch of	Troy weight.			Avoird.		Comparative weight.
	oz.	pw.	gr.	oz.	dr.	
Human blood	0	11	2.89	0	9.76	1.054
Amber - -	0	10	20.79	0	9.54	1.030
Cow's milk -	0	10	20.79	0	9.54	1.030
Sea-water	0	10	20.79	0	9.54	1.030
Pump-water	0	10	13.30	0	9.26	1.000
Spring-water	0	10	12.94	0	9.25	0.999
Diſtilled water	0	10	11.42	0	9.20	0.993
Red wine -	0	10	11.42	0	9.20	0.993
Oil of amber	0	10	7.63	0	9.06	0.978
Proof ſpirits -	0	9	19.73	0	8.62	0.931
Dry oak - -	0	9	18.00	0	8.56	0.925
Olive oil - -	0	9	15.17	0	8.45	0.913
Pure ſpirits -	0	9	3.27	0	8.02	0.866
Spirit of turpent.	0	9	2.76	0	7.99	0.864
Oil of turpentine	0	8	8.53	9	7.33	0.772
Dry crabtree	0	8	1.69	0	7.08	0.765
Saſſafras wood	0	5	2.04	0	4.46	0.482
Cork - -	0	2	12.77	0	2.21	0.240

Take away the decimal point from the numbers in the right-hand column, or (which is the ſame) multiply them by 1000, and they will ſhew how many ounces avoirdupoiſe are contained in a cubic foot of each body.

15
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tals.

The uſe of the table of ſpecific gravities will beſt appear by an example. Suppoſe a body to be compounded of gold and ſilver, and it is required to find the quantity of each metal in the compound.

Firſt find the ſpecific gravity of the compound, by weighing it in air and in water; and dividing its aërial weight by what it loſes thereof in water, the quotient will ſhew its ſpecific gravity, or how many times it is heavier than its bulk of water. Then, ſubtract the ſpecific gravity of ſilver (found in the table) from that of the compound, and the ſpecific gravity of the compound from that of gold; the firſt remainder ſhews the bulk of gold, and the latter the bulk of ſilver, in the whole compound: and if theſe remainders be multiplied by the reſpective ſpecific gravities, the products will ſhew the proportion of weights of each metal in the body. Example:

Suppoſe the ſpecific gravity of the compounded body be 13; that of ſtandard ſilver (by the table) is 10.5, and that of gold 19.63: therefore 10.5 from 13, remains 2.5, the proportional bulk of the gold; and 13 from 19.63, remains 6.63, the proportional bulk of ſilver in the compound. Then, the firſt remainder 2.5, multiplied by 19.63, the ſpecific gravity of gold, produces 49.075 for the proportional weight of gold; and the laſt remainder 6.63 multiplied by 10.5, the ſpecific gravity of ſilver, produces 69.615 for the proportional weight of ſilver in the whole body. So that for every 49.07 ounces or pounds of gold, there are 69.6 pounds or ounces of ſilver in the body.

Hence it is eaſy to know whether any ſuſpected metal be genuine, or allayed, or counterfeit; by finding how much it is heavier than its bulk of water, and comparing the ſame with the table: if they agree, the metal is good; if they differ, it is allayed or counterfeited.

16
How to try ſpirituous liquors.

A cubical inch of good brandy, rum, or other proof ſpirits, weighs 235.7 grains; therefore, if a true inch cube of any metal weighs 235.7 grains leſs in ſpirits than in air, it ſhews the ſpirits are proof. If it loſes leſs of its aërial weight in ſpirits, they are above proof; if it loſes more, they are under: For, the better the ſpirits are, they are the lighter; and the worſe, the heavier.

Sect. IV. *Hydraulics.*

Hydraulics is that part of hydroſtatics, which teaches to eſtimate the ſwiftneſs or the force of fluids in motion.

It has been always thought an inquiry of great curioſity, and ſtill greader advantage, to know the cauſes by which water ſpouts from veſſels to different heights and diſtances. We have obſerved, for inſtance, an open veſſel of liquor upon its ſtand, pierced at the bottom: the liquor, when the opening is firſt made, ſpouts out with great force; but as it continues to run, becomes leſs violent, and the liquor flows more feebly. A knowledge of hydraulics will inſtruct us in the cauſe of this diminution of its ſtrength; it will ſhew preciſely how far the liquor will ſpout from any veſſel, and how faſt or in what quantities it will flow. Upon the principles of this ſcience, many machines worked by water are entirely conſtructed; ſeveral different engines uſed in the mechanic arts, various kinds of mills, pumps, and fountains, are the reſult of this theory, judiciouſly applied.

17
The velocity of ſpouting water.

And what is thus demonſtrated of the bottom of the veſſel, is equally true at every other depth whatſoever. Let us then reduce this into a theorem: *The velocity with which water ſpouts out at a hole in the ſide or bottom of a veſſel, is as the ſquare root of the depth or diſtance of the hole below the ſurface of the water.* For, in order to make double the quantity of a fluid run through one hole as through another of the ſame ſize, it will require four times the preſſure of the other, and therefore muſt be four times the depth of the other below the ſurface of the water: and for the ſame reaſon, three times the quantity running in an equal time through the ſame ſort of hole, muſt run with three times the velocity; which will require nine times the preſſure, and conſequently muſt be nine times as deep below the ſurface of the fluid: and ſo on.—To prove this by an experiment: Let two pipes, as C and *g*, of equal ſized bores, be fixed into the ſide of the veſſel AB; the pipe *g* being four times as deep below the ſurface of the water at *b* in the veſſel as the pipe C is: and whilſt theſe pipes run, let water be conſtantly poured into the veſſel, to keep the ſurface ſtill at the ſame height. Then, if a cup that holds a pint be ſo placed as to receive the water that ſpouts from the pipe C, and at the ſame moment a cup that holds a quart be ſo placed as to receive the water that ſpouts from the pipe *g*, both cups will be filled at the ſame time by their reſpective pipes.

Plate CLII. fig. 9.

18
The horizontal diſtance to which water will ſpout from pipes.

The horizontal diſtance to which a fluid will ſpout from a horizontal pipe in any part of the ſide of an upright veſſel below the ſurface of the fluid, is equal to twice the length of a perpendicular to the ſide of the veſſel, drawn from the mouth of the pipe to a ſemicircle deſcribed upon the altitude of the fluid: and therefore, the fluid will ſpout to the greateſt diſtance poſſible

Plate CLII. fig. 9.

poſſible from a pipe whoſe mouth is at the centre of the ſemicircle; becauſe a perpendicular to its diameter (ſuppoſed parallel to the ſide of the veſſel) drawn from that point, is the longeſt that can poſſibly be drawn from any part of the diameter to the circumference of the ſemicircle. Thus, if the veſſel AB be full of water, the horizontal pipe D be in the middle of its ſide, and the ſemicircle N*edcb* be deſcribed upon D as a centre, with the radius or ſemidiameter D*g*N, or D*fb*, the perpendicular D*d* to the diameter ND*b* is the longeſt that can be drawn from any part of the diameter to the circumference N*edcb*. And if the veſſel be kept full, the jet G will ſpout from the pipe D, to the horizontal diſtance NM, which is double the length of the perpendicular D*d*. If two other pipes, as C and E, be fixed into the ſide of the veſſel at equal diſtances above and below the pipe D, the perpendiculars C*c* and E*e*, from theſe pipes to the ſemicircle, will be equal; and the jets F and H ſpouting from them will each go to the horizontal diſtance NK; which is double the length of either of the equal perpendiculars C*c* or D*d*.

19 How water may be conveyed over hills and valleys.

Fluids by their preſſure may be conveyed over hills and valleys in bended pipes, to any height not greater than the level of the ſprings from whence they flow. This is what the ancients were ignorant of; and therefore they uſually built AQUEDUCTS (vaſt rows of arches one above another, between two hills, at a vaſt expence of money, time, and labour,) in order to convey water over them, croſs the valley, in a common channel. This is now done to equal advantage, and at much leſs expence, by a range of pipes laid down one hill and up the other. An inſtance whereof may be given by a bent tube or crane; into one of the equal legs whereof if water be poured, it will riſe to the ſame level exactly in the other. The reaſon is obvious: In the leg A, (fig. 14.) there are, ſuppoſe, two ounces of water endeavouring by the power of gravity to deſcend with the force of 2; theſe will thruſt forward, buoy up, and ſupport an equal quantity of a like fluid in B; and the bottom of the machine C, againſt which both ſides equally bear, will of conſequence ſuſtain a double preſſure, or that of four ounces; and in the preſent caſe will pretty well repreſent the prop or fixed point of a balance-beam; as the equal fluid-columns AC, and BC, may be admitted to denote equal weights, ſuſpended on the balance-arms, counterpoiſing each other. So that the riſe of fluids to their firſt level, thus conſidered, is a caſe truly ſtatical; and all their other motions proceed only from weight added.

20 The ſyphon.

A *ſyphon*, generally uſed for decanting liquors, is a bended pipe, whoſe legs are of unequal lengths; and the ſhorteſt leg muſt always be put into the liquor intended to be decanted, that the perpendicular altitude of the column of liquor in the other leg may be longer than the column in the immerſed leg, eſpecially above the ſurface of the water. For, if both columns were equally high in that reſpect, the atmoſphere, which preſſes as much upward as downward, and therefore acts as much upward againſt the column in the leg that hangs without the veſſel, as it act downward upon the ſurface of the liquor in the veſſel, would hinder the running of the liquor through the ſyphon, even though it were brought over the bended part by ſuction. So that there is nothing left to cauſe the motion of the liquor, but the ſuperior weight of the column, in the longer leg, on account of its having the greater perpendicular height.

Fig. 10.

Let D be a cup filled with water to C; and ABC a ſyphon, whoſe ſhorter leg BCF is immerſed in the water from C to F. If the end of the other leg were no lower than the line AC, which is level with the ſurface of the water, the ſyphon would not run, even though the air ſhould be drawn out of it at the mouth A. For although the ſuction would draw ſome water at firſt, yet the water would ſtop at the moment the ſuction ceaſed; becauſe the air would act as much upward againſt the water at A, as it acted downward for it by preſſing on the ſurface at C. But if the leg AB comes down to G, and the air be drawn out at G by ſuction, the water will immediately follow, and continue to run until the ſurface of the water in the cup comes down to F; becauſe, till then, the perpendicular height of the column BAG will be greater than that of the column CB; and, conſequently, its weight will be greater, until the ſurface comes down to F; and then the ſyphon will ſtop, though the leg CF ſhould reach to the bottom of the cup. For which reaſon, the leg that hangs without the cup is always made long enough to reach below the level of its bottom; as from *d* to E: and then, when the ſyphon is emptied of air by ſuction at E, the water immediately follows, and by its continuity brings away the whole from the cup; juſt as pulling one end of a thread will make the whole clue follow.

If the perpendicular height of a ſyphon, from the ſurface of the water to its bended top at B, be more than 33 feet, it will draw no water, even though the other leg were much longer, and the ſyphon quite emptied of air, becauſe the weight of a column of water 33 feet high, is equal to the weight of as thick a column of air, reaching from the ſurface of the earth to the top of the atmoſphere: ſo that there will then be an equilibrium; and conſequently, though there would be weight enough of air upon the ſurface C to make the water aſcend in the leg CB almoſt to the height B, if the ſyphon were emptied of air, yet the weight would not be ſufficient to force the water over the bend; and therefore, it could never be brought into the leg BAG.

Mercury may be drawn through a ſyphon in the ſame manner as water; but then the utmoſt height of the ſyphon muſt always be leſs than 30 inches, as mercury is near 14 times heavier than water. That fluids are forced through the ſyphon by the preſſure of the atmoſphere, is proved experimentally by the air-pump; for, if a ſyphon immerſed in a veſſel of water be placed when running in the receiver, and the air extracted, the running will immediately ceaſe. If the ſyphon is very ſmall, however, this is not always the caſe; and the running of capillary ſyphons *in vacuo* is a circumſtance very difficult to be explained. See BAROMETER, n° 10—13. and SYPHON.

There is a ſort of ſyphon that will draw off water without having the air previouſly extracted from it: this conſiſts of a capillary tube, about 1-10th of an inch bore, and acts by the attraction of coheſion: for the water being attracted by the leg immerſed, is ſlowly drawn up to the top of the ſyphon, and from thence gradually deſcends by its own gravity. From the ſame cauſe it is, that if one end of a piece of the liſt of cloth be put into the water of a veſſel, and the other end hang over its ſide, the water will be ſucked up by the end of the liſt in the veſſel, which in this caſs acts as a bundle of very fine capillary tubes, and drop from the other end. This experiment with a capillary tube will ſucceed *in vacuo*.

Upon the principle of the ſyphon depend the experiments of *Tantalus's cup*, n° 38; *the Fountain at command*, n° 39; and *the inverted drinking-glaſs*, n° 52. As to the laſt of theſe, it may be here obſerved, that if the paper was put dry on ſuch a veſſel empty, it would ſink in the air, and fall away even by its own gravity; and if put on wet, it were to be doubted whether a very ſmall weight added thereto would not ſeparate it from the glaſs, ſo inconſiderable would the tenacity of the water be in this caſe. The paper therefore cannot be ſuppoſed to ſupport the incumbent weight of water; and the true cauſe thereof muſt be this: The bottom and ſides of the inverted glaſs-veſſel being rigid, keep off the preſſure of the air from the fluid above, whereas it hath liberty of acceſs and freely acts thereon below: and that it does ſo, will in part appear to an obſerver by the concavity of the paper underneath. Could the air's preſſure in this caſe be any-how admitted through the foot of the veſſel inverted, without doubt the whole column would deſcend together. And the like would happen ſhould the paper be removed; but for a different reaſon, viz. the large column of water in the mug, being compoſed of many collateral ones, which, being diſpoſed as in a bundle, reſt on the paper wherewith the veſſel is covered, as on a common baſe; and theſe being all equally denſe, and equally fluid, are all retained, and continued of the ſame length, by the general and uniform preſſure of the air againſt the paper below; and ſo long as this continues, none of them getting the leaſt advantage over the reſt, they are all ſuſtained in a body compact together. But when the paper is removed, it being ſcarce poſſible to hold the veſſel ſo exactly level, but that ſome one or other of theſe ſmaller fluid columns will become longer, conſequently heavier, than thoſe adjacent, and, over-balancing the reſt, will deſcend, and give the lighter fluid, the air, leave to riſe into its place, even to the top of the glaſs; the general preſſure whereof being there admitted, will ſoon cauſe the reſt of them to move, and the whole quantity will then deſcend, ſeemingly together.

Again, ſhould a veſſel be but part filled with water, the ſame effect will follow to a certain degree. For inſtance, ſuppoſe we fill a long glaſs half with water, cover it with paper, and turn it down as before. Six inches ſuppoſe of water, endeavouring to deſcend, will by its weight rareſy the air in the glaſs above it, perhaps a 60th part or more. The denſer air without will then overpoiſe the air rarefied within; and therefore a certain quantity of water, equal to the difference of the two preſſures, will in this caſe be thereby buoyed up and ſupported. But the air within the glaſs being dilated as aforeſaid, the water ſuſpended muſt be expected to hang ſomething below the mouth of it; though not enough, perhaps, to overcome the tenacity of the water, and make it all deſcend.

21 Intermitting ſprings Plate CLIII. fig. 2.

Upon the principle of the ſyphon alſo we may eaſily account for *intermitting* or *reciprocating ſprings*. Let AA be part of a hill, within which there is a cavity BB; and from this cavity a vein or channel running in the direction of BCDE. The rain that falls upon the ſide of the hill will ſink and ſtrain through the ſmall pores and crannies G, G, G, G; and fill the cavity K with water. When the water riſes to the level HHC, the vein BCDE will be filled to C, and the water will run through CDF as through a ſyphon; which running will continue until the cavity be emptied, and then it will ſtop until the cavity be filled again.

22 Jets-d'eau.

We have ſeen that fluids led in pipes, will always riſe to the level of the reſervoir whence they are ſupplied; the riſing column being puſhed forward, and raiſed by another equally heavy, at the ſame time endeavouring to deſcend. A like effect might be expected from jets of water thus impelled, did not friction againſt the ſides of the machines, and the reſiſtance of the air, both lateral and perpendicular, generally prove an abatement, and prevent its riſing ſo high as the head.

Where jets are executed in the beſt manner, and the friction ſpoken of is as much as poſſible removed, the impediment of the air only, through which they needs muſt beat in their riſe, will cauſe them, according to experiment, to fall ſhort of the height of the reſervoirs, in the following proportions, viz.

Jet.	Reservoir.	
Feet.	Feet.	Inches.
5	5 :	1
10	10 :	4
15	15 :	9
20	21 :	4
25	27 :	1
30	33 :	0
35	39 :	1
40	45 :	4
45	51 :	9
50	58 :	4
55	65 :	1
60	72 :	0
65	79 :	1
70	86 :	4
75	93 :	9
80	101 :	4
85	109 :	1
90	117 :	0
95	125 :	1
100	133 :	4

Whence in general it may be obſerved:

That as often as a five-foot jet (to be taken in theſe matters as a ſtandard,)

Shall be contained in the height of any jet propoſed;

By ſo many inches multiplied into themſelves, or ſquared,

The ſurface of the water in the reſervatory which ſupplies it, ought to exceed that jet in height.

Thus, to obtain a jet of 30 feet, which contains five feet ſix times, the reſervoir ought to be 36 inches, or a yard higher; and a jet of 60 feet may be had from a head higher by four times that difference, 144 inches, or four yards. So that *jets done in the beſt manner fall ſhort of the heights of their reſervatories, in a kind of ſubduplicate ratio of the heights to which they riſe.*

This great diſproportion in the riſe of jets muſt in general be owing to the reſiſtance of the air they are made to move through; which has been ſhewn to be in proportion to the ſquares of their celerities reſpectively: nor can the acceleration of the falling water in the pipe, or the retardment of the riſing ſtream by the action of gravity, be concerned at all in it; ſince theſe are probably adequate, and counterbalance each other every where in the ſame level.

The air's reſiſtance being thus conſiderable, it will always be found neceſſary to increaſe the bore of the adjutage or ſpouting-pipe with the height of the reſervatory: for if it be too ſmall, the riſing ſtream will want ſufficient weight and power to divide the air; which being denſeſt near the earth, a ſmall ſtream of water, endeavouring to mount to a great height, will be daſhed againſt it with ſo great violence, as to fall away in a miſt and be wholly loſt. And it may be obſerved, that the weightier any body is, the greater force it will have when in motion: ſince an ounce-ball fired from a muſquet, will go much farther, and do greater execution, than will an equal weight of ſhot; and theſe again may be projected farther than ſo much lead raſped into powder and fired off. A charge of water fired from a piſtol would ſcarce wet a paper at the diſtance of ſix feet. Accordingly, ſhould a caſk of water be any where pierced with holes of two, four, ſix, eight, and twelve lines over, all in the ſame level, the larger bore will always be found to throw the water fartheſt.

It may be of uſe here to add Mr Marriote's proportions of the bores of the adjutages and pipes of conduct, who was very converſant in theſe things, and hath written very well on this ſubject.

N. B. The French divide their inch into 12 equal parts, which they call *lines*.

Heights of Reſervoirs.	*Diameters of fit Adjutages.*	*Diameter of the Pipes of Conduct.*
FEET.	LINES.	LINES.
5	3, 4, 5, or 6	22
10	4, 5, or 6 ——	25 INCHES.
15	5, or 6 ——	27, or $2\frac{1}{4}$
20	6, or half an inch	30, or $2\frac{1}{2}$
25	Ditto ——	33, or $2\frac{3}{4}$
30	Ditto ——	36, or 3
40	7, or 8 ——	51, or $4\frac{1}{4}$
50	8, or 10 ——	65, or $5\frac{1}{2}$
60	10 or 12 ——	72, or 6
80	12, or 14 ——	84, or 7
100	12, 14, or 15	96, or 8

Hence it may be remarked, that there is a certain and fit proportion to be obſerved between the adjutage whereby the jet is delivered, and the pipe conducting it from the head. In general, *About five times the diameter of the adjutage for jets under half an inch, and ſix or ſeven times for all above, will ſize the pipes of conduct pretty well:* not but it will always be an error on the right ſide, to have them rather larger than in ſtrictneſs they ought to be, that the jet may always be freely ſupplied with water, and in due time.

For a like reaſon, if there be occaſion for a cock to be placed in any part of the pipe of conduct, particular care muſt be taken that it ſhould be there bigger in proportion, that the water-way may not be pinched; but that the cavity be left at leaſt equal to the bore of the reſt of the pipe.

The bore of an adjutage cannot be too ſmooth or true. Thoſe that are cylindrical are beſt; thoſe that are bored conical worſt, becauſe of the reflections of the water from the inclined ſides of the machine, which in the hurry of the iſſuing ſtream will in them unavoidably be made.

When fluids are deſigned to be raiſed higher than the ſprings from whence they flow, forcing engines muſt be uſed; of which, and other hydraulic machines, we come now to give a particular account.

SECT. V. *Hydraulic Engines.*

23 Of pumps.

THE pump is at once the moſt common and moſt uſeful of all the hydraulic inſtruments. It was firſt invented by Cteſebes, a mathematician of Alexandria, 120 B. C. When the air's preſſure came afterwards to be known, it was much improved, and it is now brought to a great degree of perfection.

Of this machine there are ſimply three kinds, viz. the ſucking, the forcing, and the lifting-pump. By the two laſt, water may be raiſed to any height, with an adequate apparatus and ſufficient power: by the former it may, by the general preſſure of the atmoſphere on the ſurface of the well-water, be raiſed no more than 33 feet, as was before hinted, though in practice it is ſeldom applied to the raiſing it much above 28; becauſe from the variations obſerved on the barometer, it is apprehended that the air may, on certain occaſions, be ſomething lighter than 33 feet of water; and whenever that ſhall happen, for want of the due counterpoiſe, this pump may fail in its performance.

24 The common pump.

The *common ſucking-pump*, with which we draw water out of wells, is an engine both pneumatic and hydraulic. It conſiſts of a pipe open at both ends, in which is a moveable piſton, bucket, or ſucker, as big as the bore of the pipe in that part wherein it works; and is leathered round, ſo as to fit the bore exactly; and may be moved up and down, without ſuffering any air to come between it and the pipe or pump-barrel.

We ſhall explain the conſtruction of this and the forcing-pump by pictures of glaſs models, in which both the action of the piſtons and motion of the valves are ſeen.

Plate CLIII. fig. 3.

Hold the model DCBL upright in the veſſel of water K, the water being deep enough to riſe at leaſt as high as from A to I. The valve *a* on the moveable bucket G, and the valve *b* on the fixed box H, (which box quite fills the bore of the pipe or barrel at H) will each lie cloſe, by its own weight, upon the hole in the bucket and box, until the engine begins to work. The valves are made of braſs, and covered underneath with leather for cloſing the holes the more exactly: and the bucket G is raiſed and depreſſed alternately by the handle E and rod D *d*, the bucket being ſuppoſed at B before the working begins.

Take hold of the handle E, and thereby draw up the bucket from B to C, which will make room for the air in the pump all the way below the bucket to dilate itſelf, by which its ſpring is weakened, and then its force is not equivalent to the weight or preſſure of the outward air upon the water in the veſſel K: and therefore, at the firſt ſtroke, the outward air will preſs up the water through the notched foot A, into the lower pipe, about as far as *e*: this will condenſe the rarefied air in the pipe between *e* and C to the ſame ſtate it was in before; and then, as its ſpring within the pipe is equal to the force or preſſure of the outward air, the water will riſe no higher by the firſt ſtroke; and the valve *b*, which was raiſed a little by the dilation of the air in the pipe, will fall, and ſtop the hole in the box H; and the ſurface of the water will ſtand at *e*. Then depreſs the piſton or bucket from C to B; and as the air in the part B cannot get back again through the valve *b*, it will (as the bucket deſcends) raiſe the valve *a*, and ſo make its way through the upper part of the barrel *d* into the open air. But upon raiſing the bucket G a ſecond time, the air between it and the water in the lower pipe at *a* will be again left at liberty to fill a larger ſpace; and ſo its ſpring being again weakened, the preſſure of the outward air on the water in the veſſel K will force more water up into the lower pipe from *e* to *f*; and when the bucket is at its greateſt height C, the lower valve *b* will fall, and ſtop the hole in the box H as before. At the next ſtroke of the bucket or piſton, the water will riſe through the box H towards B; and then the valve *b*, which was raiſed by it, will fall when the bucket G is at its greateſt height. Upon depreſſing the bucket again, the water cannot be puſhed back through the valve *b*, which keeps cloſe upon the hole whilſt the piſton deſcends. And upon raiſing the piſton again, the outward preſſure of the air will force the water up through H, where it will raiſe the valve, and follow the bucket to C. Upon the next depreſſion of the bucket G, it will go down into the water in the barrel B; and as the water cannot be driven back through the now cloſe valve *b*, it will raiſe the valve *a* as the bucket deſcends, and will be lifted up by the bucket when it is next raiſed. And now, the whole ſpace below the bucket being full, the water above it cannot ſink when it is next depreſſed; but upon its depreſſion, the valve *a* will riſe to let the bucket go down; and when it is quite down, the valve *a* will fall by its weight, and ſtop the hole in the bucket. When the bucket is next raiſed, all the water above it will be lifted up, and begin to run off by the pipe F. And thus, by raiſing and depreſſing the bucket alternately, there is ſtill more water raiſed by it; which getting above the pipe F, into the wide top I, will ſupply the pipe, and make it run with a continued ſtream.

So, at every time the bucket is raiſed, the valve *b* riſes, and the valve *a* falls; and at every time the bucket is depreſſed, the valve *b* falls, and *a* riſes.

As it is the preſſure of the air or atmoſphere which cauſes the water to riſe and follow the piſton or bucket G as it is drawn up; and ſince a column of water 33 feet high is of equal weight with as thick a column of the atmoſphere from the earth to the very top of the air; therefore, the perpendicular height of the piſton or bucket from the ſurface of the water in the well muſt always be leſs than 33 feet; otherwiſe the water will never get above the bucket. But, when the height is leſs, the preſſure of the atmoſphere will be greater than the weight of the water in the pump, and will therefore raiſe it above the bucket: and when the water has once got above the bucket, it may be lifted thereby to any height, if the rod D be made long enough, and a ſufficient degree of ſtrength be employed to raiſe it with the weight of the water above the bucket.

The force required to work a pump, will be as the height to which the water is raiſed, and as the ſquare of the diameter of the pump-bore in that part where the piſton works. So that, if two pumps be of equal heights, and one of them be twice as wide in the bore as the other, the wideſt will raiſe four times as much water as the narroweſt; and will therefore require four times as much ſtrength to work it.

The wideneſs or narrowneſs of the pump, in any other part beſides that in which the piſton works, does not make the pump either more or leſs difficult to work, except what difference may ariſe from the friction of the water in the bore; which is always greater in a narrow bore than in a wide one, becauſe of the greater velocity of the water.

The pump-rod is never raiſed directly by ſuch a handle as E at the top, but by means of a lever, whoſe longer arm (at the end of which the power is applied) generally exceeds the length of the ſhorter arm five or ſix times; and, by that means, it gives five or ſix times as much advantage to the power. Upon theſe principles, it will be eaſy to find the dimenſions of a pump that ſhall work with a given force, and draw water from any given depth. But, as theſe calculations have been generally neglected by pump-makers (either for want of ſkill or induſtry) the following table was calculated by the late ingenious Mr Booth for their benefit. In this calculation, he ſuppoſed the handle of the pump to be a lever increaſing the power five times; and had often found that a man can work a pump four inches diameter and 30 feet high, and diſcharge 27$\frac{1}{2}$ gallons of water (Engliſh wine-meaſure) in a minute. Now, if it be required to find the diameter of a pump that ſhall raiſe water with the ſame eaſe from any other height above the ſurface of the *well*; look for that height in the firſt column, and over-againſt it in the ſecond you have the diameter or width of the pump, and in the third you find the quantity of water which a man of ordinary ſtrength can diſcharge in a minute.

Height of the pump above the ſurface of the *well*.	Diameter of the bore where tke bucket works.		Water diſcharged in a minute, Engliſh wine-meaſure.	
Feet.	Inches.	100 parts.	Gallons.	Pints.
10	6	.93	81	6
15	5	.66	54	4
20	4	.90	40	7
25	4	.38	32	6
30	4	.00	27	2
35	3	.70	23	3
40	3	.46	20	3
45	3	.27	18	1
50	3	.10	16	3
55	2	.95	14	7
60	2	.84	13	5
65	2	.72	12	4
70	2	.62	11	5
75	2	.53	10	7
80	2	.45	10	2
85	2	.38	9	5
90	2	.31	9	1
95	2	.25	8	5
100	2	.19	8	1

25
The forcing pump, Plate CLIII. fig. 4.

The *forcing-pump* raiſes water through the box H in the ſame manner as the ſucking-pump does, when the plunger or piſton *g* is lifted up by the rod *D d*. But this plunger has no hole thro' it, to let the water in the barrel B C get above it, when it is depreſſed to B, and the valve *b* (which roſe by the aſcent of the water through the box H when the plunger *g* was drawn up) falls down and ſtops the hole in H, the moment that the plunger is raiſed to its greateſt height. Therefore, as the water between the plunger *g* and box H can neither get through the plunger upon its deſcent, nor back again into the lower part of the pump L *e*, but has a free paſſage by the cavity around H into the pipe MM, which opens into the air-veſſel KK at P; the water is forced through the pipe MM by the deſcent of the plunger, and driven into the air-veſſel; and in running up through the pipe at P, it opens the valve *a*; which ſhuts at the moment the plunger begins to be raiſed, becauſe the action of the water againſt the under ſide of the valve then ceaſes.

The water, being thus forced into the air-veſſel KK by repeated ſtrokes of the plunger, gets above the lower end of the pipe GHI, and then begins to condenſe the air in the veſſel KK. For, as the pipe GH is fixed air-tight into the veſſel below F, and the air has no way to get out of the veſſel but through the mouth of the pipe at I, and cannot get out when the mouth I is covered with water, and is more and more condenſed as the water riſes upon the pipe, the air then begins to act forcibly by its ſpring againſt the ſurface of the water at H: and this action drives the water up through the pipe IHGF, from whence it ſpouts in a jet S to a great height; and is ſupplied by alternately raiſing and depreſſing of the plunger *g*, which conſtantly forces the water that it raiſes thro' the valve H, along the pipe MM, into the air-veſſel KK.

The higher that the ſurface of the water H is raiſed in the air-veſſel, the leſs ſpace will the air be condenſed into which before filled that veſſel; and therefore the force of its ſpring will be ſo much the ſtronger upon the water, and will drive it with the greater force through the pipe at F: and as the ſpring of the air continues whilſt the plunger *g* is riſing, the ſtream or jet S will be uniform, as long as the action of the plunger continues; and when the valve *b* opens, to let the water follow the plunger upward, the valve *a* ſhuts, to hinder the water, which is forced into the air-veſſel, from running back by the pipe MM into the barrel of the pump.

If there was no air-veſſel to this engine, the pipe GHI would be joined to the pipe MMN at P; and then, the jet S would ſtop every time the plunger is raiſed, and run only when the plunger is depreſſed.

26
The liſti
pump. Plate CLII. fig. 13.

Of *liſting-pumps* there are ſeveral ſorts; the moſt common is thus conſtructed. AB is the barrel, fixed in the frame KILM; which is alſo fixed immoveable, with the lower part in the water that is to be pumped up. GEQHO is a frame with two ſtrong iron rods, moveable through holes in the upper and lower parts of the pump, IK and LM. In the bottom of this frame is fixed an inverted piſton BD, with its bucket and valve uppermoſt at D. From the top of the barrel there goes off a part KH, either fixed to the barrel, or moveable by a ball and ſocket (as here repreſented at F); but in either caſe ſo very exact and tight, that no water or air can poſſibly get into the barrel, as that would prevent the effect of the pump. In this part, at C, is fixed a valve opening upward.

When the piſton frame is thruſt down into the water, the piſton D will deſcend, and the water beneath it ruſh up through the valve at D, and get above the piſton; where, upon the frame's being lifted up, the piſton will force the water through the valve C, into the ciſtern P, there to run off by the ſpout. It is to be remembered, that this ſort of pump muſt be ſet ſo far in the water, that the piſton may play below its ſurface. It appears by the above deſcription, that this is only a different manner of conſtructing a forcing-pump.

By means of forcing-pumps,—water may be raiſed to any height above the level of a river or ſpring; and machines may be contrived to work theſe pumps, either by a running ſtream, a fall of water, or by horſes. An inſtance in each ſort will be ſufficient to ſhew the method.

Plate CLIII. fig. 5.

27
A pump-engine to go by water.

1. By a running ſtream, or a fall of water. Let AA be a wheel, turned by the fall of water BB; and have any number of cranks (ſuppoſe ſix) as C, D, E, F, G, H, on its axis, according to the ſtrength of the fall of water, and the height to which the water is intended to be raiſed by the engine. As the wheel turns round, theſe cranks move the levers *c*, *d*, *e*, *f*, *g*, *h*, up and down, by the iron rods *i*, *k*, *l*, *m*, *n*, *o*; which alternately raiſe and depreſs the piſtons by the other iron rods *p*, *q*, *r*, *ſ*, *t*, *u*, *w*, *x*, *y*, in 12 pumps; nine whereof, as L, M, N, O, P, Q, R, S, T, appear in the plate; the other three being hid behind the work at V. And as pipes may go from all theſe pumps, to convey

Fig. 1.

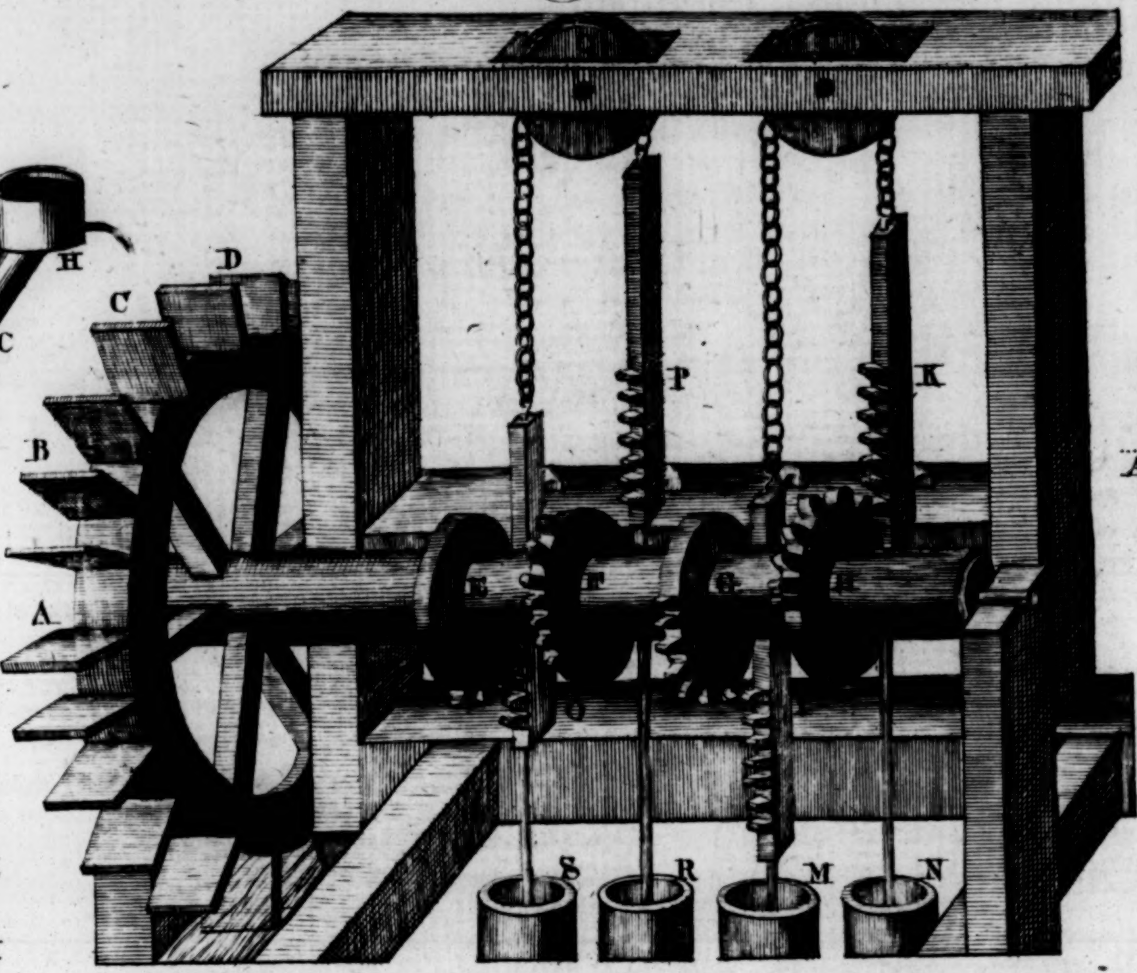
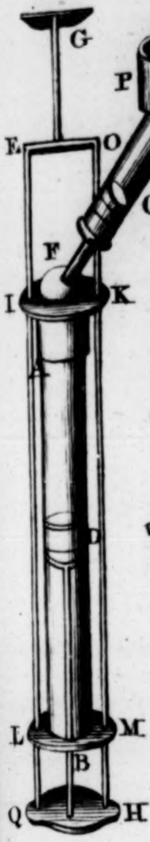

D
C
B
A
P
K
E
F
G
H
O
S
R
M
N

Fig. 13.


G
P
H
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O
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F
I
K
A
D
L
M
B
Q
H

Fig. 2.

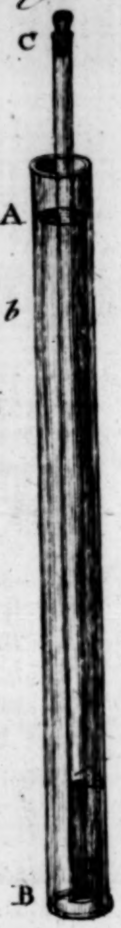


Fig. 14.

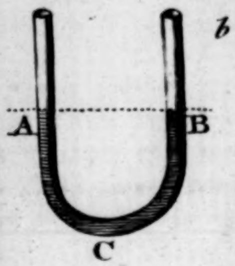


Fig. 3.

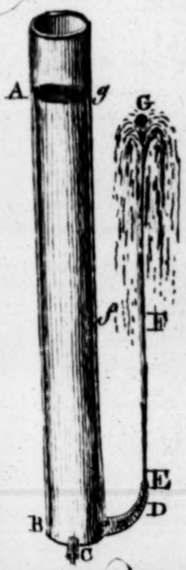


Fig. 4.

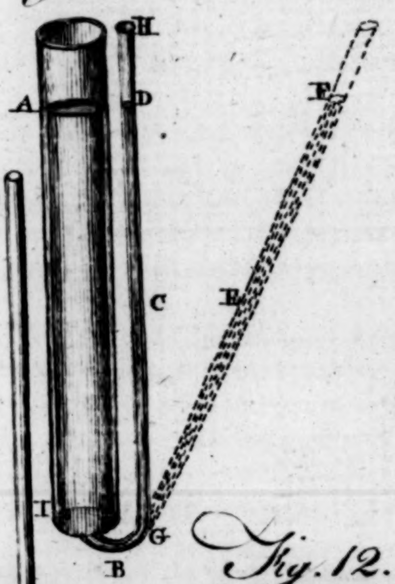


Fig. 5.

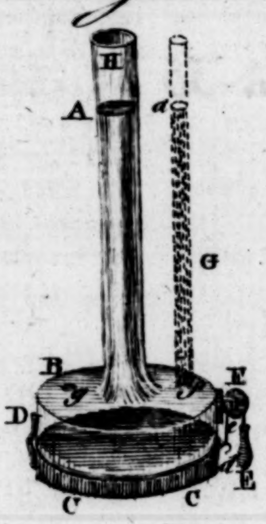

H
A
d
G
B
y
F
D
E
C
C

Fig. 6.

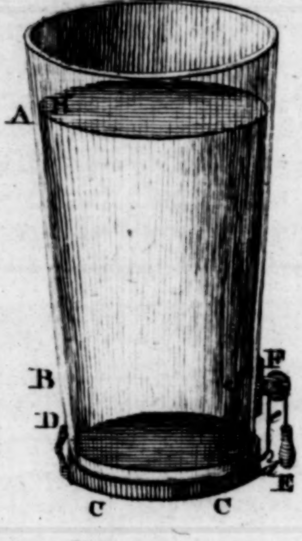


Fig. 8.

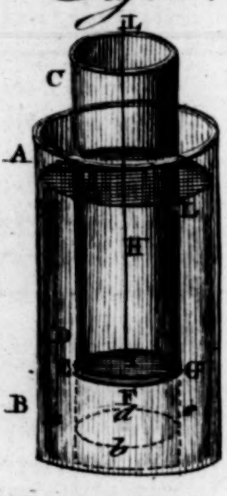

L
C
A
L
H
B
F
d
b
G

Fig. 7.

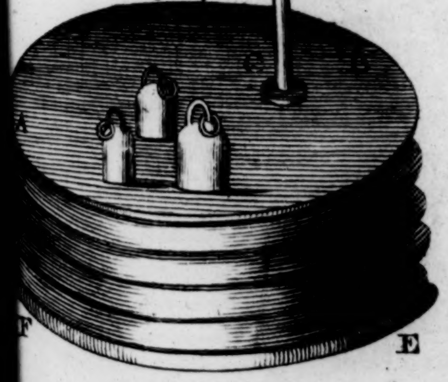


Fig. 12.

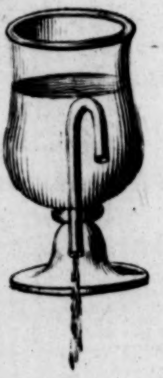


Fig. 10.

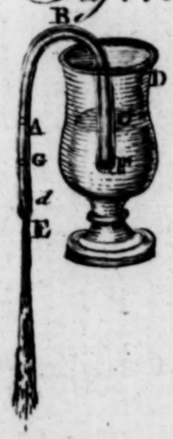


Fig. 11.

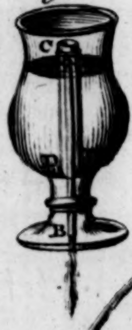
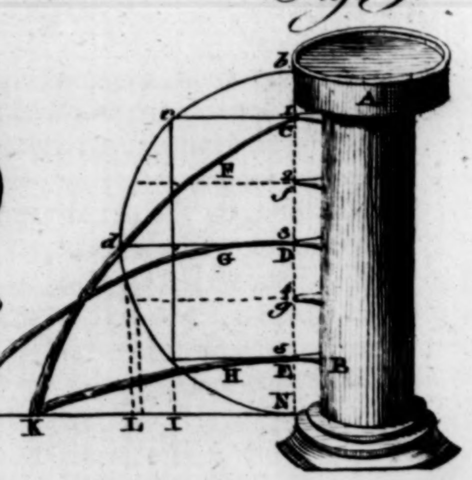


Fig. 9.


b
A
c
C
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f
d
G
D
g
H
B
E
N
M
K
L
I

A. Bell Sculpt.

3 MA 53

vey the water (drawn up by them to a ſmall height) into a cloſe ciſtern, from which the main pipe proceeds, the water will be forced into this ciſtern by the deſcent of the piſtons. And as each pipe, going from its reſpective pump into the ciſtern, has a valve at its end in the ciſtern, theſe valves will hinder the return of the water by the pipes; and therefore, when the ciſtern is once full, each piſton upon its deſcent will force the water (conveyed into the ciſtern by a former ſtroke) up the main pipe, to the height the engine was intended to raiſe it: which height depends upon the quantity raiſed, and the power that turns the wheel. When the power upon the wheel is leſſened by any defect of the quantity of water turning it, a proportionable number of the pumps may be laid aſide, by diſengaging their rods from the vibrating levers.

This figure is a repreſentation of the engine erected at Blenheim for the duke of Marlborough, by the late ingenious Mr Alderſea. The water-wheel is 7½ feet in diameter, according to Mr Switzer's account in his Hydraulics.

When ſuch a machine is placed in a ſtream that runs upon a ſmall declivity, the motion of the levers and action of the pumps will be but ſlow; ſince the wheel muſt go once round for each ſtroke of the pumps. But, when there is a large body of ſlow running water, a cog or ſpur wheel may be placed upon each ſide of the water-wheel AA, upon its axis, to turn a trundle upon each ſide; the cranks being upon the axis of the trundle. And by proportioning the cog-wheels to the trundles, the motion of the pumps may be made quicker, according to the quantity and ſtrength of the water upon the firſt wheel; which may be as great as the workman pleaſes, according to the length and breadth of the float-boards or wings of the wheel. In this manner, the engine for raiſing water at London-Bridge is conſtructed in which the water-wheel is 20 feet diameter, and the floats 14 feet long.

8 adru- ump- for g wa-

ABCD is a wheel turned by water according to the order of the letters. On the horizontal axis are four ſmall wheels, toothed almoſt half round; and the parts of their edges on which there are no teeth are cut down ſo as to be even with the bottoms of the teeth where they ſtand.

The teeth of theſe four wheels take alternately into the teeth of four racks, which hang by two chains over the pullies Q and L; and to the lower ends of theſe racks there are four iron rods fixed, which go down into the four forcing-pumps, S, R, M, and N. And, as the wheels turn, the racks and pump-rods are alternately moved up and down.

Thus ſuppoſe the wheel G has pulled down the rack I, and drawn up the rack K by the chain: as the laſt tooth of G juſt leaves the uppermoſt tooth of I, the firſt tooth of H is ready to take into the lowermoſt tooth of the rack K, and pull it down as far as the teeth go; and then the rack I is pulled upward thro' the whole ſpace of its teeth, and the wheel G is ready to take hold of it, and pull it down again, and ſo draw up the other.——In the ſame manner, the wheels E and F work the racks O and P.

Theſe four wheels are fixed on the axle of the great wheel in ſuch a manner, with reſpect to the poſitions of their teeth, that, whilſt they continue turning round, there is never one inſtant of time in which one or other of the pump-rods is not going down and forcing the water. So that, in this engine, there is no occaſion for having a general air-veſſel to all the pumps, to procure a conſtant ſtream of water flowing from the upper end of the main pipe.

From each of theſe pumps, near the loweſt end, in the water, there goes off a pipe, with a valve on its fartheſt end from the pump; and theſe ends of the pipes all enter one cloſe box, into which they deliver the water: and into this box, the lower end of the main conduct-pipe is fixed. So that, as the water is forced or puſhed into the box, it is alſo puſhed up the main pipe to the height that it is intended to be raiſed.

(2d) 28 A pump-engine to go by horſes.

Plate CLIII. fig. 6.

2. Where a ſtream or fall of water cannot be had, and gentlemen want to have water raiſed, and brought to their houſes from a rivulet or ſpring; this may be effected by a horſe-engine, working three forcing-pumps which ſtand in a reſervoir filled by the ſpring or rivulet: the piſtons being moved up and down in the pumps by means of a triple crank ABC, which, as it is turned round by the trundle G, raiſes and depreſſes the rods D, E, F. If the wheel has three times as many cogs as the trundle has ſtaves or rounds, the trundle and cranks will make three revolutions for every one of the wheel: and as each crank will fetch a ſtroke in the time it goes round, the three cranks will make nine ſtrokes for every turn of the great wheel.

The cranks ſhould be made of caſt iron, becauſe *that* will not bend; and they ſhould each make an angle of 120 with both of the others, as at *a*, *b*, *c*; which is (as it were) a view of their *radii* in looking endwiſe at the axis: and then there will be always one or other of them going downward, which will puſh the water forward with a continued ſtream into the main pipe. For, when *b* is almoſt at its loweſt ſituation, and is therefore juſt beginning to loſe its action upon the piſton which it moves, *c* is beginning to move downward, which will by its piſton continue the propelling force upon the water: and when *c* is come down to the poſition of *b*, *a* will be in the poſition of *c*.

The more perpendicularly the piſton-rods move up and down in the pumps, the freer and better will their ſtrokes be: but a little deviation from the perpendicular will not be material. Therefore, when the pump-rods D, E, and F, go down into a deep well, they may be moved directly by the cranks, as is done in a very good horſe-engine of this ſort at the late Sir James Creed's at Greenwich, which forces up water about 64 feet from a well under ground, to a reſervoir on the top of his houſe. But when the cranks are only at a ſmall height above the pumps, the piſtons muſt be moved by vibrating levers, as in the above engine at Blenheim: and the longer the levers are, the nearer will the ſtrokes be to a perpendicular.

29 A calculation of the quantity of water that may be raiſed by a horſe-engine.

Let us ſuppoſe, that in ſuch an engine as Sir James Creed's, the great wheel is 12 feet diameter, the trundle 4 feet, and the radius or length of each crank 9 inches, working a piſton in its pump. Let there be three pumps in all, and the bore of each pump be four inches diameter. Then, if the great wheel has three times as many cogs as the trundle has ſtaves, the trundle and cranks will go three times round for each revolution of the horſes and wheel, and the three cranks will make nine ſtrokes of the pumps in that time, each ſtroke being 18 inches (or double the length of the crank) in a four-inch bore. Let the diameter of the horſe-walk be 18 feet, and the perpendicular height to which the water is raiſed above the ſurface of the well be 64 feet.

If the horſes go at the rate of two miles an hour (which is very moderate walking) they will turn the great wheel 187 times round in an hour.

In each turn of the wheel the piſtons make nine ſtrokes in the pumps, which amount to 1683 in an hour.

Each ſtroke raiſes a column of water 18 inches long and four inches thick, in the pump-barrels; which column, upon the deſcent of the piſton, is forced into the main pipe, whoſe perpendicular altitude above the ſurface of the well is 64 feet.

Now, ſince a column of water 18 inches long, and 4 inches thick, contains 226.18 cubic inches, this number multiplied by 1683 (the ſtrokes in an hour) gives 380661 for the number of cubic inches of water raiſed in an hour.

A gallon, in wine-meaſure, contains 231 cubic inches, by which divide 380661, and it quotes 1468 in round numbers, for the number of gallons raiſed in an hour; which, divided by 63, gives 26$\frac{1}{2}$ hogſheads. If the horſes go faſter, the quantity raiſed will be ſo much the greater.

In this calculation it is ſuppoſed that no water is waſted by the engine. But as no forcing engine can be ſuppoſed to loſe leſs than a fifth part of the calculated quantity of water, between the piſtons and barrels, and by the opening and ſhutting of the valves, the horſes ought to walk almoſt 2$\frac{1}{2}$ miles *per* hour to fetch up this loſs.

A column of water 4 inches thick and 64 feet high, weighs 349$\frac{9}{16}$ pounds averdupois, or 424$\frac{5}{12}$ pounds troy; and this weight, together with the friction of the engine, is the reſiſtance that muſt be overcome by the ſtrength of the horſes.

The horſe-tackle ſhould be ſo contrived, that the horſes may rather puſh on than drag the levers after them. For, if they draw, in going round the walk, the outſide leather-ſtraps will rub againſt their ſides and hams; which will hinder them from drawing at right angles to the levers, and ſo make them pull at a diſadvantage. But if they puſh the levers before their breaſts, inſtead of dragging them, they can always walk at right angles to theſe levers.

It is noways material what the diameter of the main or conduct pipe be: for the whole reſiſtance of the water therein againſt the horſes will be according to the height to which it is raiſed, and the diameter of that part of the pump in which the piſton works, as we have already obſerved. So that by the ſame pump, an equal quantity of water may be raiſed in (and conſequently made to run from) a pipe of a foot diameter, with the ſame eaſe as in a pipe of five or ſix inches: or rather with more eaſe, becauſe its velocity in a large pipe will be leſs than in a ſmall one, and therefore its friction againſt the ſides of the pipe will be leſs alſo.

And the force required to raiſe water depends not upon the length of the pipe, but upon the perpendicular height to which it is raiſed therein above the level of the ſpring. So that the ſame force, which would raiſe water to the height AB in the upright pipe A *i k l m n o p q* B, will raiſe it to the ſame height or level BIH in the oblique pipe AEFGH. For the preſſure of the water at the end A of the latter, is no more than its preſſure againſt the end A of the former.

Plate CLIII. fig. 7.

The weight or preſſure of water at the lower end of the pipe, is always as the ſine of the angle to which the pipe is elevated above the level parallel to the horizon. For, although the water in the upright pipe AB would require a force applied immediately to the lower end A equal to the weight of all the water in it, to ſupport the water, and a little more to drive it up and out of the pipe; yet, if that pipe be inclined from its upright poſition to an angle of 80 degrees (as in A 80) the force required to ſupport or to raiſe the ſame cylinder of water will then be as much leſs, as the ſine 80 *b* is leſs than the radius AB; or as the ſine of 80 degrees is leſs than the ſine of 90. And ſo, decreaſing as the ſine of the angle of elevation leſſens, until it arrives at its level AC or place of reſt, where the force of the water is nothing at either end of the pipe. For, altho' the abſolute weight of the water is the ſame in all poſitions, yet its preſſure at the lower end decreaſes, as the ſine of the angle of elevation decreaſes; as will appear plainly by a farther conſideration of the figure.

Let two pipes, AB and AC, of equal lengths and bores, join each other at A; and let the pipe AB be divided into 100 equal parts, as the ſcale S is; whoſe length is equal to the length of the pipe.—Upon this length, as a radius, deſcribe the quadrant BDC, and divide it into 90 equal parts or degrees.

Let the pipe AC be elevated to 10 degrees upon the quadrant, and filled with water: then, part of the water that is in it will riſe in the pipe AB; and if it be kept full of water, it will raiſe the water in the pipe AB from A to *i*; that is, to a level *i* 10 with the mouth of the pipe at 10: and the upright line *a* 10, equal to A *e*, will be the ſine of 10 degrees elevation; which being meaſured upon the ſcale S, will be about 17.4 of ſuch parts as the pipe contains 100 in length: and therefore, the force or preſſure of the water at A, in the pipe A 10, will be to the force or preſſure at A in the pipe AB, as 17.3 to 100.

Let the ſame pipe be elevated to 20 degrees in the quadrant; and if it be kept full of water, part of that water will run into the pipe AB, and riſe therein to the height A *k*, which is equal to the length of the upright line *b* 20, or to the ſine of 20 degrees elevation; which, being meaſured upon the ſcale S, will be 34.2 of ſuch parts as the pipe contains 100 in length. And therefore, the preſſure of the water at A, in the full pipe A 20, will be to its preſſure, if that pipe were raiſed to the perpendicular ſituation AB, as 34.2 to 100.

Elevate the pipe to the poſition A 30 on the quadrant, and if it be ſupplied with water, the water will riſe from it, into the pipe AB, to the height A *l*, or to the ſame level with the mouth of the pipe at 30. The ſine of this elevation, or of the angle of 30 degrees, is *c* 30; which is juſt equal to half the length of the pipe, or to 50 of ſuch parts of the ſcale as the length of the pipe contains 100. Therefore, the preſſure of the water at A, in a pipe elevated 30 degrees above the horizontal level, will be equal to one half of what it would be if the ſame pipe ſtood upright in the ſituation AB.

And thus, by elevating the pipe to 40, 50, 60, 70, and 80 degrees on the quadrant, the ſines of theſe elevations will be *d* 40, *e* 50, *f* 60, *g* 70, and *h* 80; which will be equal to the heights A*m*, A*n*, A*o*, A*p*, and A*q*: and theſe heights meaſured upon the ſcale *S* will be 64.3, 76.6, 86.6, 94.0, and 98.5; which expreſs the preſſures at A in all theſe elevations, conſidering the preſſure in the upright pipe AB as 100.

Sine of	Parts	Sine of	Parts	Sine of	Parts
D. 1	17	D 31	515	D. 61	875
2	35	32	530	62	883
3	52	33	545	63	891
4	70	34	559	64	899
5	87	35	573	65	906
6	104	36	588	66	913
7	122	37	602	67	920
8	139	38	616	68	927
9	156	39	629	69	934
10	174	40	643	70	940
11	191	41	656	71	945
12	208	42	669	72	951
13	225	43	682	73	956
14	242	44	695	74	961
15	259	45	707	75	966
16	276	46	719	76	970
17	292	47	731	77	974
18	309	48	743	78	978
19	325	49	755	79	982
20	342	50	766	80	985
21	358	51	777	81	988
22	375	52	788	82	990
23	391	53	799	83	992
24	407	54	809	84	994
25	423	55	819	85	996
26	438	56	829	86	997
27	454	57	839	87	998
28	469	58	848	88	999
29	485	59	857	89	1000
30	500	60	866	90	1000

Becauſe it may be of uſe to have the lengths of all the ſines of a quadrant from 0 degrees to 90, we have given the foregoing Table, ſhewing the length of the ſine of every degree in ſuch parts as the whole pipe (equal to the radius of the quadrant) contains 1000. Then the ſines will be integral or whole parts in length. But if you ſuppoſe the length of the pipe to be divided only into 100 equal parts, the laſt figure of each part or ſine muſt be cut off as a decimal; and then thoſe which remain at the left hand of this ſeparation will be integral or whole parts.

Thus, if the radius of the quadrant (ſuppoſed to be equal to the length of the pipe AC) be divided into 1000 equal parts, and the elevation be 45 degrees, the ſine of that elevation will be equal to 707 of theſe parts: but if the radius be divided only into 100 equal parts, the ſame ſine will be only 70.7 or $70\frac{7}{10}$ of theſe parts. For, as 1000 is to 707, ſo is 100 to 70.7.

As it is of great importance to all engine-makers, to know what quantity and weight of water will be contained in an upright round pipe of a given diameter and height; ſo as, by knowing what weight is to be raiſed, they may proportion their engines to the force which they can afford to work them; we ſhall ſubjoin Tables ſhewing the number of cubic inches of water contained in an upright pipe of a round bore, of any diameter from one inch to ſix and a half, and of any height from one foot to two hundred: together with the weight of the ſaid number of cubic inches, both in troy and avoirdupois ounces. The number of cubic inches divided by 231, will reduce the water to gallons in wine-meaſure; and, divided by 282, will reduce it to the meaſure of ale-gallons. Alſo, the troy ounces divided by 12, will reduce the weight to troy pounds; and the avoirdupois ounces divided by 16, will reduce the weight to avoirdupois pounds.

And here we muſt repeat it again, that the weight or preſſure of the water acting againſt the power that works the engine, muſt always be eſtimated according to the perpendicular height to which it is to be raiſed, without any regard to the length of the conduct-pipe, when it has an oblique poſition, and as if the diameter of that pipe were juſt equal to the diameter of that part of the pump in which the piſton works. Thus, by the following Tables, the preſſure of the water, againſt an engine whoſe pump is of a $4\frac{1}{2}$ inch bore, and the perpendicular height of the water in the conduct pipe is 80 feet, will be equal to 8057,5 troy ounces, and to 8848.2 avoirdupois ounces; which makes 671.4 troy pounds, and 553 avoirdupois.

EXAMPLE. *Required the number of cubic inches, and the weight of the water, in an upright pipe 278 feet high, and $1\frac{1}{2}$ inch diameter.*

	Feet.	*Cubic inches.*	*Troy oz.*	*Avoir. oz.*
	200	4241.1	2238.2	2457.8
	70	1484.4	783.3	860.2
	8	169.6	89.5	98.3
Anſw.	278	5895.1	3111.0	3416.3

Here the neareſt ſingle decimal figure is only taken into the account; and the whole being reduced by diviſion, amounts to $25\frac{1}{2}$ wine-gallons in meaſure; to $259\frac{1}{4}$ pounds troy, and to $213\frac{1}{2}$ pounds avoirdupois.

Theſe tables were at firſt calculated to ſix decimal places for the ſake of exactneſs: but in tranſcribing them there are no more than two decimal figures taken into the account, and ſometimes but one; becauſe there is no neceſſity for computing to hundredth-parts of an inch or of an ounce in practice.

HYDRO-

HYDROSTATICAL TABLES.

Inch diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	9.42	4.97	5.46
2	18.85	9.95	10.92
3	28.27	14.92	16.38
4	37.70	19.89	21.85
5	47.12	24.87	27.31
6	56.55	29.84	32.77
7	65.97	34.82	38.23
8	75.40	39.79	43.69
9	84.82	44.76	49.16
10	94.25	49.74	54.62
20	188.49	99.48	109.24
30	282.74	149.21	163.86
40	376.99	198.95	218.47
50	471.24	248.69	273.09
60	565.49	298.43	327.71
70	659.73	348.17	382.33
80	753.98	397.90	436.95
90	843.23	447.64	491.57
100	942.48	497.38	546.19
200	1884.96	994.76	1092.38

1½ Inch diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces	In avoirdupoiſe ounces.
1	21.21	11.19	12.29
2	42.41	22.38	24.58
3	63.62	33.57	36.87
4	84.82	44.76	49.16
5	106.03	55.95	61.45
6	127.23	67.15	73.73
7	147.44	78.34	86.02
8	169.65	89.53	98.31
9	190.85	100.72	110.60
10	212.06	111.91	122.89
20	424.12	223.82	245.78
30	636.17	335.73	368.68
40	848.23	447.64	491.57
50	1060.29	559.55	614.46
60	1272.35	671.46	737.35
70	1484.40	783.37	860.24
80	1696.46	895.28	983.14
90	1908.52	1007.19	1106.03
100	2120.58	1119.09	1228.92
200	4241.15	2238.18	2457.84

2 Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	37.70	19.89	21.85
2	75.40	39.79	43.69
3	113.10	59.68	65.54
4	150.80	79.58	87.39
5	188.50	99.47	109.24
6	226.19	119.37	131.08
7	263.89	139.26	152.93
8	301.59	159.16	174.78
9	339.29	179.06	196.63
10	376.99	198.95	218.47
20	753.98	397.90	436.95
30	1130.97	596.85	665.42
40	1507.97	795.80	873.90
50	1884.96	994.75	1092.37
60	2261.95	1193.70	1310.85
70	2638.94	1392.65	1529.32
80	3015.93	1591.60	1747.80
90	3392.92	1790.56	1966.27
100	3769.91	1989.51	2184.75
200	7539.82	3979.00	4369.50

2½ Inches diameter.			
Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoirdupois ounces.
1	58.90	31.08	34.14
2	117.81	62.17	68.27
3	176.71	93.26	102.41
4	235.62	124.34	136.55
5	294.52	155.43	170.68
6	353.43	186.52	204.82
7	412.33	217.60	238.96
8	471.24	248.69	273.09
9	530.14	279.77	307.23
10	589.05	310.86	341.37
20	1178.10	621.72	682.73
30	1767.15	932.58	1024.10
40	2356.20	1243.44	1365.47
50	2545.25	1554.30	1706.83
60	3534.29	1865.16	2048.20
70	4123.34	2176.02	2389.57
80	4712.39	2486.88	2730.94
90	5301.44	2797.74	3072.30
100	5890.49	3108.60	2413.67
200	11780.98	6217.20	4827.34

HYDROSTATICAL TABLES.

3 Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoir-dupos ounces.
1	84.8	44.76	49.16
2	169.6	89.53	98.31
3	254.5	134.29	147.47
4	239.3	179.06	196.63
5	424.1	223.82	245.78
6	508.9	268.58	294.94
7	593.7	313.35	344.10
8	698.6	358.11	393.25
9	763.4	402.87	442.41
10	848.2	447.64	491.57
20	1696.5	895.28	983.14
30	2244.7	1342.92	1474.70
40	3392.9	1790.56	1966.27
50	4241.1	2238.19	2457.84
60	5089.4	2685.83	2949.41
70	5937.6	3133.47	3440.98
80	6785.8	3581.11	3932.55
90	7634.1	4028.75	4424.12
100	8482.3	4476.39	4915.68
200	16964.6	8952.78	9831.36

3½ Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoir-dupois ounces.
1	115.4	60.9	66.9
2	230.9	121.8	133.8
3	346.4	182.8	200.7
4	461.8	243.7	267.6
5	577.3	304.6	334.5
6	692.7	365.6	401.4
7	808.2	426.5	468.4
8	923.6	487.4	535.3
19	1039.1	548.3	602.2
0	1154.5	609.3	669.1
20	2309.1	1218.6	1338.2
30	3463.6	1827.9	2007.2
40	4618.1	2437.1	2676.3
50	5772.7	3046.4	3345.4
60	6927.2	3655.7	4014.5
70	8081.7	4265.0	4683.6
80	9236.3	4874.3	5352.6
90	10390.8	5483.6	6021.7
100	11545.4	6092.9	6690.8
200	23090.7	12185.7	13381.5

4 inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy inches.	In avoir-dupois ounces.
1	150.8	79.6	87.4
2	301.6	159.2	174.8
3	452.4	238.7	262.2
4	603.2	318.3	349.6
5	754.0	397.9	436.9
6	904.8	477.5	524.3
7	1055.6	557.1	611.7
8	1206.4	636.6	699.1
9	1357.2	716.2	786.5
10	1508.0	795.8	873.9
20	3115.9	1591.6	1747.8
30	4523.9	2387.4	2621.7
40	6631.9	3183.2	3495.6
50	7539.8	3997.0	4369.5
60	9047.8	4774.8	5243.4
70	10555.8	5570.6	6117.3
80	12063.7	6366.4	6991.2
90	13571.7	7162.2	7865.1
100	15079.7	7958.0	8739.0
200	30159.3	15916.0	17478.0

4½ Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy onnces.	In avoir-dupois ounces.
1	190.8	100.7	110.6
2	381.7	201.4	221.2
3	572.6	302.2	331.8
4	763.4	402.9	442.4
5	954.3	503.6	453.0
6	1145.1	604.3	663.6
7	1337.9	705.0	774.2
8	1526.8	805.7	884.8
9	1717.7	906.5	995.4
10	1908.5	1007.2	1106.0
20	3817.0	2014.4	2212.1
30	5725.6	3021.6	3818.1
40	7634.1	4028.7	4424.1
50	9542.6	5035.9	5530.1
60	11451.1	6043.1	6636.2
70	13359.6	7050.3	7742.2
80	15268.2	8057.5	8848.2
90	17176.7	9064.7	9954.3
100	19085.2	10071.9	11060.3
200	38170.4	20143.8	22120.6

HYDROSTICAL TABLES.

5 Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy inches.	In avoir-dupois ounces.
1	235.6	124.3	136.5
2	471.2	248.7	273.1
3	706.8	373.0	409.6
4	942.5	497.4	546.2
5	1178.1	621.7	682.7
6	1413.7	746.1	819.3
7	1649.3	870.4	955.8
8	1884.9	994.8	1092.4
9	2120.6	1119.1	1228.9
10	2356.2	1243.4	1365.5
20	4712.4	2486.9	2730.9
30	7068.6	3730.3	4096.4
40	9424.8	4973.8	5461.9
50	11780.0	6217.2	6827.3
60	14137.2	7460.6	8192.6
70	16493.4	8704.1	9558.3
80	18849.6	9947.5	10923.7
90	21205.8	11191.0	12289.2
100	23562.0	12434.4	13654.7
200	47124.0	24868.8	27309.3

6 Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoir-dupois ounces.
1	339.3	179.0	196.6
2	678.6	358.1	393.3
3	1017.9	537.2	589.9
4	1357.2	716.2	786.5
5	1696.5	895.3	983.1
6	2035.7	1074.3	1179.8
7	2375.0	1253.4	1376.4
8	2714.3	1432.4	1573.0
9	3053.6	1611.5	1769.6
10	3392.9	1790.6	1966.3
20	6785.8	3581.1	3932.5
30	10178.8	5371.7	5898.8
40	13571.7	7162.2	7865.1
50	16964.6	8952.8	9831.4
60	20357.5	10743.3	11797.6
70	23750.5	12533.9	13763.9
80	27143.4	14324.4	15730.2
90	30536.3	16115.0	17696.5
100	3392.92	17905.6	19662.7
200	67858.4	35811.2	39325.4

5½ Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoir-dupois ounces.
1	285.1	150.5	164.3
2	570.2	300.9	328.5
3	855.3	451.4	492.8
4	1140.4	601.8	657.1
5	1425.5	752.3	821.3
6	1710.6	902.7	985.6
7	1995.7	1053.2	1149.9
8	2280.8	1203.6	1314.2
9	2565.9	1354.1	1478.4
10	2851.0	1504.6	1642.7
20	5702.0	3009.1	3285.4
30	8553.0	4513.7	4928.1
40	11404.0	6018.2	6570.8
50	14255.0	7522.8	8213.5
60	17106.0	9027.4	9856.2
70	19957.0	10531.9	11498.9
80	22808.0	12036.5	13141.6
90	25659.0	13541.1	14784.3
100	20510.0	150 5.6	16426.9
100	57020.0	30091.2	32853.9

6½ Inches diameter.

Feet high.	Solidity in cubic inches.	Weight in troy ounces.	In avoir-dupois ounces.
1	398.2	210.1	230.7
2	797.4	420.3	461.4
3	1195.6	630.4	692.1
4	1593 8	840.6	922.8
5	1991.9	1050.8	1153.6
6	2390.1	1260.9	1384.3
7	2788.3	1471.1	1615.0
8	3186.5	1681.2	1845.7
9	3584.7	1891.3	2076.4
10	3982.9	2101.5	2307.1
20	7965.8	4202.9	4614.3
30	11948.8	6304.4	6921.4
40	15931.7	8405.9	9228.6
50	19914.6	10507.4	11535.7
60	23897.6	12608.9	13842.9
70	27880.5	14710.4	16150.0
80	31863.4	16811.8	18457.2
90	35846.3	18913.3	20764.3
100	39829.3	21014.8	23071.5
200	79658.6	42029.6	46143.0

30 Steam-engine.

Under the article Steam-*Engine*, the reader will find a particular account of that uſeful invention, with a correct deſcription and plate of it in its improved ſtate.

31 Engine for raiſing water by a multiplying wheel. Plate CLVI fig. 6.

The *multiplying machine* has no dependence on the action of the atmoſphere; but, by the weight of water only, and without pump-work of any kind, raiſes water ſufficient to ſerve a gentleman's ſeat, with an overplus for fountains, fiſh-ponds, &c.

AB are two copper pans or buckets of unequal weight and ſize, ſuſpended to chains, which alternately wind off and on the multiplying-wheel YZ; whereof the wheel Y is ſmaller in diameter, and Z larger, in proportion to the different lifts each is deſigned to perform.

When the buckets are empty, they are ſtopped level with the ſpring at X, whence they are both filled with water in the ſame time.

The greater of the two A, being the heavier when full, preponderates and deſcends ten feet, perhaps from C to D; and the leſſer, B, depending on the ſame axis, is thereby weighed up or raiſed from E to F, ſuppoſe thirty feet.

Here, by particular little contrivances, opening the valves placed at bottom of each of theſe buckets, they both diſcharge their water in the ſame time, through apertures proportionable to their capacities; the ſmaller into the ciſtern W, whence it is conveyed for ſervice by the pipe T, and the larger at D, to run waſte by the drain below at H. The bucket B being empty, is ſo adjuſted as then to overweigh; and deſcending ſteadily as it roſe betwixt the guiding rods VV, brings or weighs up A to its former level at X, where both being again repleniſhed from the ſpring, they thence proceed as before. And thus will they continue conſtantly moving (merely by their circumſtantial difference of water-weight, and without any other aſſiſtance than that of ſometimes giving the iron-work a little oil) ſo long as the materials ſhall laſt, or the ſpring ſupply water.

The ſteadineſs of the motion is in part regulated by a worm turning a jack-fly, and a little ſimple wheel-work at LM; which communicating with the multiplying wheel axle at M, is thereby moved forward or backward as the buckets either riſe or deſcend. But what principally keeps the whole movement ſteady, is the equilibrium preſerved in the whole operation by a certain weight of lead, at the end of a lever of fit length, and fixed on one of the ſpindles of the wheel-work, the numbers whereof are ſo calculated as, during the whole performance up and down, to let it move no more than one-fourth of a circle, from G to K; by which contrivance, as more or leſs of the chains ſuſpending the buckets come to be wound off their reſpective wheels Y and Z, this weight gradually falls in as a counter-balance, and ſo continues the motion equable and eaſy in all its parts.

The water waſted by this machine is not above the hundredth part of what a water-wheel will expend, to raiſe an equal quantity. But where a fall, proportionable to the intended riſe of water, cannot be had, with a convenient ſewer to carry off the waſte water over and above, this device cannot be well put in practice.

32 Perſian el. II. 8.

Water may alſo be raiſed by means of a ſtream AB turning a wheel CDE, according to the order of the letters, with buckets *a*, *a*, *a*, *a*, &c. hung upon the wheel by ſtrong pins *b*, *b*, *b*, *b*, &c. fixed in the ſide of the rim: but the wheel muſt be made as high as the water is intended to be raiſed above the level of that part of the ſtream in which the wheel is placed. As the wheel turns, the buckets on the right hand go down into the water, and are thereby filled, and go up full on the left hand, until they come to the top at K, where they ſtrike againſt the end *n* of the fixed trough M, and are thereby overſet, and empty the water into the trough; from which it may be conveyed in pipes to the place which it is deſigned for: and as each bucket gets over the trough, it falls into a perpendicular poſition again, and goes down empty, until it comes to the water at A, where it is filled as before. On each bucket is a ſpring *r*, which, going over the top or crown of the bar *m*, (fixed to the trough M), raiſes the bottom of the bucket above the level of its mouth, and ſo cauſes it to empty all its water into the trough.

Sometimes this wheel is made to raiſe water no higher than its axis; and then, inſtead of buckets hung upon it, its ſpokes, C, *d*, *e*, *f*, *g*, *h*, are made of a bent form, and hollow within; theſe hollows opening into the holes C, D, E, F, in the outſide of the wheel, and alſo into thoſe at O in the box N upon the axis. So that as the holes CD, &c. dip into the water, it runs into them; and as the wheel turns, the water riſes in the hollow ſpokes *c d*, &c. and runs out in a ſtream P from the holes at O, and falls into the trough Q, from whence it is conveyed by pipes. And this is a very eaſy way of raiſing water, becauſe the engine requires neither men nor horſes to turn it.

33 Fire-engines.

Engines for extinguiſhing fire are either forcing or lifting-pumps; and being made to raiſe water with great velocity, their execution in great meaſure depends upon the length of their levers, and the force wherewith they are wrought.

Plate CLV. fig. 15.

For example, AB is the common ſquirting fire-engine. D C is the frame of a lifting-pump, wrought by the levers E and F acting always together. During the ſtroke, the quantity of water raiſed by the piſton N ſpouts with force through the pipe G, made capable of any degree of elevation by means of the yielding leather-pipe H, or by a ball and ſocket, capable of turning every way, ſcrewed on the top of the pump. Between the ſtrokes on this machine the ſtream is diſcontinued. The engine is ſupplied by water poured in with buckets above; the dirt and filth whereof are kept from choaking the pump-work by help of the ſtrainer IK.

A conſiderable improvement has ſince been made to theſe machines in order to keep them diſcharging a continual ſtream. In doing whereof it is not to be underſtood that they really throw out more water than do the ſquirting ones of the ſame ſize and dimenſions with themſelves; but that the velocity of the water, and of courſe the friction of all the parts, being leſs violent, the ſtream is more even and manageable, and may be directed hither or thither with greater eaſe and certainty than if it came forth only by fits and ſtarts: The machine, thus improved, is therefore generally better adapted to the purpoſe intended than the former, eſpecially in the beginning of theſe calamitous accidents.

Plate CLV. fig. 16.

The ſtream is made continual from the ſpring of air confined in a ſtrong metal veſſel CC, in the fire-engine AB, fixed between the two forcing-pumps D and E, wrought with a common double lever FG moving on the centre H. The piſtons in D and E both ſuck and force alternately, and are here repreſented in their different actions; as are alſo the reſpective valves at IK and LM.

The water to ſupply this engine, if there be no opportunity of putting the end of a ſucking-pipe, occaſionally to be ſcrewed on, into a moat or canal, which would ſpare much hurry and labour in caſe of fire, is alſo poured into the veſſel AB; and being ſtrained through the wire-grate N, is, by the preſſure of the atmoſphere, raiſed through the valves K and M into the barrels of D or E, when either of their forcers aſcend; whence again it will be powerfully puſhed when they deſcend into the air-veſſel CC, thro' the valves I and L by turns: by the force whereof the common air between the water and the top of the air-veſſel O will from time to time be forcibly crowded into leſs room, and much compreſſed; and the air being a body naturally endowed with a ſtrong and lively ſpring, and always endeavouring to dilate itſelf every way alike in ſuch a circumſtance, bears ſtrongly both againſt the ſides of the veſſel wherein it is confined, and the ſurface of the water thus injected; and ſo makes a conſtant regular ſtream to riſe through the metal pipe P into the leather one Q, ſcrewed thereon; which being flexible, may be led about into rooms and entries, as the caſe may require.

Should the air contained in this veſſel be compreſſed into half the ſpace it took up in its natural ſtate, the ſpring thereof will be much about doubled; and as before it equalled and was able to ſuſtain the preſſure of a ſingle atmoſphere, it having now a double force, by the power of that ſpring alone will throw water into air, of the common degree of denſity, about thirty feet high. And ſhould this compreſſure be ſtill augmented, and the quantity of air which at firſt filled the whole veſſel be reduced into one-third of that ſpace, its ſpring will be then able to reſiſt, and conſequently to raiſe the weight of a treble atmoſphere; in which caſe, it will throw up a jet of water ſixty feet high. And ſhould ſo much water again be forced into the veſſel as to fill three parts of the capacity, it will be able to throw it up about ninety feet high: and wherever the ſervice ſhall require a ſtill greater riſe of water, more water muſt be thruſt into this veſſel; and the air therein being thus driven by main force into a ſtill narrower compaſs, at each exploſion, the gradual reſtitution thereof to its firſt dimenſions is what regularly carries on the ſtream between the ſtrokes, and renders it continual during the operation of the machine.

This experiment, in little, may be either made on the lifting or forcing pump, the noſels of which may be left large, on purpoſe for the reception of the ſmall pipe F, reaching nearly to the valve at E, and occaſionally to be ſcrewed in. Between this pipe and the ſides and top of the noſel H, a quantity of air will neceſſarily be lodged, which, when the forcer acts, will be compreſſed at every ſtroke by the riſe of the water; more whereof will be puſhed through E than can immediately get away through the pipe F, which is to be always leſs in diameter than the opening of the valve at E. The degree of which condenſation, and that of the reſtitution to its natural ſtate of denſity, may be obſerved through the glaſs-machines to ſatisfaction.

34
The ſcrew of Archimedes.
Plate CLIV fig. 4.

Archimedes's ſcrew is a ſort of ſpiral pump, and receives its name from its inventor. It conſiſts of a long cylinder AB with a hollow pipe CD round it; and is placed in an oblique poſition, with the lower end in the water, the other end being joined to the lower end of the winch IK, ſupported by the upright piece IR.

When this ſcrew is immerſed in the water, it immediately riſes in the pipe by the orifice C to a level with the ſurface of the water EF; and if the point in the ſpiral, which in the beginning of the motion is coincident with the ſurface of the water, happen not to be on the lower ſide of the cylinder, the water, upon the motion of the ſcrew, will move on in the ſpiral till it come to the point on the other ſide that is coincident with the water. When it arrives at that point, which we will ſuppoſe to be O, it cannot afterwards poſſeſs any other part of the ſpiral than that on the loweſt part of the cylinder: for it cannot move from O toward H or G, becauſe they are higher above the horizon; and as this will be conſtantly the caſe after the water in the ſpiral has attained the point O, it is plain it muſt always be on the under ſide of the cylinder.

But becauſe the cylinder is in conſtant motion, every part of the ſpiral ſcrew, from O to D, will by degrees ſucceed to the under part of the cylinder. The water therefore muſt ſucceed to every part of it, from O to D, as it comes on the lower ſide; that is, it muſt aſcend on the lower part of the cylinder through all the length of the pipe, till it come to the orifice at D, where it muſt run out, having nothing further to ſupport it.

35
The balance-pumps, fig. 5, 6.

There is a ſimple and eaſy method of working two pumps at once, by means of the balance AB, having a large iron ball at each end, and placed in equilibrium on the two ſpindles C, as repreſented in the 6th figure. On the right and left are two boards I, nailed to two croſs pieces, faſtened to the axis of the machine. On theſe boards the perſon who is to work the pump ſtands, and ſupports himſelf by a croſs piece nailed to the two poſts ED, fig. 5. At the diſtance of ten inches on each ſide the axis, are faſtened the piſtons MN.

The man, by leaning alternately on his right and left foot, puts the balance in motion, by which the pumps OP are worked, and the water thrown into the pipe H, and carried to a height proportional to the diameter of the valves, and the force of the balance. There muſt be placed on each ſide an iron ſpring, as F and G, to return the balance, and prevent its acquiring too great velocity.

36
The chai
pump.
Plate CL
fig. 3.

The *Chain-pump*, AB, is ordinarily made from twelve to twenty-four feet long; and conſiſts of two collateral ſquare barrels, and a chain of piſtons of the ſame form, fixed at proper diſtances thereon. The chain is moved in theſe round a coarſe kind of wheel-work at either end of the machine, the teeth whereof are ſo made as to receive one half of the flat piſtons, and let them fold in; and they take hold of the links as they riſe in one of the barrels, and return by the other. The machine is wrought either by the turning

3 MA 53

HYDROSTATICS &c.

Fig. 1.

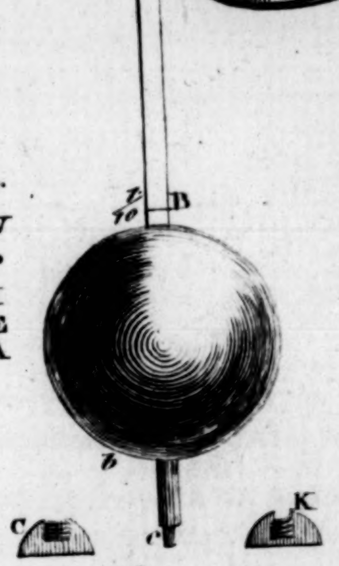
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Fig. 7.

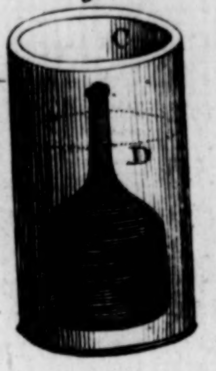

Fig. 2.

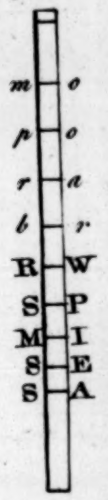
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Fig. 4.

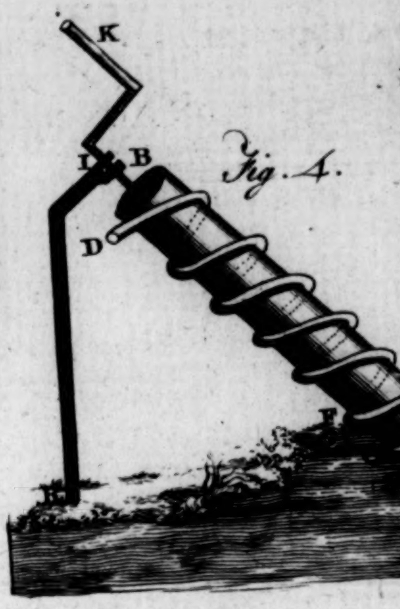

Fig. 8.

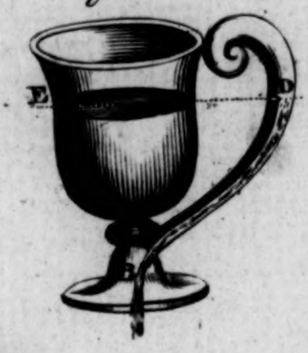

Fig. 3.

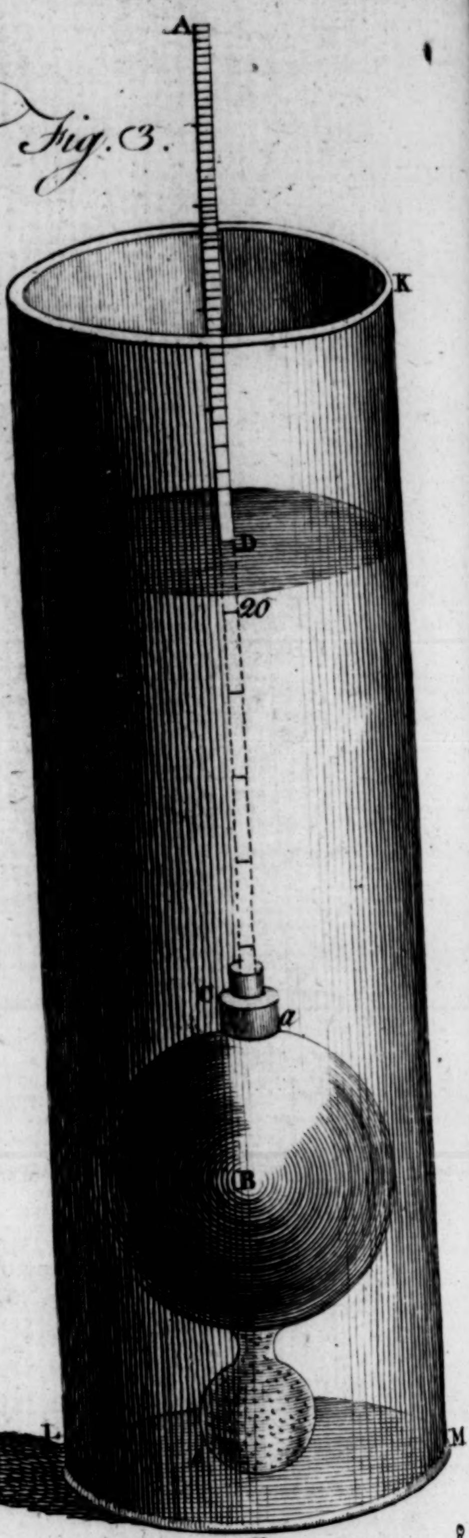
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Fig. 5.

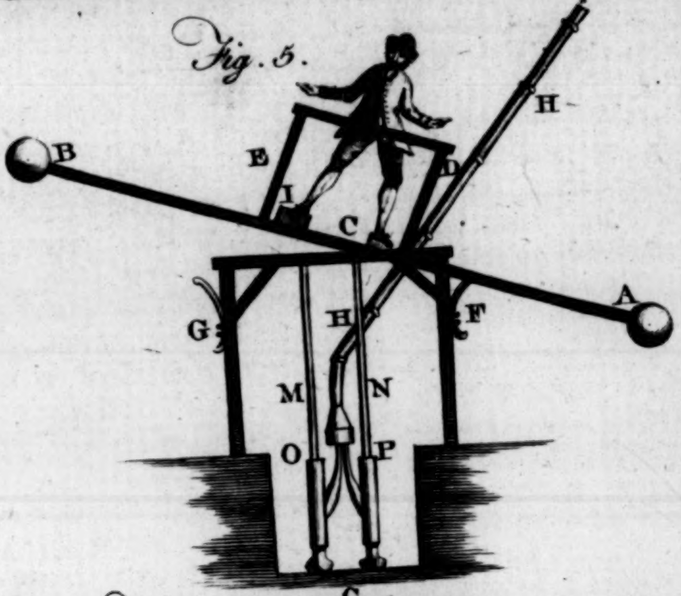
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Fig. 6.

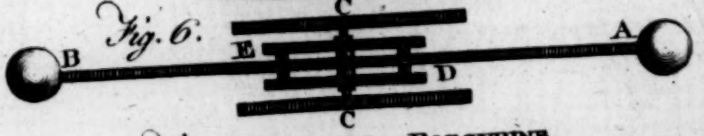


Fig. 9.

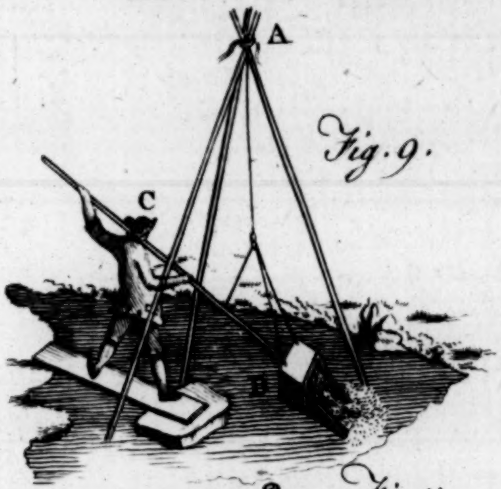


Fig. 10. HISTRIX or PORCUPINE.

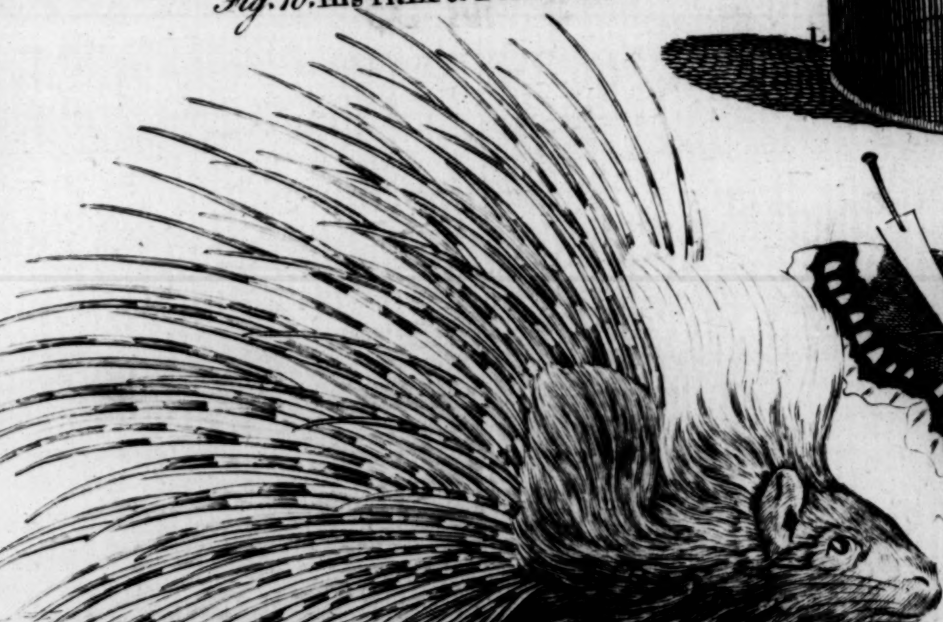


Fig. 11.

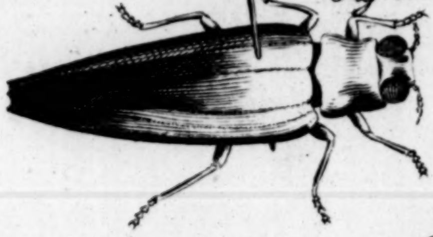


Fig. 13.

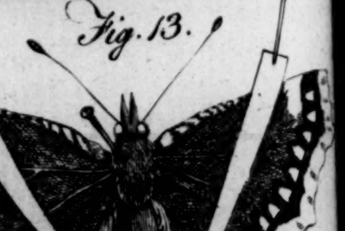


Fig. 12.

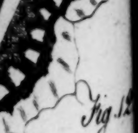


Fig. 16.

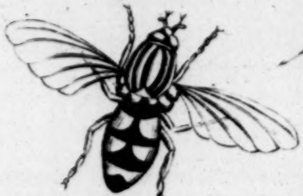


Fig. 14.

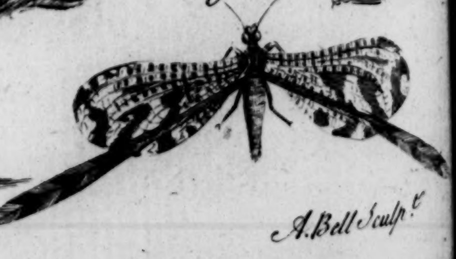
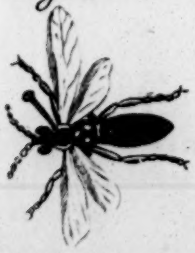


Fig. 15.



A. Bell Sculp^t

3 MA 53

Fig. 7.

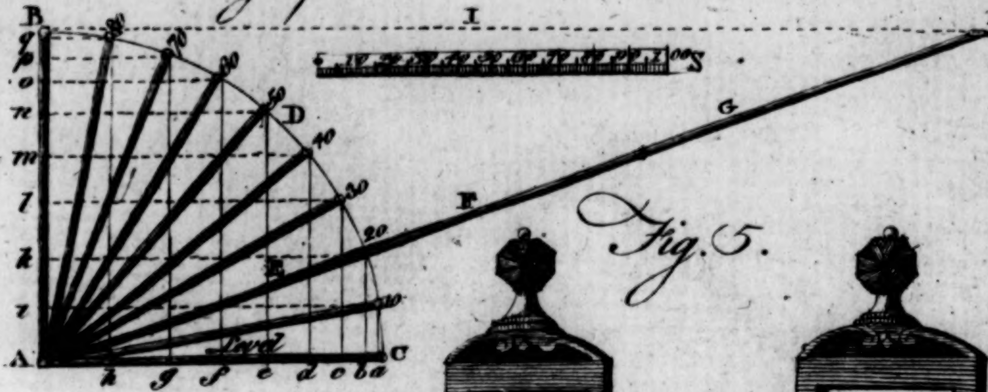

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Fig. 1.

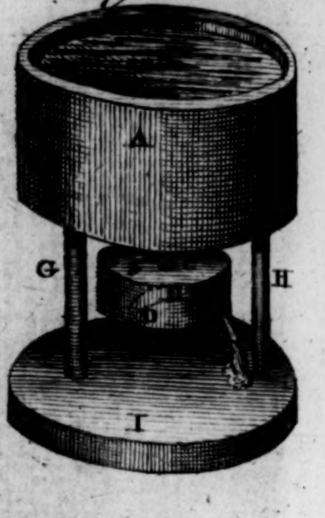

Fig. 5.

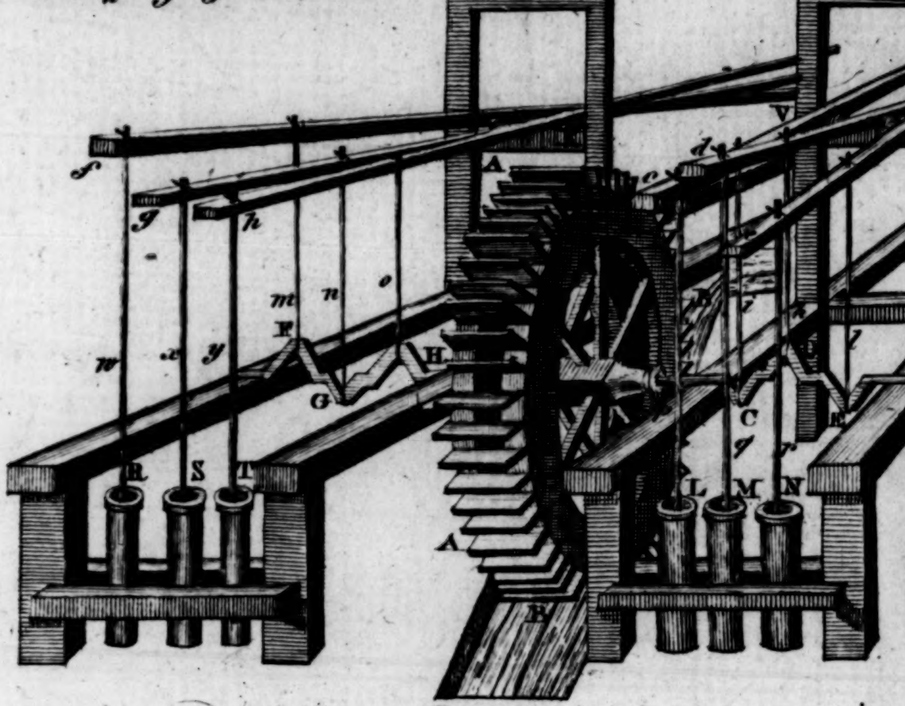
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Fig. 6.

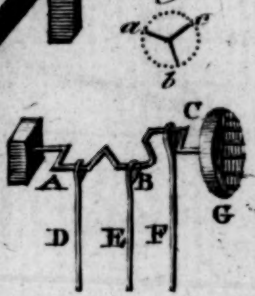
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Fig. 2.

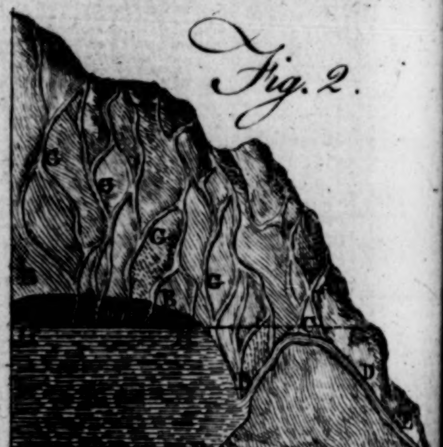

Fig. 3. Fig. 4.

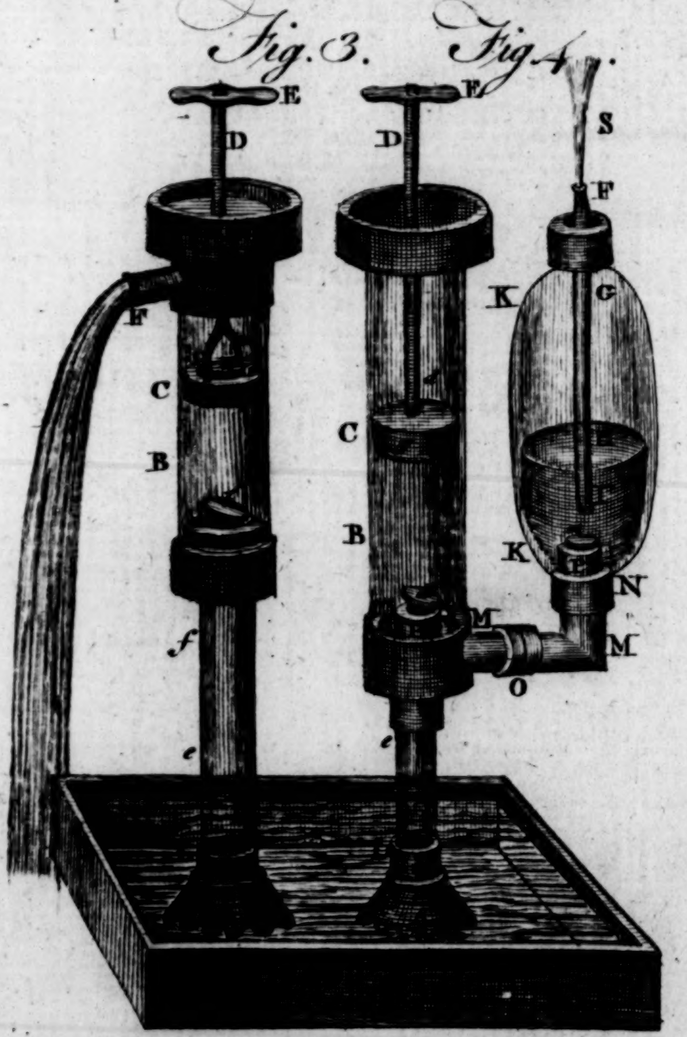
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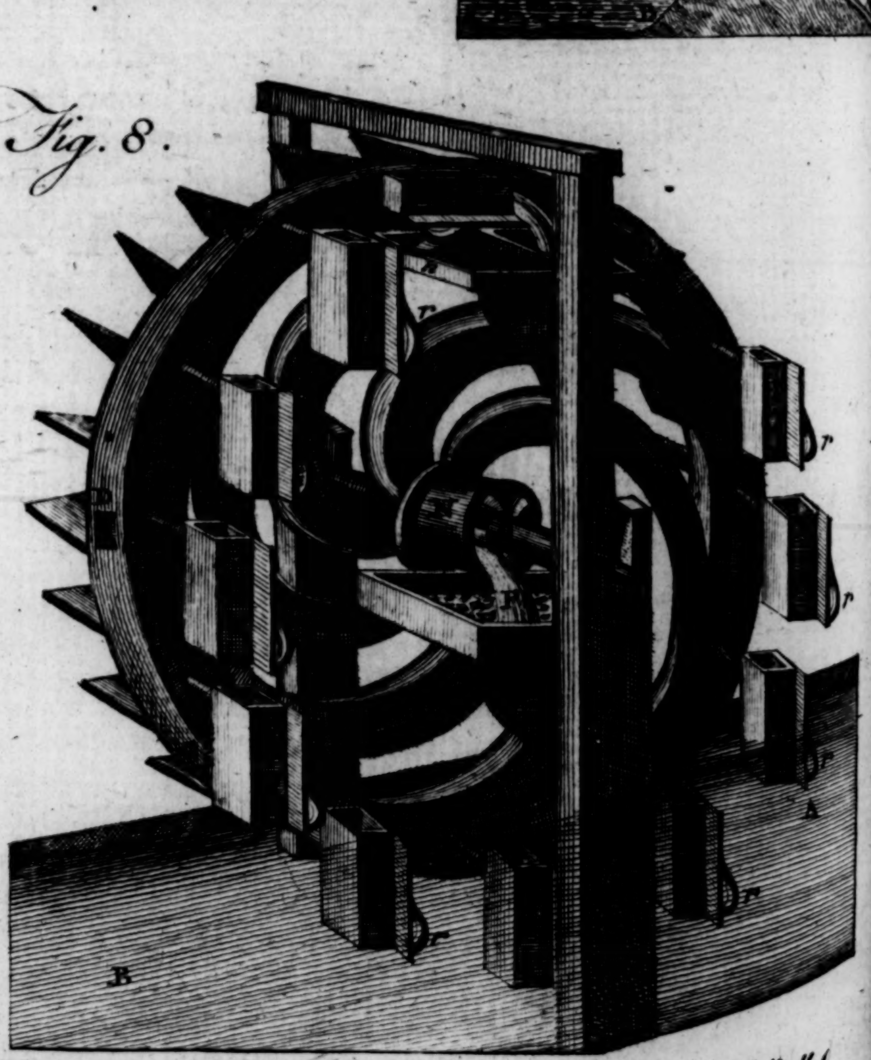
Fig. 8.



A. Bell Sc.

Entertain-
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ments.

of one handle or two, according to the labour required, depending on the height to which the water is to be raiſed. A whole row of the piſtons (which go free of the ſides of the barrel by perhaps a quarter of an inch) are always lifting when the pump is at work; yet do they, by the general puſh in the ordinary way of working, as it is pretty briſk, commonly bring up a full bore of water in the pump. This machine is ſo contrived, that, by the continual folding in of the piſtons, ſtones, dirt, and whatever happens to come in the way, may alſo be cleared; and therefore it is generally made uſe of to drain ponds, to empty ſewers, and remove foul waters, in which no other pump could work.

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The laſt machine to be deſcribed conſiſts of five pieces of board, forming a ſort of ſcoop, as B. The handle C is ſuſpended by a rope faſtened to three poles, placed in a triangle, and tied together at A.

The working of this machine conſiſts entirely in balancing the ſcoop that contains the water, and directing it in ſuch manner that the water may be thrown in any given direction. It is evident that the operation of this machine is ſo very eaſy, that it may rather be conſidered as an agreeable and ſalutary recreation than hard labour.

With this machine a man of moderate ſtrength, by two ſtrokes in four ſeconds, can draw half a cubic foot of water, that is, more than four hundred cubic feet in an hour.

This machine is frequently uſed by the Dutch in emptying the water from their dikes.

Sect. VI. *Entertaining Experiments.*

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1. Several amuſing appearances may be produced by diſguiſing or diverſifying a ſyphon. It may, for example, be diſguiſed in a cup, from which no liquor will flow till the fluid is raiſed therein to a certain height; but when the efflux is once begun, it will continue till the veſſel is emptied. Thus, fig. 11. is a cup, in the centre whereof is fixed a glaſs pipe A, continued through the bottom at B, over which is put another glaſs tube, made air-tight at top by means of the cork at C; but left ſo open at foot, by holes made at D, that the water may freely riſe between the tubes as the cup is filled. Till the fluid in the cup ſhall have gained the top of the inmoſt pipe at A, no motion will appear: The air however from between the two pipes being in the mean time extruded, by the riſe of the denſer fluid, and paſſing down the inner tube, will get away at bottom; and the water, as ſoon as the top of the incloſed tube ſhall be covered thereby, will very ſoon follow, and continue to riſe in this machine, as in the ſyphon, till the whole is run off.

This is called by ſome, a *Tantalus's cup*; and, to humour the thought, a hollow figure is ſometimes put over the inner tube, of ſuch a length, that when the fluid is got nearly up to the lips of the man, the ſyphon may begin to act and empty the cup.

This is in effect no other than if the two legs of the ſyphon were both within the veſſel, as in fig. 12. into which the water poured will riſe in the ſhorter leg of the machine, by its natural preſſure upwards, to its own level; and when it ſhall have gained the bend of the ſyphon, it will come away by the longer leg, as already deſcribed. An apple, an orange, or any other ſolid, may be put into the veſſel, to raiſe the water, when it is near the bend, to ſet it a-running, by way of amuſement.

Entertain-
ing experi-
ments.

Plate CLIV

Again, let the handle of the cup, fig. 8. be hollow; let the tube CD, ſcrewed therein, communicate freely with the water poured into the cup, that it may riſe equally in both. Being once above the level ED, it will overflow, and, deſcending through the cavity DB, will empty the cup of its liquor.

39
The foun-
tain at com-
mand.
Plate CLIII
fig. 1.

2. The device called *the fountain at command*, acts upon the ſame principle with the ſyphon in the cup. Let two veſſels A and B be joined together by the pipe C, which opens into them both. Let A be opened at top, B cloſe both at top and bottom, (ſave only a ſmall hole at *b* to let the air get out of the veſſel B,) and A be of ſuch a ſize as to hold about ſix times as much water as B. Let a ſyphon DEF be ſoldered to the veſſel D, ſo that the part DE*e* may be within the veſſel, and F without it; the end D almoſt touching the bottom of the veſſel, and the end F below the level of D: the veſſel B hanging to A by the pipe C (ſoldered into both), and the whole ſupported by the pillars G and H upon the ſtand I. The bore of the pipe muſt be conſiderably leſs than the bore of the ſyphon.

The whole being thus conſtructed, let the veſſel A be filled with water, which will run through the pipe C, and fill the veſſel B. When B is filled above the top of the ſyphon at E, the water will run through the ſyphon, and be diſcharged at F. But as the bore of the ſyphon is larger than the bore of the pipe, the ſyphon will run faſter than the pipe, and will ſoon empty the veſſel B; upon which the water will ceaſe from running through the ſyphon at F, until the pipe C refills the veſſel B, and then it will begin to run as before. And thus the ſyphon will continue to run and ſtop alternately, until all the water in the veſſel A has run through the pipe C.—So that, after a few trials, one may eaſily gueſs about what time the ſyphon will ſtop, and when it will begin to run; and then, to amuſe others, he may call out "*ſtop*," or "*run*," accordingly.

40
Portable
fountain
and clep-
ſydra.
Plate CLV.
fig. 18.

3. This fig. repreſents a very pretty portable fountain, which, being charged with water, and inverted, will play a jet nearly as high as the reſervoir, till the fluid is exhauſted; and then turned up on the other end, the ſame thing will happen, and a real clepſydra, or water-clock, be thereby formed.

This device conſiſts of two hollow veſſels, A and B, communicating with each other only by the recurved tubes C and D; at the ends of which, E and F, are placed ſmall adjutages to direct the jet. G and H are two open tubes, ſoldered into the bottom of the baſons belonging to A and B, through which the water flows in, and fills thoſe veſſels to a certain height, that is, according to their length. They by their diſpoſition alſo prevent the return of the water the ſame way, when the machine is turned upſide down.

41
Hydro-
ſcope, or
water-
clock.
Plate CLVI
fig. 4.

4. Provide a cylindric veſſel of glaſs or china, ABCD, about a foot high, and four inches diameter. Make a hole in its bottom, in which glue a ſmall glaſs-tube E, of about one-third of an inch diameter, and whoſe end has been partly cloſed in the flame of a lamp, ſo that it will not ſuffer the water to paſs out but by drops, and that very ſlowly. Cover the top of the veſſel

Entertaining experiments.

ſel with a circle of wood F, in the centre of which make a round hole about half an inch diameter.

Have a glaſs-tube GH, a foot high, and a quarter of an inch diameter; and at one end let it have a ſmall glaſs globe I, to which you may hang a weight L, by which it is kept *in equilibrio*, on or near the ſurface of the water; or you may pour a ſmall quantity of mercury into the tube, for the ſame purpoſe. Fill the veſſel with water; put the tube in it, and over it place the cover F, through the hole of which the tube muſt paſs freely up and down. Now, as the water drops gradually out of the veſſel, the tube will continue to deſcend till it come to the bottom.

Therefore, paſte on the tube a graduated paper, and put it in the veſſel when nearly full of water. Hang a watch by it, ſet to a certain hour; and as the tube deſcends, mark the hours, with the half and quarter hours. If the veſſel be ſufficiently large, with regard to the hole at the bottom, it will go for 12 hours, a day, or as much longer as you pleaſe, and requires no other trouble than that of pouring in water to a certain height. Care muſt be had, however, that the water be clean; for if there be any ſediment, it will in time ſtop the ſmall hole at bottom, or at leaſt render the motion of the water irregular.

The veſſel may be of tin, but the pipe at bottom ſhould be glaſs, that its ſmall aperture may not alter by uſe. It is to be obſerved, that the tube of one of theſe clocks is not to be graduated by another: for though the veſſel be of the ſame diameter at top, it may not be perfectly cylindrical throughout; nor is it eaſy to make the hole at the bottom of one veſſel exactly of the ſame dimenſion with that of another.

42 Clepſydra. Plate CLVI fig. 7.

5. The hon. Mr Charles Hamilton has deſcribed a curious clepſydra or water-clock of new conſtruction. An open canal *e e*, ſupplied with a conſtant and equal ſtream by the ſyphon *d*, has at each end *f f*, open pipes of exactly equal bores, which deliver the water that runs along the canal *e*, alternately into the veſſels *g* 1, *g* 2, in ſuch a quantity as to raiſe the water from the mouth of the tantalus *t*, exactly in an hour. The canal *e e* is equally poiſed by the two pipes *f* 1, *f* 2, upon a centre *r*, the ends of the canal *e* are raiſed alternately, as the cups *z z* are depreſſed, to which they are connected by lines running over the pullies *l l*. The cups *z z* are fixed at each end of the balance *m m*, which moves up and down upon its center *v*. *n* 1, *n* 2, Are the edges of two wheels or pullies, moving different ways alternately, and fitted to the cylinder *o* by oblique teeth both in the cavity of the wheel and upon the cylinder, which, when the wheel *n* moves one way, that is, in the direction of the minute-hand, meet the teeth of the cylinder and carry the cylinder with it, and, when *n* moves the contrary way, ſlip over thoſe of the cylinder, the teeth not meeting, but receding from each other. One or other of theſe wheels *n n* continually moves *o* in the ſame direction, with an equable and uninterrupted motion. A fine chain goes twice round each wheel, having at one end a weight *x*, always out of water, which equiponderates with *y* at the other end, when kept floating on the ſurface of the water in the veſſel *g*, which *y* muſt always be; the two cups *z*, *z*, one at each end of the balance, keep it *in æquilibrio*, till one of them is forced down by the weight and impulſe of the water, which it receives from the tantalus *t t i*: each of theſe cups *z*, *z*, has likewiſe a tantalus of its own *h*, *h*, which empties it after the water has done running from *g*, and leaves the two cups again *in æquilibrio*: *q* is a drain to carry off the water. The dial-plate, &c. needs no deſcription. The motion of the clepſydra is effected thus: As the end of the canal *e e*, fixed to the pipe *f* 1, is, in the figure, the loweſt, all the water ſupplied by the ſyphon runs through the pipe *f* 1, into the veſſel *g* 1, till it runs over the top of the tantalus *t*; when it immediately runs out at *i* into the cup *z*, at the end of the balance *m*, and forces it down; the balance moving on its centre *v*. When one ſide of *m* is brought down, the ſtring which connects it to *f* 1, running over the pulley *l*, raiſes the end *f* 1, of the canal *e*, which turns upon its centre *r*, higher than *f* 2; conſequently, all the water which runs through the ſyphon *d* paſſes through *f* 2 into *g* 2, till the ſame operation is performed in that veſſel, and ſo on alternately. As the height the water riſes in *g* in an hour, viz. from *s* to *t*, is equal to the circumference of *n*, the float *y* riſing thro' that height along with the water, lets the weight *x* act upon the pulley *n*, which carries with it the cylinder *o*; and this, making a revolution, cauſes the index *k* to deſcribe an hour on the dial-plate. This revolution is performed by the pulley *n* 1; the next is performed by *n* 2, whilſt *n* 1 goes back, as the water in *g* 1 runs out through the tantalus; for *y* muſt follow the water, as its weight increaſes, out of it. The axis *o* always keeps moving the ſame way; the index *p* deſcribes the minutes; each tantalus muſt be wider than the ſyphon, that the veſſels *g g* may be emptied as low as *s*, before the water returns to them.

43 A fount which ſpouts ter in f of a ſhow fig. 2.

6. To the tube wherein the water is to riſe, fit a ſpherical or lenticular head, AB, made of a plate of metal, and perforated at top with a great number of little holes. The water riſing with vehemence towards AB, will be there divided into innumerable little threads, and afterwards broke, and diſperſed into the fineſt drops.

44 A fount which ſpreads water in form of table-cl fig. 3.

7. To the tube AB, ſolder two ſpherical ſegments C and D, almoſt touching each other; with a ſcrew E, to contract or amplify the interſtice or chink at pleaſure. Others chooſe to make a ſmooth, even cleſt, in a ſpherical or lenticular head, fitted upon the tube. The water ſpouting through the chink, or cleft, will expand itſelf in manner of a cloth.

45 The glo lar foun Plate CL fig. 11.

8. Make a hollow globe A, of copper or lead, and of a ſize adapted to the quantity of water that comes from the pipe to which it is to be placed. Pierce a number of ſmall holes thro' this globe, that all tend towards its centre; obſerving, however, that the diameters of all theſe holes, taken together, muſt not exceed that of the pipe at the part from whence the water flows. Annex to it a pipe B, of ſuch height as you think convenient; and let it be ſcrewed at C, to the pipe from whence the jet flows. The water that comes from the jet ruſhing with violence into the globe, will be forced out at the holes, with the direction in which they are made, and will produce a very pleaſing ſphere of water.

46 The hy draulic dancer, fig. 17.

9. Procure a little figure made of cork, as AB, which you may paint, or dreſs in a light ſtuff, after your own fancy. In this figure you are to place the ſmall hollow cone C, made of thin leaf braſs. When the figure is placed on the jet-d'eau that plays in

ntertain-ing experi-ments.

in a perpendicular direction, it will remain ſuſpended on the top of the water, and perform a great variety of motions.

If a hollow ball of copper, of an inch diameter, and very light, be placed on a ſimilar jet, it will, in like manner, remain ſuſpended, revolving on its centre, and ſpreading the water all round it, in the manner repreſented by fig. 14. or Plate CLVI. fig. 1.—But note, that as it is neceſſary the ball, &c. when on the deſcent, ſhould keep the ſame preciſe perpendicular wherein it roſe (ſince otherwiſe it would miſs the ſtream and fall downright,) ſuch a *fountain* ſhould only be played in a place free from wind.

47 he hemi-pher cal ſcade. late CLV. g. 1.

10. Make a hollow leaden cone A, whoſe axis is one-third of the diameter of its baſe. The circle C, that forms its baſe, muſt be in proportion to the ſurface of water that flows from the jet on which it is to be placed, that it may flow from it equally on all ſides. To the cone join the pipe B, which ſerves not only as a ſupport, but is to be pierced with a number of holes, that it may ſupply the cone with a ſufficient quantity of water. Screw the tube juſt mentioned to the top of that from whence the jet proceeds.—The water that ruſhes into the cone from the pipe, will run over its circumference, and form a hemiſpherical caſcade. If this piece be ſo conſtructed that it may be placed in a reverſed poſition, it will produce a fountain in the form of a vaſe, (ſee fig. 8.); and if there be a ſufficient quantity of water, both theſe pieces may be placed on the ſame pipe, the fountain at top and the caſcade underneath, which by their variety will produce a very pleaſing appearance.

48 e water- te CLVI 5.

11. Let there be two portions of a hollow ſphere, that are very ſhallow: and let them be ſo joined together, that the circular ſpace between them may be very narrow. Fix them vertically to a pipe from whence a jet proceeds. In that part by which the portions of the ſphere are joined, there muſt be made a number of holes; then the water ruſhing into the narrow cavity will be forced out from the holes, and produce a regular figure of the ſun, as in the plate. This piece requires a large quantity and force of water to make it appear to advantage.

Several pieces of this ſort may be placed over each other, in a horizontal direction, and ſo that the ſame pipe may ſupply them all with water (ſee fig. 7.) It is proper to obſerve, that the diameter of theſe pieces muſt continually diminiſh, in proportion to their diſtance from the bottom.

e CLV.

49 revol- water- e CLV. 1.

12. Make a hollow circle A, the ſides of which are to be pierced with 12 or 15 holes, made in an inclined direction: or you may place the like number of ſmall tubes round the circle. Fix this circle on the top of a jet, in ſuch manner that it may turn freely round. The water ruſhing violently into the hollow circle will keep it in continual motion; and at the ſame time forcing out of the holes or ſmall tubes, will form a revolving figure with rays in different directions, as in the plate.

50 com- ed jet

13. Provide a ſtrong copper veſſel A, of ſuch figure as you think convenient; in which ſolder a pipe BE, of the ſame metal. Let there be a cock at H, which muſt be made ſo tight that no air can paſs by it. The pipe BE muſt go very near the bottom of the veſſel, but not touch it. There muſt be another pipe F, at whoſe extremity G there is a very ſmall hole: this pipe muſt be ſcrewed into the former.

Entertaining experiments.

The veſſel being thus diſpoſed, take a good ſyringe; and placing the end of it in the hole at G, open the cock, and force the air into the veſſel; then turn the cock and take out the ſyringe. Repeat this operation ſeveral times, till the air in the veſſel be ſtrongly condenſed. Then fill the ſyringe with water, and force it into the veſſel, in the ſame manner as you did the air; and repeat this operation till you can force no more water into the veſſel; then ſhut the cock. This veſſel will be always ready to perform an extempore jet d'eau: for, on turning the cock, the ſpring of the compreſſed air will force out the water with great violence, and the jet will continue, tho' conſtantly decreaſing in force, till the water is all exhauſted, or the air within the veſſel is come to the ſame denſity with that without.

51 The marvellous veſſel, fig. 5.

14. Let there be made a tin veſſel, about ſix inches high, and three inches in diameter. The mouth of this veſſel muſt be only one quarter of an inch wide; and in its bottom make a great number of ſmall holes, about the ſize of a common ſewing needle. Plunge this veſſel in water, with its mouth open; and when it is full, cork it up and take it out of the water. So long as the veſſel remains corked, no water whatever will come out, but as ſoon as it is uncorked, the water will iſſue from the ſmall holes at its bottom. You muſt obſerve, that if the holes at the bottom of the veſſel be more than one-ſixth of an inch diameter, or if they be in too great number, the water will run out tho' the veſſel be corked; for then the preſſure of the air againſt the bottom of the veſſel will not be ſufficient to confine the water.

52 A glaſs full of water inverted, and the water not ſpilt. Fig. 13.

An experiment ſimilar to this is made with a glaſs filled with water, over which a piece of paper is placed. The glaſs is then inverted; and the water, by the preſſure of the air under it, will remain in the glaſs. That the paper, tho' the ſeeming, is not the real, ſupport of the water, will appear from n° 20.

53 The circulating fountain, fig. 10.

15. In this fountain the boxes CE and DYX being cloſe, you ſee only the baſon ABW, with a hole at W, through which the water that ſpouts out at B falls and runs down through the pipe WX into the box DYX, from whence it drives out the air, through the aſcending pipe YZ, into the cavity of the box CE, where preſſing upon the water contained in that box, it forces it out, through the ſpouting pipe OB, as long as there is any water in CE; ſo that the continuance of the play is while the water in CE ſpouts out and falls down through the pipe WX, into the cavity DYX. The force of the jet is in proportion to the height of the pipe WX, or of the diſtance between the boxes CE and DY. The height of the water, meaſured from the baſon ABW to the ſurface of the water in the lower box DYX, is always equal to the height, meaſured from the top of the jet to the ſurface of the water in the middle cavity CE. Now, ſince the ſurface CE is always falling, and the water DY is always riſing, the height of the jet muſt continually decreaſe, till it is ſhorter by the depth of the cavity CE, which is emptying, added to the depth of the cavity DY, which is always filling; and when the jet is fallen ſo low, it immediately ceaſes.

The method of preparing this fountain is as follows. Firſt, pour water in at W, till you have filled the cavity DXY: then turn the fountain over, and the water will run from the cavity DXY, into the cavity CE, which you will know to be full by the water's running out at B when it is held down. Set the fountain up again, and pour about a pint of water into the baſon ABW; and as ſoon as it has filled the pipe WX, the fountain will play, and continue as long as there is any water in CE. You may then empty the water left in the baſon into any other veſſel, and invert the fountain; which, upon being placed again erect, will begin to play, when the water poured out of the baſon is put into it again. There are fountains of this ſort that have four pipes, inſtead of two, and by that means the water is forced up to twice the height it is in this. See alſo nº 40.

54 The magical caſcade, fig. 9.

16. Procure a tin veſſel ABC, five inches high and four in diameter; and let it be cloſed at top. To the bottom of this veſſel let there be ſoldered the pipe DE, of ten inches length and half an inch in diameter: this pipe muſt be open at each end, and the upper end muſt be above the water in the veſſel. To the bottom alſo fix five or ſix ſmall tubes F, about one-eighth of an inch diameter. By theſe pipes the water contained in the veſſel is to run ſlowly out.

Place this machine on a ſort of tin baſon GH, in the middle of which is a hole of one quarter of an inch diameter. To the tube DE, fix ſome pieces that may ſupport the veſſel over the baſon; and obſerve that the end D, of the tube DE, muſt be little more than one quarter of an inch from the baſon. There muſt be alſo another veſſel placed under the baſon, to receive the water that runs from it.

Now, the ſmall pipes diſcharging more water into the baſon than can run out at the hole in its centre, the water will riſe in the baſon, above the lower end of the pipe DE, and prevent the air from getting into the veſſel AB; and conſequently the water will ceaſe to flow from the ſmall pipes. But the water continuing to flow from the baſon, the air will have liberty again to enter the veſſel AB, by the tube DE, and the water will again flow from the ſmall pipes. Thus they will alternately ſtop and flow, as long as any water remains in the veſſel AB.

As you will eaſily know, by obſerving the riſe of the water, when the pipes will ceaſe to flow, and by the fall of it, when they will begin to run again, you may ſafely predict the change; or you may command them to run or ſtop, and they will ſeem to obey your orders.

55 The illuminated fountain, fig. 4.

17. This fountain begins to play when certain candles placed round it are lighted, and ſtops when thoſe candles are extinguiſhed. It is conſtructed as follows. Provide two cylindrical veſſels, AB and CD. Connect them by tubes open at both ends, as HL, FB, &c. ſo that the air may deſcend out of the higher into the lower veſſel. To theſe tubes fix candleſticks H, &c. and to the hollow cover CF, of the lower veſſel, fit a ſmall tube EF, furniſhed with a cock G, and reaching almoſt to the bottom of the veſſel. In G let there be an aperture with a ſcrew, whereby water may be poured into CD.

Now, the candles at H, &c. being lighted, the air in the contiguous pipes will be thereby rarified, and the jet from the ſmall tube EF will begin to play: as the air becomes more rarified, the force of the jet will increaſe, and it will continue to play till the water in the lower veſſel is exhauſted. It is evident, that as the motion of the jet is cauſed by the heat of the candles, if they be extinguiſhed, the fountain muſt preſently ſtop.

56 The ſolar fountain, fig. 11.

18. The motion of the water in this fountain is produced by the heat of the ſun, in the following manner. GNS is a thin hollow globe of copper, of 18 inches diameter, ſupported by a ſmall inverted baſon, placed on a frame with four legs ABCD, which have between them, at the bottom, a baſon of two feet diameter. Through the leg C paſſes a concealed pipe, which comes from G, the bottom of the inſide of the globe: this pipe goes by HV, and joins the upright pipe *u* I, to make a jet at I. The ſhort pipe *u* I, which goes to the bottom of the baſon, has a valve at V, under the horizontal pipe H *u*, and another valve at V, above that horizontal pipe, under the cock at K. The uſe of this cock is to keep the fountain from playing in the day, till you think proper. The north pole N of the globe has a ſcrew that opens a hole, whereby water is poured into the globe.

The machine being thus prepared, and the globe half filled with water, let it be ſet in an open place, when the heat of the ſun, rarifying the air as it beats the copper, the air will preſs ſtrongly againſt the water, which coming down the pipe GCHVI, will lift up the valve V, and ſhut the valve *u*. The cock being opened, the water will ſpout out at I, and continue to play a long time, if the ſun ſhine.

At night, when the air is condenſed, that which is on the outſide of the veſſel will preſs on the adjutage I, and ſhut the valve V; and at the ſame time preſſing on the water in the baſon D*u*H, which has been played in the day, will puſh it up, through the valve *u*, and pipe *u*HG, into the globe, ſo as to fill it again, to the ſame height as at firſt. When the ſun ſhines again on the globe, the fountain will play again, &c. A ſmall jet will play ſix or eight hours.

If the globe be ſet to the latitude of the place, and rectified before it be fixed, with the hour-lines or meridians drawn upon it, the hours marked, and the countries painted, as on the common globe, it will form a good dial: the ſun then ſhining upon the ſame places in this globe, as it does on the earth itſelf. This fountain was invented by Dr Deſaguliers.

57 The hydraulic divers.

19. There is a pretty contrivance, by which the ſpecific gravity of the body is ſo altered, that it riſes and ſinks in water at our pleaſure. Let little images of men, about an inch high, of coloured glaſs, be beſpoke at a glaſs-houſe; and let them be made ſo as to be hollow within, but ſo as to have a ſmall opening into this hollow, either at the ſole of the foot or elſewhere. Let them be ſet afloat in a clear glaſs-phial of water, filled within about an inch of the mouth of the bottle; then let the bottle have its mouth cloſed with a bladder, cloſely tied round its neck, ſo as to let no air eſcape one way or the other. The images themſelves are nearly of the ſame ſpecific gravity with water, or rather a little more light, and conſequently float near the ſurface. Now when we preſs down the bladder, tied on at the top, into the mouth of the bottle, and thus preſs the air upon the ſurface of the water in the bottle; the water being preſſed will force into the hollow of the image through the little opening: thus the air within

HYDROSTATICS.

Plate CLV.

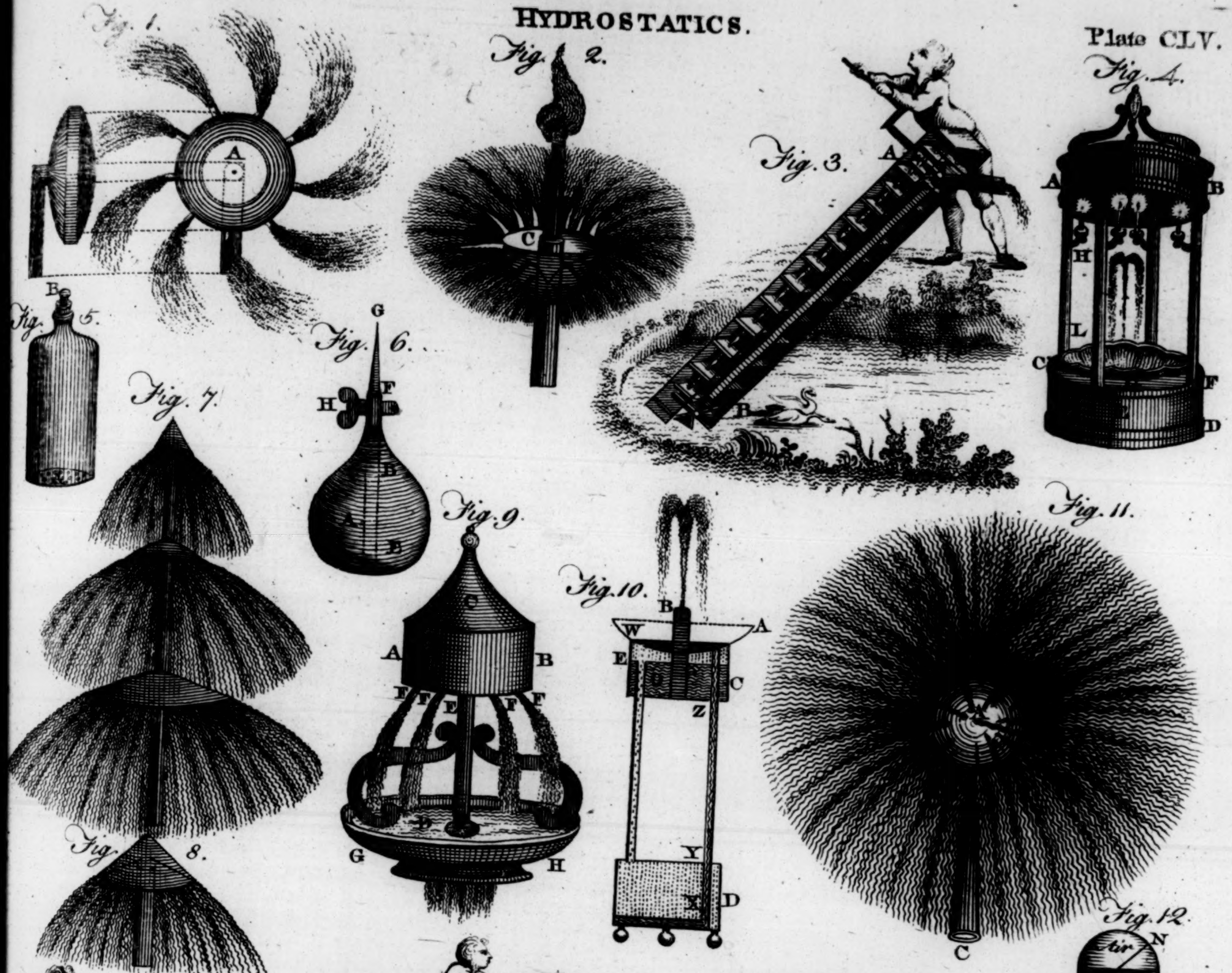

Fig. 1.
A
Fig. 2.
C
Fig. 3.
A
B
Fig. 4.
A
B
H
L
C
F
D
Fig. 5.
B
Fig. 6.
G
F
H
B
A
E
Fig. 7.
Fig. 8.
Fig. 9.
A
B
F
E
D
G
H
Fig. 10.
B
W
A
E
C
Z
Y
X
D
Fig. 11.
C
Fig. 12.
Air
N
S
A
B
C
K
H
Fig. 13.
Fig. 14.
Fig. 15.
E
B
D
K
H
G
F
C
A
Fig. 16.
H
F
B
G
C
M
K
A
Q
Fig. 17.
A
B
Fig. 18.
C
E

A Bell Sculpt

3 MA.55

HYDROSTATICS.

Plate CLVI.

Fig. 1.

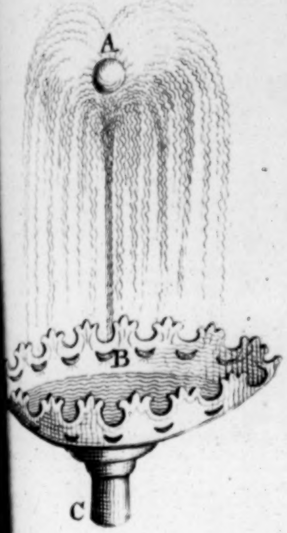

Fig. 2.

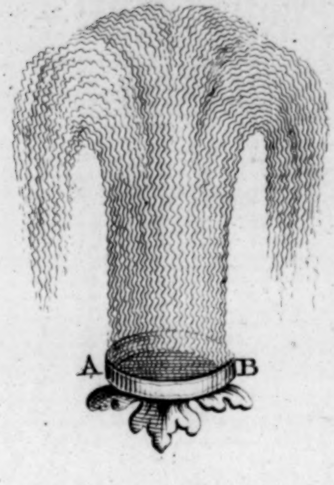

Fig. 3.

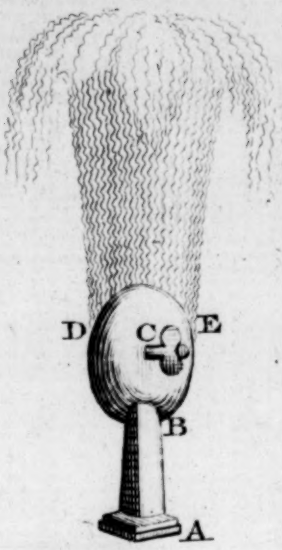

Fig. 4.

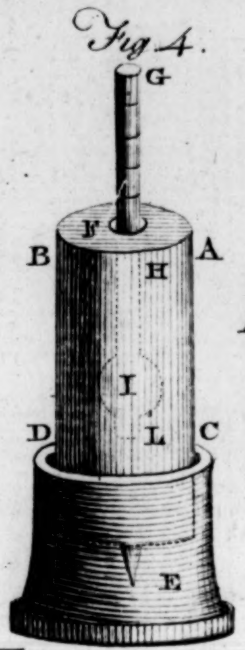
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Fig. 5.

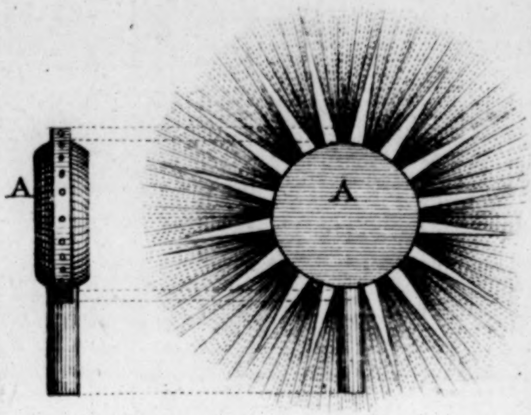

Fig. 6.

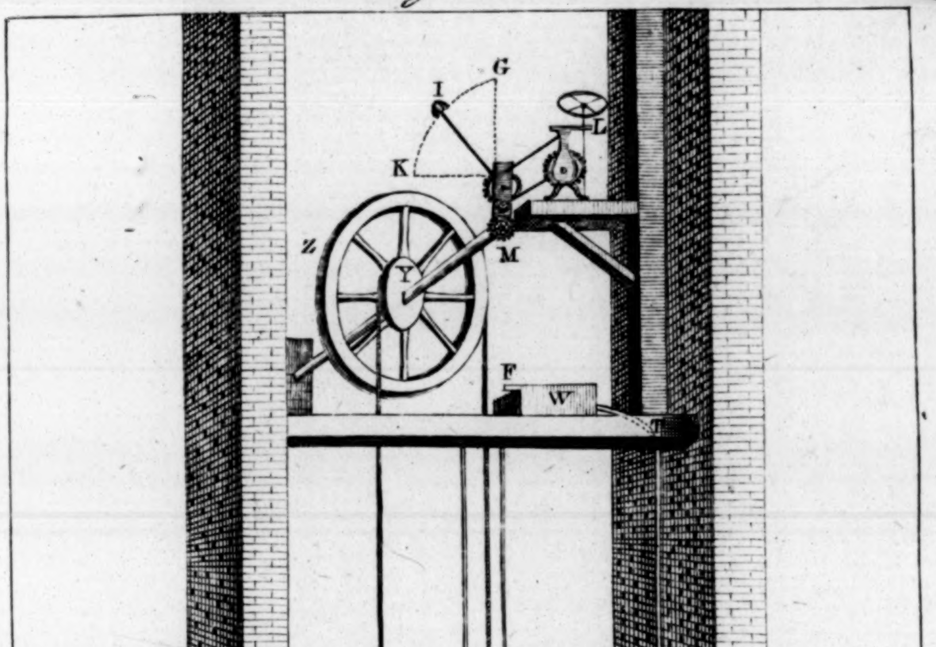
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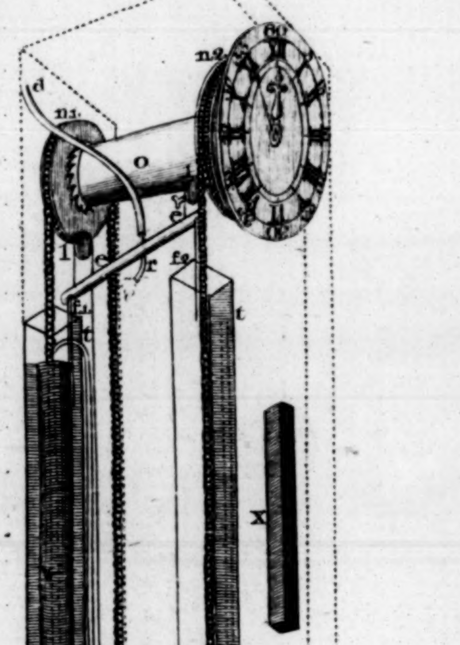
Fig. 7.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q
m

A. Bell Sculp.

3 MA 55

Hydrothorax
||
Hygrometer.

within the images will be preſſed more cloſely together, and being alſo more filled with water now than before, the images will become more heavy, and will conſequently deſcend to the bottom; but, upon taking off the preſſure from above, the air within them will again drive out the water, and they will riſe to the ſame heights as before. If the cavities in ſome of the images be greater than thoſe in others, they will riſe and fall differently, which makes the experiment more amuſing.

Hygrometer.

HYDROTHORAX, a collection of water in the breaſt. See (the Index ſubjoined to) MEDICINE.

HYGINUS (Caius Julius), a grammarian, the freedman of Auguſtus, and the friend of Ovid, was born in Spain, or, according to others, in Alexandria. He wrote many books which are mentioned by ancient authors; all of which are loſt, except ſome fables, and a work entitled *Aſtronomicon Poeticon;* and even theſe are come down to us very imperfect. The beſt edition of theſe remains is that of Munker, publiſhed with ſome other pieces of antiquity in 2 vols 8vo, 1681, under the title of *Mythographi Latini.*

HYGROMETER, an inſtrument for meaſuring the degrees of dryneſs or moiſture of the atmoſphere, in like manner as the barometer and thermometer meaſure its different degrees of gravity or warmth.

Though every ſubſtance which ſwells in moiſt, and ſhrinks in dry weather, is capable of becoming an hygrometer; yet this kind of inſtrument is far from being as yet arrived at ſuch a degree of perfection as the barometers and thermometers. There are three general principles on which hygrometers have been conſtructed. 1. The lengthening and ſhortening of ſtrings by dryneſs and moiſture, or their twiſting and untwiſting by the ſame. 2. The ſwelling and ſhrinking of ſolid ſubſtances by moiſture or dryneſs; and, 3. By the increaſe or decreaſe of the weight of particular bodies whoſe nature is to abſorb the humidity of the atmoſphere.

1. On the firſt of theſe principles Mr Smeaton hath conſtructed an hygrometer greatly ſuperior to any that had appeared before, and of which the following account is given in the 62d volume of the Philoſophical Tranſactions.

“ Having ſome years ago attempted to make an accurate and ſenſible hygrometer by means of a hempen cord of a conſiderable length, I quickly found, that, though it was more than ſufficiently ſuſceptible of every change in the humidity of the atmoſphere, yet the cord was upon the whole in a continual ſtate of lengthening. Though this change was the greateſt at firſt, yet it did not appear probable that any given time would bring it to a certainty; and, furthermore, it ſeemed, that as the cord grew more determinate in mean length, the alteration by certain differences of moiſture grew leſs. Now, as on conſidering wood, catgut, paper, &c. there did not appear to be a likelihood of finding any ſubſtance ſufficiently ſenſible of differences of moiſture that would be unalterable under the ſame degrees thereof; this led me to conſider of a conſtruction which would readily admit of an adjuſtment; ſo that, though the cord whereby the inſtrument is actuated may be variable in itſelf, both as to abſolute length and difference of length under given degrees of moiſture, yet that, on ſuppoſition of a material departure from its original ſcale, it might be readily reſtored thereto; and, in conſequence, that any number of hygrometers ſimilarly conſtructed, might, like thermometers, be capable of ſpeaking the ſame language.

“ The two points of heat the more readily determinable in a thermometer, are the points of freezing and boiling water. In like manner, to conſtruct hygrometers which ſhall be capable of agreement, it is neceſſary to eſtabliſh two different degrees of a moiſture which ſhall be as fixed in themſelves, and to which we can have recourſe as readily and as often as poſſible.

“ One point is given by making the ſubſtance perfectly wet, which ſeems ſufficiently determinable; the other is that of perfect dry, which I do not apprehend to be attainable with the ſame preciſion. A readineſs to imbibe wet, ſo that the ſubſtance may be ſoon and fully ſaturated, and alſo a facility of parting with its moiſture on being expoſed to the fire to dry; at the ſame time, that neither immerſion, nor a moderate expoſition to the warmth of the fire, ſhall injure its texture; are properties requiſite to the firſt mover of ſuch an hygrometer, that in a manner exclude all ſubſtances that I am acquainted with, beſides hempen and flaxen threads and cords, or ſubſtances compounded of them.

“ Upon theſe ideas, in the year 1758, I conſtructed two hygrometers as nearly alike as poſſible, in order that I might have the means of examining their agreement or diſagreement on ſimilar or diſſimilar treatment. The interval or ſcale between dry and wet I divided into 100 equal parts, which I call the degrees of this hygrometer. The point of 0 denotes perfect dry; and the numbers increaſe with the degrees of moiſture to 100, which denotes perfect wet.

“ On comparing them for ſome time, when hung up together in a paſſage or ſtaircaſe, where they would be very little affected by fire, and where they would be expoſed to as free an air as poſſible in the inſide of the houſe, I found that they were generally within one degree, and very rarely differed two degrees; but as theſe compariſons neceſſarily took up ſome time, and were frequently interrupted by long avocations from home, it was ſome years before I could form a tolerable judgment of them. One thing I ſoon obſerved, not altogether to my liking, which was, that the flaxen cords made uſe of ſeemed to make ſo much reſiſtance to the entry of ſmall degrees of moiſture, (ſuch as is commonly experienced within doors in the ſituation above-mentioned), that all the changes were compriſed within the firſt 30° of the ſcale; but yet, on expoſing them to the warm ſteam of a waſh-houſe, the index quickly mounted to 100. I was therefore deſirous of impregnating the cords with ſomething of a ſaline nature, which ſhould diſpoſe them more forcibly to attract moiſture; in order that the index might, with the ordinary changes of the moiſture in the atmoſphere, travel over a greater part of the ſcale of 100. How to do this in a regular and fixed quantity, was the ſubject of many experiments, and ſeveral years interrupted inquiry. At laſt I tried the one hereafter deſcribed, which ſeemed to anſwer my intention in a great meaſure; and tho'

Hygrometer.

upon the whole it does not appear probable that ever this inſtrument will be made capable of ſuch an accurate agreement as the mercurial thermometers are, yet if we can reduce all the diſagreements of an hygrometer within $\frac{1}{45}$th part of the whole ſcale, it will probably be of uſe in ſome philoſophical inquiries, in lieu of inſtruments which have not yet been reduced to any common ſcale at all.

" Fig. 1. and 2. ABC is an orthographic delineation of the whole inſtrument ſeen in front in its true proportion. DE is that of the profile, or inſtrument ſeen edgewiſe. FG in both repreſents a flaxen cord about 35 inches long, ſuſpended by a turning peg F, and attached to a loop of braſs-wire at A, which goes down into the box cover H, and defends the index, &c. from injury; and by a glaſs expoſes the ſcale to view.

" Fig. 3. ſhews the inſtrument to a larger ſcale, the upright part being ſhortened, and the box-cover removed; in which the ſame letters repreſent the ſame parts as in the preceding figures; GI are two loops or long links of braſs-wire, which lay hold of the index KL, moveable upon a ſmall ſtud or centre K. The cord FG is kept moderately ſtrained by a weight M of about half a pound avoirdupois.—It is obvious, that, as the cord lengthens and ſhortens, the extreme end of the index riſes and falls, and ſucceſſively paſſes over N 2 the ſcale diſpoſed in the arch of a circle, and containing 100 equal diviſions. This ſcale is attached to the braſs ſliding ruler QP, which moves upon the directing piece RR, fixed by ſcrews to the board, which makes the frame or baſe of the whole; and the ſcale and ruler NQP is retained in any place nearer to, or further from, the centre K, as may be required by the ſcrew S.

" Fig. 4. repreſents in profile the ſliding piece and ſtud I (fig. 3.), which traverſes upon that part of the index next the centre K; and which can, by the two ſcrews of the ſtud, be retained upon any part of the index that is made parallel; and which is done for three or four inches from the centre, for that purpoſe. The ſtud is filed to the edges, like the fulcrum of a ſcale-beam; one being formed on the under-ſide, the other on the upper, and as near as may be to one another. An hook formed at the lower end of the wire-loops CI, retains the index, by the lowermoſt edge of the ſtud; while the weight M hangs by a ſmall hook upon the upper edge: by theſe means the index is kept ſteady, and the cords ſtrained by the weight, with very little friction or burthen upon the central ſtud K.

" Fig. 5. is a parallellogram of plate braſs, to keep out duſt, which is attached to the upper edge of the box-cover H; and ſerves to ſhut the part of the box-cover neceſſarily cut away, to give leave for the wire GI to traverſe with the ſliding ſtud nearer to or further from the centre of the index K; and where, in fig. 5. *a* is an hole of about an inch diameter, for the wire GI to paſs through in the riſing and falling of the index freely without touching; *b* is a ſlit of a leſſer ſize, ſufficient to paſs the wire, and admit the cover to come off without deranging the cord or index; *cc* are two ſmall ſcrews applied to two ſlits, by which the plate ſlides lengthways, in order to adapt the hole *a* to the wire GI, at any place of the ſtud I upon the index KL.

" 1. In this conſtruction, the index KL being 12 inches long, 4 inches from the extreme end are filed ſo narrow in the direction in which it is ſeen by the eye, that any part of theſe four inches lying over the diviſions of the ſcale, becomes an index thereto. The ſcale itſelf ſlides four inches, ſo as to be brought under any part of the four inches of the index attenuated as abovementioned.

" 2. The poſition of the directing piece RR is ſo determined as to be parallel to a right line drawn thro' o upon the ſcale, and the centre K of the index; conſequently, as the attenuated part of the index forms a part of a radius or right line from the ſame centre, it follows, that whenever the index points to o upon the ſcale, though the ſcale is moved nearer to or further from the centre of the index, yet it produces no change in the place to which the index points.

" 3. When the divided arch of the ſcale is at 10 inches from the centre, (that is, at its mean diſtance); then the centre of the arch and the centre of the index are coincident. At other diſtances, the extremes of which are eight or twelve inches, the centre of the diviſions, and the centre of the index pointing thereto, not being coincident, the index cannot move over the ſpaces *geometrically* proportionable to one another in all ſituations of the ſcale, yet, the whole ſcale not exceeding 30° of a circle, it will be found on computation, that the error can never be ſo great as $\frac{1}{100}$ part of the ſcale, or 1° of the hygrometer; which in this inſtrument being conſidered as indiviſible, the mechanical error will not be ſenſible.

" The cord here made uſe of is flax, and between $\frac{1}{20}$th and $\frac{1}{30}$th of an inch in diameter; which can be readily aſcertained by meaſuring a number of turns made round a pencil or ſmall ſtick. It is a ſort of cord uſed in London for making nets, and is of that particular kind called by net-makers *flaxen three-threads laid*. A competent quantity of this cord was boiled in one pound avoirdupois of water, in which was put two pennyweights troy of common ſalt; the whole was reduced by boiling to ſix ounces avoirdupois, which was done in about half an hour. As this aſcertains a given ſtrength of the brine, on taking out the cord; it may be ſuppoſed that every fibre of the cord is equally impregnated with ſalt. The cord being dried, it will be proper to ſtretch it; which may be done ſo as to prevent it from untwiſting, by tying three or four yards to two nails againſt a wall, in an horizontal poſition, and hanging a weight of a pound or two to the middle, ſo as to make it form an obtuſe angle. This done for a week or more in a room, will lay the fibres of the cord cloſe together, and prevent its ſtretching ſo faſt after being applied to the inſtrument, as it would otherwiſe be apt to do.

" The hygrometer is to be adjuſted in the following manner. The box-cover being taken off to prevent its being ſpoiled by the fire, and chooſing a day naturally dry, ſet the inſtrument nearly upright, about a yard from a moderate fire; ſo that the cord may become dry, and the inſtrument warm, but not ſo near as would ſpoil the fineſt linen by too much heat, and yet fully evaporate the moiſture; there let the inſtrument ſtay till the index is got as low as it will go; now and then ſtroaking the cord betwixt the thumb

and

Hygrometer.

and finger downwards, in order to lay the fibres thereof cloſe together; and thereby cauſing it to lengthen as much as poſſible. When the index is thus become ſtationary, which will generally happen in about an hour, more or leſs, as the air is naturally more or leſs dry, by means of the peg at top raiſe or depreſs the index, till it lies over the point *o*. This done, remove the inſtrument from the fire; and having ready ſome warm water in a tea-cup, take a middling camel's-hair pencil, and, dipping it in the water, gently anoint the cord till it will drink up no more, and till the index becomes ſtationary and water will have no more effect upon it, which will alſo generally happen in about an hour. If in this ſtate the index lies over the degree marked 100, all is right: if not, ſlack the ſcrew S, and ſlide the ſcale nearer to or further from the centre, till the point 100 comes under the index, and then the inſtrument is adjuſted for uſe: but if the compaſs of the ſlide is not ſufficient to effect this, as may probably happen on the firſt adjuſtment, ſlack the proper ſcrews, and move the ſliding-ſtudd *I* nearer to or further from the centre of the index, according as the angle formed by the index between the two points of dry or wet happens to be too ſmall or too large for the ſcale."

1. On the ſecond general principle, namely, that of the ſwelling of ſolid bodies by moiſture, and their contraction by dryneſs, Mr De Luc's is the beſt. He makes choice of ivory for the conſtruction of his hygrometer, becauſe he finds, that, being once wetted, ivory regularly ſwells by moiſture, and returns exactly to the ſame dimenſions when the moiſture is evaporated, which other bodies do not. This hygrometer is repreſented in fig. 6. *a a b* is an ivory tube open at the end *a a*, and cloſe at *b*. It is made of a piece of ivory taken at the diſtance of ſome inches from the top of a pretty large elephant's tooth, and likewiſe at the ſame diſtance from its ſurface, and from the canal which reaches to that point. (This particular direction is given, that the texture of the ivory in all different hygrometers may be the ſame, which is of great importance.) This piece is to be bored exactly in the direction of its fibres; the hole muſt be very ſtraight, its dimenſions $2\frac{1}{2}$ lines in diameter, and 2 inches 8 lines in depth from *a a* to *c*. Its bore is then to be exactly filled with a braſs cylinder, which, however, muſt project ſomewhat beyond the ivory tube, and thus it is to be turned on a proper machine, till the thickneſs of the ivory is exactly $\frac{3}{16}$ of a line, except at the two extremities. At the bottom *b*, the tube ends in a point; and at the top *a a* it muſt for about two lines be left a little thicker, to enable it to bear the preſſure of another piece put into it. Thus the thin or hygrometrical part of the tube will be reduced to $2\frac{1}{2}$ French inches, including the concavity of the bottom. Before this piece is uſed, it muſt be put into water, ſo that the external part alone may be wetted by it; and here it is to remain till the water penetrates to the inſide, and appears in the form of dew, which will happen in a few hours. The reaſon of this is, that the ivory tube remains ſomewhat larger ever after it is wetted the firſt time.

For this hygrometer, a glaſs tube muſt be provided about 14 inches long, the lower end of which is ſhewn in *d d e e*. Its internal diameter is about $\frac{1}{4}$ of a line.

Hygrometer.

If now the ivory tube is exactly filled with mercury, and the glaſs one affixed to it, as the capacity of the former decreaſes by being dried, the mercury will be forced up into the glaſs one.

The piece *f f g g* is intended to join the ivory with the glaſs tube. It is of braſs, ſhaped as in the figure. A cylindrical hole is bored through it, which holds the glaſs tube as tight as poſſible without danger of breaking it; and its lower part is to enter with ſome degree of difficulty into the ivory pipe. To hinder that part of the tube which incloſes the braſs piece from being affected by the variations of the moiſture, it is covered with a braſs verrel repreſented in *h h i i*. The pieces muſt be united together with gum-lac or maſtic.

The introduction of the mercury is the next operation. For this purpoſe, a ſlip of paper three inches wide is firſt to be rolled over the glaſs tube, and tied faſt to the extremity neareſt the ivory pipe. A horſe-hair is then to be introduced to the tube, long enough to enter the ivory pipe by an inch, and to reach three or four inches beyond the extremity of the glaſs one. The paper which has been ſhaped round the tube muſt now be raiſed, and uſed as a funnel to pour the mercury into the inſtrument, which is held upright. The pureſt quickſilver is to be uſed for this purpoſe, and it will therefore be proper to uſe that revived from cinnabar. It eaſily runs into the tube; and the air eſcapes by means of the horſe-hair, aſſiſted with ſome gentle ſhakes. Freſh mercury muſt from time to time be ſupplied, to prevent the mercurial tube from being totally emptied; in which caſe, the mercurial pellicle which always forms by the contact of the air would run in along with it.

Some air-bubbles generally remain in the tube; they may be ſeen through the ivory pipe, which is thin enough to have ſome tranſparency. Theſe being collected together by ſhaking, muſt be brought to the top of the tube, and expelled by means of the horſe-hair. To facilitate this operation, ſome part of the mercury muſt be taken out of the tube, in order that the air may be leſs obſtructed in getting out, and the horſe-hair have a freer motion to aſſiſt it. Air, however, cannot be entirely driven out in this manner. It is the weight of the mercury with which the tube is for that reaſon to be filled, which in time completes its expulſion, by making it paſs through the pores of the ivory. To haſten this, the hygrometers are put into a proper box. This is fixed nearly in a vertical direction to the ſaddle of a horſe, which is ſet a-trotting for a few hours. The ſhakes ſometimes divide the column of mercury in the glaſs tube, but it is eaſily re-united with the horſe-hair. When, upon ſhaking the hygrometer vertically, no ſmall tremulous motion is any longer perceived in the upper part of the column, one may be ſure that all the air is gone out.

The ſcale of this hygrometer may be adjuſted, as ſoon as the air is gone out, in the following manner. The inſtrument is to be ſuſpended in a veſſel of water cooled with ice, freſh quantities of which are to be added as the former melts. Here it is to remain till it has ſunk as low as it will ſink by the enlargement of the capacity of the ivory tube, owing to the moiſture it has imbibed. This uſually happens in ſeven or eight hours, and is to be carefully noted. In two or

Hygrometer.

three hours the mercury begins to aſcend, becauſe the moiſture paſſes into the cavity, and forces it up. The the loweſt ſtation of the mercury is then to be marked 0; and for the more accurate marking the degrees on the ſcale, M. De Luc always choſe to have his hygrometrical tube made of one which had formerly belonged to a thermometer. The reaſon of this is, that in the thermometer the expanſion of the mercury by heat had been already determined. The diſtance between the thermometrical points of melting ice and boiling water at 27 French inches of the barometer was found to be 1937 parts. The bulb of this preparatory thermometer was broke in a baſon, in order to receive carefully all the mercury that it contained. This being weighed in nice ſcales amounted to 1428 grains. The hygrometer contained 460 grains of the ſame mercury. Now it is plain, that the extent of the degrees on the hygrometer, ought to be to that of the degrees on the preparatory thermometer as the different weights of the mercury contained in each; conſequently 1428 : 460 :: 1937 : 624 nearly; and therefore the correſponding intervals ought to follow the ſame proportion: and thus the length of a ſcale was obtained, which might be divided into as many parts as he pleaſed.

Fig. 7. is a repreſentation of De Luc's hygrometer when fully conſtructed. In elegance it far exceeds Smeaton's or any other, and probably alſo in accuracy; for by means of a ſmall thermometer fixed on the board along with it, the expanſion of the mercury by heat may be known with great accuracy, and of conſequence how much of the height of the mercury in the hygrometer is owing to that cauſe, and how much to the mere moiſture of the atmoſphere.

3. On the third principle, namely, the alteration of the weight of certain ſubſtances by their attracting the moiſture of the air, few attempts have been made, nor do they ſeem to have been attended with much ſucceſs. Sponges dipped in a ſolution of alkaline ſalts, and ſome kinds of paper, have been tried. Theſe are ſuſpended to one end of a very accurate balance, and counterpoiſed by weights at the other, and ſhew the degrees of moiſture or dryneſs by the aſcent or deſcent of one of the ends. But, beſides that ſuch kinds of hygrometers are deſtitute of any fixed point from whence to begin their ſcale, they have another inconvenience (from which indeed Smeaton's is not free, and which has been found to render it erroneous), namely, that all ſaline ſubſtances are deſtroyed by long continued expoſure to the air in very ſmall quantities, and therefore can only imbibe the moiſture for a certain time. Oil of vitriol hath therefore been recommended in preference to the alkaline or neutral ſalts. See Chemistry, n° 105; and, indeed, for ſuch as do not chuſe to be at the trouble of conſtructing a hygrometer on the principles of Mr Smeaton or De Luc, this will probably be found the moſt eaſy and accurate. Fig. 8. repreſents an hygrometer of this kind. A is a ſmall glaſs cup containing a ſmall quantity of oil of vitriol, B an index counterpoiſing it, and C the ſcale; where it is plain, that as the oil of vitriol attracts the moiſture of the air the ſcale will deſcend, which will raiſe the index, and *vice verſa*. This liquid is exceedingly ſenſible of the increaſe or decreaſe of moiſture. A ſingle grain, after its full increaſe, has varied its equilibrium ſo ſenſibly, that the tongue of a balance, only an inch and a half long, has deſcribed an arch one third of an inch in compaſs, (which arch would have been almoſt three inches if the tongue had been one foot), even with ſo ſmall a quantity of liquor; conſequently, if more liquor, expanded under a large ſurface, were uſed, a pair of ſcales might afford as nice an hygrometer as any kind yet invented.—A great inconvenience, however, is, that as the air muſt have full acceſs to the liquid, it is impoſſible to keep out the duſt, which, by continually adding its weight, muſt render the hygrometer falſe: add to this, that even oil of vitriol itſelf is by time deſtroyed, and changes its nature, if a ſmall quantity of it is continually expoſed to the air. So that of all the inventions that have hitherto appeared, De Luc's alone ſeems capable of being brought to the requiſite perfection.

Hygroſcope ‖ Hymen.

HYGROSCOPE. The ſame with Hygrometer.

HYLA (anc. geog.), a river of Myſia Minor, famous for Hylas the favourite boy of Hercules, who was carried down the ſtream and drowned. It is ſaid to run by Pruſa; whence it ſeems to be the ſame with the *Rhyndacus*, which runs north-weſt into the Propontis.

HYLAS, in fabulous hiſtory, ſon of Theodamus, was raviſhed by the nymphs of a fountain as he was taking out ſome water for Hercules by whom he was beloved.

HYMEN, or Hymenæus, a fabulous divinity, the ſon of Bacchus and Venus Urania, was ſuppoſed by the ancients to preſide over marriages; and accordingly was invoked in epithalamiums, and other matrimonial ceremonies, under the formula, *Hymen, o Hymenæe!*

The poets generally crown this deity with a chaplet of roſes; and repreſent him, as it were, diſſolved and enervated with pleaſures; dreſſed in a yellow robe, and ſhoes of the ſame colour; with a torch in his hand.—Catullus, in one of his epigrams, addreſſes him thus:

> *Cinge tempora floribus,*
> *Suaveolentis amaraci.*

It was for this reaſon, that the new-married couple bore garlands of flowers on the wedding-day: which cuſtom alſo obtained among the Hebrews; and even among Chriſtians, during the firſt ages of the church, as appears from Tertullian, *De corono militari*, where he ſays, *Coronant & nuptæ ſponſos.*—S. Chryſoſtom likewiſe mentions theſe crowns of flowers; and to this day the Greeks call marriage ϛεφανομα, in reſpect of this crown or garland.

Hymen, in anatomy, a membrane in general; but by it is uſually underſtood the membrane which appears in the form of a creſcent, and is ſituated at the entrance of the vagina. When this membrane is ruptured, it is ſhrivelled up, and forms the carunculæ myrtiformes. It naturally ſhrinks with years, and often diſappears before the age of 20, ſo can be no proof of virginity.

In ſome infants this membrane ſo cloſes up the urethra, that the urine cannot be voided: in others, the urine paſſes, but when the menſes flow, they cannot be diſcharged, becauſe of the imperforated hymen.

When the mark of perforation cannot be ſeen, the cure is thought to be impracticable; but when the puncture punƈture of a lancet could not produce the deſired effect, a trochar and canula hath ſucceeded, though a paſſage of four inches was perforated before the end was obtained.—In the memoirs of the Royal Academy of Sciences for 1756, we have an account of a conception without any perforation of the hymen.

HYMENÆAL, ſomething belonging to marriage; ſo called from HYMEN. See POETRY, n° 157.

HYMN, a ſong or ode in honour of God; or a poem, proper to be ſung, compoſed in honour of ſome deity. See SONG, and ODE.—The word is Greek, υμνος, *hymn*, formed of the verb υδω, *celebro*, "I celebrate."—Iſiodore, on this word, remarks, that *hymn* is properly a ſong of joy, full of the praiſes of God: by which, according to him, it is diſtinguiſhed from *threna*, which is a mourning ſong, full of lamentation.

St Hilary, biſhop of Poictiers, is ſaid to have been the firſt that compoſed hymns to be ſung in churches, and was followed by St Ambroſe. Moſt of thoſe in the Roman Breviary were compoſed by Prudentius. They have been tranſlated into French verſe by Meſſieurs de Port Royal.—In the Greek Liturgy there are four kinds of hymns; but the word is not taken in the ſenſe of a praiſe offered in verſe, but ſimply of a laud or praiſe. The angelic hymn, or *Gloria in excelſis*, makes the firſt kind; the *triſagion* the ſecond; the *Cherubic hymn*, the third; and the hymn of *victory* and *triumph* called επινικος, the laſt.

The hymns or odes of the ancients, generally conſiſted of three ſtanzas or couplets; the firſt called *ſtrophe*, the ſecond *antiſtrophe*, and the laſt *epode*.

HYMMETTUS (anc. geog.), a mountain of Attica near Athens, famous for its marble quarries, and for its excellent honey. *Hymettius* the epithet. Pliny ſays that the orator Craſſus was the firſt who had marble columns from this place.

HYOIDES, in anatomy, a bone placed at the root of the tongue. See ANATOMY, n° 27.

HYOSCYAMUS, HENBANE; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ſeveral ſpecies, one of which, viz. the niger, or common henbane, is a native of Britain. It grows on road-ſides, and among rubbiſh. It is a biennial plant, with long fleſhy roots which ſtrike deep into the ground, ſending out ſeveral large ſoft leaves, deeply ſlaſhed on their edges; the following ſpring the ſtalks come up, which are about two feet high, garniſhed with flowers ſtanding on one ſide in a double row, ſitting cloſe to the ſtalks alternately. They are of a dark purpliſh colour, with a black bottom; and are ſucceeded by roundiſh capſules which open with a lid at the top, and have two cells filled with ſmall irregular ſeeds.—The ſeeds, leaves, and roots of this plant, as well as of all other ſpecies of this genus, are poiſonous: and many well atteſted inſtances of their bad effects are recorded; madneſs, convulſions, and death, being the common conſequence. In a ſmaller doſe, they occaſion giddineſs and ſtupor. It is ſaid that the leaves ſcattered about a houſe will drive away mice.—The juice of the plant evaporated to an extract, is ordered by the Edinburgh college in ſome caſes as a narcotic, in which reſpect undoubtedly it may be a powerful medicine if properly managed. The doſe is from half a ſcruple to half a dram.—Goats are not fond of the plant; horſes, cows, ſheep, and ſwine, refuſe it.

HYO-THYROIDES, in anatomy, one of the muſcles belonging to the os hyoides. See ANATOMY, *Table of the Muſcles*.

HYPALLAGE, among grammarians, a ſpecies of hyperbaton, conſiſting in a mutual permutation of one caſe for another. Thus Virgil ſays, *Dare claſſibus auſtros*, for *dare claſſes auſtris*; and again, *Necdum illis labra admovi*, for *necdum illa labris admovi*.

HYPANTE, or HYPERPANTE, a name given by the Greeks to the feaſt of the preſentation of Jeſus in the temple.—This word, which ſignifies *lowly* or *humble meeting*, was given to this feaſt from the meeting of old Simeon and Anna the propheteſs in the temple when Jeſus was brought thither.

HYPATIA, a learned and beautiful lady of antiquity, the daughter of Theon a celebrated philoſopher and mathematician, and preſident of the famous Alexandrian ſchool, was born at Alexandria about the end of the fourth century. Her father, encouraged by her extraordinary genius, had her educated not only in all the ordinary qualifications of her ſex, but cauſed her likewiſe to be inſtructed in the moſt abſtruſe ſciences. She made ſuch great progreſs in philoſophy, geometry, aſtronomy, and the mathematics, that ſhe paſſed for the moſt learned perſon of her time. At length ſhe was thought worthy to ſucceed her father in that diſtinguiſhed and important employment, the government of the ſchool of Alexandria; and to teach out of that chair where Ammonius, Hierocles, and many other great men, had taught before; and this at a time too when men of great learning abounded both at Alexandria and in many other parts of the Roman empire. Her fame was ſo extenſive, and her worth ſo univerſally acknowledged, that we cannot wonder if ſhe had a crowded auditory. "She explained to her hearers, (ſays Socrates), the ſeveral ſciences that go under the general name of philoſophy; for which reaſon there was a confluence to her, from all parts, of thoſe who made philoſophy their delight and ſtudy." One cannot repreſent to himſelf without pleaſure, the flower of all the youth of Europe, Aſia, and Africa, ſitting at the feet of a very beautiful lady, (for ſuch we are aſſured Hypatia was), all greedily ſwallowing inſtruction from her mouth, and many of them, doubtleſs, love from her eyes; though we are not ſure that ſhe ever liſtened to any ſolicitations, ſince Suidas, who talks of her marriage with Iſidorus, yet relates at the ſame time that ſhe died a maid.

Her ſcholars were as eminent as they were numerous; one of whom was the celebrated Syneſius, who was afterwards biſhop of Ptolemais. This ancient Chriſtian Platoniſt every where bears the ſtrongeſt, as well as the moſt grateful teſtimony of the virtue of his tutoreſs; and never mentions her without the moſt profound reſpect, and ſometimes in terms of affection coming little ſhort of adoration. But it was not Syneſius only, and the diſciples of the Alexandrian ſchool, who admired Hypatia for her virtue and learning: never was woman more careſſed by the public, and yet never woman had a more unſpotted character. She was held as an oracle for her wiſdom, which made her conſulted by the magiſtrates in all important caſes; and this frequently drew her among the greateſt concourſe of men, without the leaſt cenſure of her manners.

In a word, when Nicephorus intended to paſs the higheſt compliment on the princeſs Eudocia, he thought he could not do it better than by calling her another *Hypatia*.

While Hypatia thus reigned the brighteſt ornament of Alexandria, Oreſtes was governor of the ſame place for the emperor Theodoſius, and Cyril was biſhop or patriarch. Oreſtes having had a liberal education, could not but admire Hypatia; and as a wiſe governor frequently conſulted her. This, together with an averſion which Cyril had againſt Oreſtes, proved fatal to the lady. Above 500 monks aſſembling, attacked the governor one day, and would have killed him, had he not been reſcued by the townſmen; and the reſpect which Oreſtes had for Hypatia cauſing her to be traduced among the Chriſtian multitude, they dragged her from her chair, tore her to pieces, and burned her limbs. Cyril is not clear from a ſuſpicion of fomenting this tragedy. Cave indeed endeavours to remove the imputation of ſuch an horrid action from the patriarch; and lays it upon the Alexandrian mob in general, whom he calls *leviſſimum hominum genus*, "a very trifling inconſtant people." But though Cyril ſhould be allowed neither to have been the perpetrator, nor even the contriver of it, yet it is much to be ſuſpected that he did not diſcountenance it in the manner he ought to have done: which ſuſpicion muſt needs be greatly confirmed by reflecting, that he was ſo far from blaming the outrage committed by the monks upon Oreſtes, that he afterwards received the dead body of Ammonius, one of the moſt forward in that outrage, who had grievouſly wounded the governor, and who was juſtly puniſhed with death. Upon this riotous ruffian Cyril made a panegyric in the church where he was laid, in which he extolled his courage and conſtancy, as one that had contended for the truth; and changing his name to *Thaumaſius*, or the "Admirable," ordered him to be conſidered as a martyr. "However, (continues Socrates), the wiſeſt part of Chriſtians did not approve the zeal which Cyril ſhewed on this man's behalf, being convinced that Ammonius had juſtly ſuffered for his deſperate attempt."

HYPECOUM, WILD CUMIN; a genus of the digynia order, belonging to the tetrandria claſs of plants. There are four ſpecies, all of them low herbaceous plants with yellow flowers. The juice of theſe plants is of a yellow colour, reſembling that of celandine, and is affirmed by ſome eminent phyſicians to be as narcotic as opium. From the nectarium of the bloſſom the bees collect great quantities of honey. All the ſpecies are eaſily propagated by ſeeds.

HYPER, a Greek prepoſition frequently uſed in compoſition, where it denotes exceſs; its literal ſignification being *above*, or *beyond*.

HYPERBATON, in grammar, a figurative conſtruction inverting the natural and proper order of words and ſentences. The ſeveral ſpecies of the hyperbaton are, the anaſtrophe, the hyſteron-proteron, the hypallage, ſynchyſis, tmeſis, parentheſis, and the hyperbaton ſtrictly ſo called. See ANASTROPHE, &c.

HYPERBATON, ſtrictly ſo called, is a long retention of the verb which completes the ſentence, as in the following example from Virgil.

Interea Reges: ingenti mole Latinus
Quadrijugo vehitur curru, cui tempora circum
Aurati bis ſex radii fulgentia cingunt,
Solis avi ſpecimen: bigis it Turnus in albis
Bino manu lato criſpans hoſtilia ferro:
Hinc Pater Æneas, Romanæ ſtirpis origo,
Sidereo flagrans clypeo et celeſtibus armis;
Et juxta Aſcanius, magnæ ſpes altera Romæ:
Procedunt Caſtris.

HYPERBOLA, a curve formed by cutting a cone in a direction parallel to its axis. See CONIC-*Sections*.

HYPERBOLE, in rhetoric, a figure, whereby the truth and reality of things are exceſſively either enlarged or diminiſhed. See ORATORY, n° 58.

Elements Criticiſm.

An object uncommon with reſpect to ſize, either very great of its kind or very little, ſtrikes us with ſurpriſe; and this emotion forces upon the mind a momentary conviction that the object is greater or leſs than it is in reality: the ſame effect, preciſely, attends figurative grandeur or littleneſs; and hence the hyperbole, which expreſſes this momentary conviction. A writer, taking advantage of this natural deluſion, enriches his deſcription greatly by the hyperbole: and the reader, even in his cooleſt moments, reliſhes this figure, being ſenſible that it is the operation of nature upon a warm fancy.

It cannot have eſcaped obſervation, that a writer is generally more ſucceſsful in magnifying by a hyperbole than in diminiſhing. The reaſon is, that a minute object contracts the mind, and fetters its powers of imagination; but that the mind, dilated and inflamed with a grand object, moulds objects for its gratification with great facility. Longinus, with reſpect to a diminiſhing hyperbole, cites the following ludicrous thought from a comic poet: "He was owner of a bit of ground not larger than a Lacedemonian letter." But, for the reaſon now given, the hyperbole has by far the greater force in magnifying objects; of which take the following examples:

> For all the land which thou ſeeſt, to thee will I give it, and to thy ſeed for ever. And I will make thy ſeed as the duſt of the earth: ſo that if a man can number the duſt of the earth, then ſhall thy ſeed alſo be numbered. *Gen.* xiii. 15. 16.

Illa vel intactæ ſegetis per ſumma volaret
Gramina: nec teneras curſu læſiſſet ariſtas.
Æneid. vii. 808.

———Atque imo barathri ter gurgite vaſtos
Sorbet in abruptum fluctus, rurſuſque ſub auras
Erigit alternos, et ſidera verberat unda.
Æneid. iii. 421.

———Horrificis juxta tonat Ætna ruinis,
Interdumque atram prorumpit ad æthera nubem,
Turbine fumantem piceo et candente favilla:
Attollitque globos flammarum, et ſidera lambit.
Æneid. iii. 571.

Speaking of Polyphemus,

———Ipſe arduus, altaque pulſat
Sidera. *Æneid.* iii. 619.

———When he ſpeaks,
The air, a charter'd libertine, is ſtill.
Henry V. *act* 1. *ſc.* 1.

Now ſhield with ſhield, with helmet helmet cloſ'd,
To armour armour, lance to lance oppoſ'd,
Hoſt againſt hoſt with ſhadowy ſquadrons drew,
The ſounding darts in iron tempeſts flew,
Victors and vanquiſh'd join promiſcuous cries,
And ſhrilling ſhouts and dying groans ariſe;
With ſtreaming blood the ſlipp'ry fields are dy'd,
And ſlaughter'd heroes ſwell the dreadful tide.
Iliad iv. 508.

Quintilian is ſenſible that this figure is natural: "For, (ſays he), not contented with truth, we naturally incline to augment or diminiſh beyond it; and for that reaſon the hyperbole is familiar even among the vulgar and illiterate:" and he adds, very juſtly, "That the hyperbole is then proper, when the object of itſelf exceeds the common meaſure." From theſe premiſſes, one would not expect the following inference, the only reaſon he can find for juſtifying this figure of ſpeech, "Conceditur enim amplius dicere, quia dici quantum eſt, non poteſt: meliuſque ultra quam citra ſtat oratio." (We are indulged to ſay more than enough, becauſe we cannot ſay enough; and it is better to be above than under.) In the name of wonder, why this ſlight and childiſh reaſoning, when immediately before he had obſerved, that the hyperbole is founded on human nature? We could not reſiſt this perſonal ſtroke of criticiſm; intended not againſt our author, for no human creature is exempt from error; but againſt the blind veneration that is paid to the ancient claſſic writers, without diſtinguiſhing their blemiſhes from their beauties.

Having examined the nature of this figure, and the principle on which it is erected; let us proceed to the rules by which it ought to be governed. And, in the firſt place, it is a capital fault, to introduce an hyperbole in the deſcription of an ordinary object or event; for in ſuch a caſe, it is altogether unnatural, being deſtitute of ſurpriſe, its only foundation. Take the following inſtance, where the ſubject is extremely familiar, viz. ſwimming to gain the ſhore after a ſhipwreck,

I ſaw him beat the ſurges under him,
And ride upon their backs: he trod the water;
Whoſe enmity he flung aſide, and breaſted
The ſurge moſt ſwoln that met him: his bold head
'Bove the contentious waves he kept, and oar'd
Himſelf with his good arms, in luſty ſtrokes
To th' *ſhore*, that o'er his wave-born baſis bow'd,
As ſtooping to relieve him. *Tempeſt, act* 2. *ſc.* 1.

In the next place it may be gathered from what is ſaid, that an hyperbole can never ſuit the tone of any diſpiriting paſſion: ſorrow in particular will never prompt ſuch a figure, and for that reaſon the following hyperboles muſt be condemned as unnatural:

K. Rich. Aumerle, thou weep'ſt, my tender-hearted couſin!
We'll make foul weather with deſpiſed tears;
Our ſighs, and they, ſhall lodge the ſummer-corn,
And make a dearth in this revolving land.
Richard II. *act* 3. *ſc.* 6.

Draw them to Tyber's bank, and weep your tears
Into the channel, till the loweſt ſtream
Do kiſs the moſt exalted ſhores of all.
Julius Cæſar, act 1. *ſc.* 1.

Thirdly, A writer, if he wiſh to ſucceed, ought always to have the reader in his eye: he ought, in particular, never to venture a bold thought or expreſſion, till the reader be warmed and prepared. For this reaſon, an hyperbole in the beginning of a work can never be in its place. Example:

Jam pauca aratro jugera regiæ
Moles relinquent. *Horat. Carm. lib.* 2. *ode* 15.

In the fourth place, The niceſt point of all, is to aſcertain the natural limits of an hyperbole, beyond which being overſtrained it has a bad effect. Longinus, (chap. iii.) with great propriety of thought, enters a caveat againſt an hyperbole of this kind: he compares it to a bow-ſtring, which relaxes by overſtraining, and produceth an effect directly oppoſite to what is intended. To aſcertain any preciſe boundary, would be difficult, if not impracticable. We ſhall therefore only give a ſpecimen of what may be reckoned overſtrained hyperboles. No fault is more common among writers of inferior rank; and inſtances are found even among thoſe of the fineſt taſte; witneſs the following hyperbole, too bold even for an Hotſpur.

Hotſpur, talking of Mortimer:

In ſingle oppoſition hand to hand,
He did confound the beſt part of an hour
In changing hardiment with great Glendower.
Three times they breath'd, and three times did they drink,
Upon agreement, of ſwift Severn's flood;
Who then affrighted with their bloody looks,
Ran fearfully among the trembling reeds,
And hid his criſp'd head in the hollow bank,
Blood-ſtained with theſe valiant combatants.
Firſt Part Henry IV. *act* 1. *ſc* 4.

Speaking of Henry V.

England ne'er had a King until his time.
Virtue he had, deſerving to command:
His brandiſh'd ſword did blind men with its beams:
His arms ſpread wider than a dragon's wings:
His ſparkling eyes, replete with awful fire,
More dazzled, and drove back his enemies,
Than mid-day ſun fierce bent againſt their faces.
What ſhould I ſay? his deeds exceed all ſpeech:
He never lifted up his hand, but conquer'd.
Firſt Part Henry VI. *act* 1. *ſc.* 1.

Laſtly, An hyperbole, after it is introduced with all advantages, ought to be comprehended within the feweſt words poſſible: as it cannot be reliſhed but in the hurry and ſwelling of the mind, a leiſurely view diſſolves the charm, and diſcovers the deſcription to be extravagant at leaſt, and perhaps alſo ridiculous. This fault is palpable in a ſonnet which paſſeth for one of the moſt complete in the French language: Phillis, in a long and florid deſcription, is made as far to outſhine the ſun as he outſhines the ſtars:

Le ſilence regnoit ſur la terre et ſur l'onde,
L'air devenoit ſerain et l'Olimp vermeil,

Et l'amourex Zephir affranchi du ſomeil,
Reſſuſcitoit les fleurs d'une haleine feconde.

L'Aurore deployoit l'or de ſa treſſe blonde,
Eet ſemoit de rubis le chemin du ſoleil;
Enfin ce Dieu venoit au plus grand appareil
Qu'il ſoit jamais venu pour eclairer le monde:

Quand la jeune Philis au viſage riant,
Sortant de ſon palais plus clair que l'orient,
Fit voir une lumiere et plus vive et plus belle.

Sacre flambeau du jour, n'en ſoiez point jaloux,
Vous parutes alors auſſi peu devant elle,
Que les feux de la nuit avoient fait devant vous.
Malleville.

There is in Chaucer a thought expreſſed in a ſingle line, which ſets a young beauty in a more advantageous light than the whole of this much laboured poem:

Up roſe the ſun, and up roſe Emelie.

HYPERBOREAN, in the ancient geography. The ancients denominated thoſe people and places *Hyperborean*, which were to the northward of the Scythians. They had but very little acquaintance with theſe Hyperborean regions; and all they tell us of them is very precarious, much of it falſe. Diodorus Siculus ſays, the Hyperboreans were thus called by reaſon they dwelt beyond the wind Boreas; υϖερ ſignifying "above, or beyond," and Βορεας, *Boreas*, the "north wind." This etymology is very natural and plauſible; notwithſtanding all that Rudbeck has ſaid againſt it, who would have the word to be Gothic, and to ſignify *nobility*. Herodotus doubts, whether or no there were any ſuch nations as the Hyperborean. Strabo, who profeſſes that he believes there are, does not take *hyperborean* to ſignify *beyond Boreas* or the north, as Herodotus underſtood it: the prepoſition υϖερ, in this caſe, he ſuppoſes only to help to form a ſuperlative; ſo that *hyperborean*, on his principle, means no more than *moſt northern*: by which it appears the ancients ſcarce knew themſelves what the name meant.

HYPERCATALECTIC, in the Greek and Latin poetry is applied to a verſe that has one or two ſyllables too much, or beyond the regular and juſt meaſure; as,

Muſæ ſorores ſunt Minervæ:

Alſo,

Muſæ ſorores Palladis lugent.

HYPERCRITIC, an over-rigid cenſor, or critic: one who will let nothing paſs, but animadverts ſeverely on the ſlighteſt fault. See Criticism. The word is compounded of υπερ, *ſuper*, "over, above, beyond;" and κριτικος, of κριτης, *judex*, of κρινω, *judico*, "I judge."

HYPERDULIA, in the Romiſh theology, is the worſhip rendered to the holy virgin. The word is Greek, υπερδυλεια, compoſed of υπερ, *above*, and δυλια, *worſhip*, *ſervice*. The worſhip offered to ſaints is called *dulia;* and that to the mother of God, *hyperdulia*, as being ſuperior to the former.

HYPERIA (anc. geog.), the ſeat of the Phæacians near the Cyclops, (Homer): ſome commentators take it to be Camarina in Sicily; but, according to others, ſuppoſed to be an adjoining iſland, which they take to be Melita, lying in ſight of Sicily. And this ſeems to be confirmed by Apollonius Rhodius. Whence the Phæacians afterwards removed to Corcyra, called *Scheria*, *Phæacia*, and *Macris;* having been expelled by the Phœnicians, who ſettled in Melita for commerce, and for commodious harbours, before the war of Troy. (Diodorus Siculus.)

HYPERICUM, St John's wort; a genus of the polyandria order, belonging to the polyadelphia claſs of plants.

Species. Of this genus there are 29 ſpecies, moſt of them hardy deciduous ſhrubs, and under-ſhrubby plants, adorned with oblong and oval ſimple foliage, and pentapetalous yellow flowers in cluſters. The moſt remarkable are, 1. The *hircinum*, or ſtinking St John's-wort. This riſes three or four feet high, with ſeveral ſhrubby two-edged ſtalks from the root, branching by pairs oppoſite at every joint; oblong, oval, cloſe-fitting oppoſite leaves; and, at the ends of all the young ſhoots, cluſters of yellow flowers. Of this there are three varieties; one with ſtrong ſtalks, ſix or eight feet high, broad leaves, and large flowers; the other with ſtrong ſtalks, broad leaves, and without any diſagreeable odour; the third hath variegated leaves. All theſe varieties are ſhrubby; and flower in June and July in ſuch numerous cluſters, that the ſhrubs appear covered with them; and produce abundance of ſeed in autumn. 2. The *canarienſis* hath ſhrubby ſtalks, dividing and branching ſix or ſeven feet high; oblong, cloſe-fitting leaves by pairs; and, at the ends of the branches, cluſters of yellow flowers appearing in June and July. 3. The *aſcyron*, or dwarf American St John's-wort, hath ſpreading roots, ſending up numerous, ſlender, ſquare ſtalks, a foot long; oval, ſpear-ſhaped, cloſe-ſitting, ſmooth leaves by pairs oppoſite; and, at the ends of the ſtalks, large yellow flowers. 4. The *androſæmum*, commonly called *tutſan*, or *park-leaves*, hath an upright under-ſhrubby ſtalk, two feet high, branching by pairs oppoſite; and at the ends of the ſtalks, cluſters of ſmall yellow flowers appearing in July and Auguſt, and ſucceeded by roundiſh berry-like black capſules. This grows naturally in many parts of Britain. 5. The *balearicum*, or wart-leaved St John's-wort, is a native of Majorca; and hath a ſhrubby ſtalk, branching two feet high, with reddiſh ſcarified branches, ſmall oval leaves warted underneath, and large yellow flowers appearing great part of the year. 6. The *monogynum*, or one-ſtyled *China hypericum*, hath a ſhrubby purpliſh ſtalk, about two feet high; oblong, ſmooth, ſtiff, cloſe-ſitting leaves, of a ſhining green above, and white underneath; cluſters of ſmall yellow flowers, with coloured cups, and only one ſtyle, flowering the greateſt part of the year. 7. The *laſianthus*, or Surinam St John's-wort, hath ſhrubby ſtalks, branching a yard high; ſpear-ſhaped ſerrated leaves; hoary underneath, and yellow flowers from the axillas of the ſtalks. It is a native of Surinam and Carolina.

Culture. The four firſt ſpecies are hardy, and will grow in any ſoil or ſituation; the three laſt muſt be potted, in order to have ſhelter in the green-houſe in winter. The two firſt ſpecies propagate very faſt by ſuckers, which are every year ſent up plentifully from the root; and in autumn or ſpring may be readily ſlipped off from the old plants with roots to each, or the whole plant may be taken up and divided into as many parts as there are ſuckers and ſlips with roots, planting the ſtrongeſt where they are to remain, and the weakeſt in nurſery-rows, where they are to remain a year in order to acquire ſtrength. They may alſo be propagated by ſeeds ſown in autumn, in a bed of common earth, in drills an inch deep. The other two hardy ſorts are alſo propagated by ſlipping the roots in autumn, or early in the ſpring; and may likewiſe be raiſed in great plenty from ſeeds. The three other ſpecies are propagated by layers and cuttings, planted in pots, and plunged in a hot-bed.

Properties. The tutſan hath long held a place in the medicinal catalogues; but its uſes are very much undetermined. The leaves given in ſubſtance are ſaid to deſtroy worms. By diſtillation they yield an eſſential oil. The flowers tinge ſpirits and oils of a fine purple colour. Cows, goats, and ſheep, eat the plant; horſes and ſwine refuſe it. The dried plant boiled in water with alum, dyes yarn of a yellow colour; and the Swedes give a fine purple tinge to their ſpirits with the flowers.

HYPERIDES, an orator of Greece, was the diſciple of Plato and Iſocrates, and governed the republic of Athens. He defended with great zeal and courage the liberties of Greece; but was put to death by Antipater's order, 322 B. C. He compoſed many orations, of which only one now remains. He was one of the ten celebrated Greek orators.

HYPERMNESTRA, in fabulous hiſtory, one of the 50 daughters of Danaus king of Argos. She alone refuſed to obey the cruel order Danaus had given to all his daughters, to murder their huſbands the firſt night of their marriage; and therefore ſaved the life of Lynceus, after ſhe had made him promiſe not to violate her virginity. Danaus, enraged at her diſobedience, confined her cloſely in priſon, whence Lynceus delivered her ſome time after.

HYPERSARCOSIS, in medicine and ſurgery, an exceſs of fleſh, or rather a fleſhy excreſcence, ſuch as thoſe generally ariſing upon the lips of wounds, &c.

HYPHEN, an accent or character in grammar, implying that two words are to be joined, or connected into one compound word, and marked thus -; as *pre-eſtabliſhed, five-leaved, &c.* Hyphens alſo ſerve to connect the ſyllables of ſuch words as are divided by the end of the line.

HYPNOTIC, in the materia medica, ſuch medicines as any way produce ſleep, whether called *narcotics, hypnotics, opiates*, or *ſoporifics*.

HYPNOTICUS SERPENS, the *Sleep-ſnake*, in zoology, the name of an Eaſt-Indian ſpecies of ſerpent, called by the Ceyloneſe *nintipolong*, a word importing the ſame ſenſe. It is of a deep blackiſh brown, variegated with ſpots of white, and is a very fatal kind in its poiſon; its bite always bringing on a ſleep which ends in death.

HYPNUM, FEATHER-MOSS; a genus of the order of muſci, belonging to the cryptogamia claſs of plants. There are 46 ſpecies, all of them natives of Great Britain; none of them, however, have any remarkable property, except the proliferum and parietinum. The firſt is of a very ſingular ſtructure, one ſhoot growing out from the centre of another; the veil is yellow and ſhining; the lid with a kind of long bill; the leaves not ſhining; ſometimes of a yellowiſh, and ſometimes of a deep green. This moſs covers the ſurface of the earth in the thickeſt ſhades, through which the ſun never ſhines, and where no other plant can grow. The ſecond hath ſhoots nearly flat and winged, undivided for a conſiderable length, and the leaves ſhining; but the old ſhoots do not branch into new ones as in the preceding ſpecies. It grows in woods and ſhady places; and, as well as the former, is uſed for filling up the chinks in wooden houſes.

HYPOBOLE. See ORATORY, n° 81.

HYPOCAUSTUM, among the Greeks and Romans, a ſubterraneous place, where was a furnace to heat the baths. The word is Greek, formed of the prepoſition υπο, *under;* and the verb καιω, *to burn.*—Another ſort of hypocauſtum was a kind of kiln to heat their winter-parlours. The remains of a Roman hypocauſtum, or ſweating-room, were diſcovered under ground at Lincoln in 1739. We have an account of theſe remains in the Philoſophical Tranſactions, n° 461. § 29.—Among the moderns, the hypocauſtum is that place where the fire is kept, which warms a ſtove or hot-houſe.

HYPOCHÆRIS, HAWK'S-EYE; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants. There are four ſpecies; none of which have any remarkable property, except the maculata, or ſpotted hawk's-eye. It is a native of Britain, and grows on high grounds. The leaves are oblong, egg-ſhaped, and toothed; the ſtem almoſt naked, generally with a ſingle branch; the bloſſoms yellow, opening at ſix in the morning, and cloſing at four in the afternoon. The leaves are boiled and eaten like cabbage. Horſes are fond of this plant when green, but not when dry. Cows, goats, and ſwine eat it; ſheep are not fond of it.

HYPOCHONDRIA, in anatomy, a ſpace on each ſide the epigaſtric region, or upper part of the abdomen. See ANATOMY, n° 349, *d.*

HYPOCHONDRIAC PASSION, a diſeaſe in men, ſimilar to the hyſteric affection in women. See (the *Index* ſubjoined to) MEDICINE.

HYPOCISTIS, in the materia medica, an inſpiſſated juice obtained from the ſeſſile aſarum, much reſembling the true Egyptian acacia. They gather the fruit while unripe, and expreſs the juice, which they revaporate ove a very gentle fire, to the conſiſtence of an extract, and then form into cakes, and expoſe them to the ſun to dry. It is an aſtringent of conſiderable power; is good againſt diarrhœas and hæmorrhages of all kinds; and may be uſed in redellent gargariſms in the manner of the true acacia; but it is very rarely met with genuine in our ſhops, the German acacia being uſually ſold under its name.

HYPOGASTRIC, an appellation given to the internal branch of the iliac artery.

HYPOGASTRIUM, in anatomy, the middle part of the lower region of the belly. See ANATOMY, n° 349, *d.*

HYPOPYON, in medicine, a collection of purulent matter under the corner of the eye.

HYPOTHEC, in law, a right of ſecurity eſtabliſhed by law to creditors upon the goods and effects of their debtors, for the payment of certain debts.

HYPOTHENUSE, in geometry, the longeſt ſide of a right-angled triangle, or that which ſubtends the right-angle.

HYPOSTASIS, a Greek term, literally ſignifying *ſubſtance*, or *ſubſiſtence;* uſed in theology for *perſon.*—The word is Greek, υποςασις; compounded of υπι, *ſub*, "under;" and ιςημι, *ſto, exiſto*, "I ſtand, I exiſt;" q. d. *ſub-ſiſtentia.* Thus we hold, that there is but one nature or eſſence in God, but three *hypoſtaſes* or perſons.

The term *hypoſtaſis* is of a very ancient ſtanding in the church. St Cyril repeats it ſeveral times, as alſo the phraſe *union according to hypoſtaſis.* The firſt time it occurs is in a letter from that father to Neſtorius, where he uſes it inſtead of προσωπων, the word we commonly render *perſon*, which did not ſeem expreſſive enough. "The philoſophers (ſays St Cyril) have allowed three *hypoſtaſes:* They have extended the Divinity to three *hypoſtaſes:* They have even ſometimes uſed the word *trinity:* And nothing was wanting but to have admitted the conſubſtantiality of the three *hypoſtaſes*, to ſhew the unity of the divine nature, excluſive of all triplicity in reſpect of diſtinction of nature, and not to hold it neceſſary to conceive any reſpective inferiority of *hypoſtaſes.*"

This term occaſioned great diſſentions in the ancient church; firſt among the Greeks, and afterwards alſo among the Latins. In the council of Nice, *hypoſtaſis* was defined to denote the ſame with *eſſence* or *ſubſtance;* ſo that it was hereſy to ſay that Jeſus Chriſt was of a different *hypoſtaſis* from the Father; but cuſtom altered its meaning. In the neceſſity they were under of expreſſing themſelves ſtrongly againſt the Sabellians, the Greeks made choice of the word *hypoſtaſis*, and the Latins of *perſona;* which change proved the occaſion of endleſs diſagreement. The phraſe τρεις υποςασεις, uſed by the Greeks, ſcandalized the Latins, whoſe uſual way of rendering υποςάσις in their language was by *ſubſtantia.* The barrenneſs of the Latin tongue in theological phraſes, allowed them but one word for the two Greek ones, ȣσια and υποςασις; and thus diſabled them from diſtinguiſhing *eſſence* from *hypoſtaſis.* For which reaſon they choſe rather to uſe the term *tres perſonæ*, and *tres hypoſtaſes.*—An end was put to logomachias, in a ſynod held at Alexandria about the year 362, at which St Athanaſius aſſiſted; from which time the Latins made no great ſcruple of ſaying *tres hypoſtaſes*, nor the Greeks of *three perſons.*

HYPOTHESIS, in general, denotes ſomething ſuppoſed to be true, or taken for granted, in order to prove or illuſtrate a point in queſtion. Hypotheſes, however elegant or artful, ought to be firſt proved by repeated obſervations and conſtant experience, before they are received as truths.

HYPOTIPOSIS. See ORATORY, n° 91.

HYRCANIA (anc. geog.), a country of the farther Aſia, lying to the ſouth-eaſt of the *Mare Hyrcanum* or *Caſpium;* with Media on the weſt, Parthia on the ſouth, and Margiana on the weſt. Famous for its tygers, (Virgil); for its vines, figs, and olives, (Strabo).

HYSSOPUS, HYSSOP; a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants. There are three ſpecies; but only one of them, viz. the *officinalis*, or common hyſſop, is cultivated for uſe. This hath under-ſhrubby, low, buſhy ſtalks, growing a foot and a half high; ſmall, ſpear-ſhaped, cloſe-fitting, oppoſite leaves, with ſeveral ſmaller ones riſing from the ſame joint; and all the ſtalks and branches terminated by erect whorled ſpikes of flowers, of different colours in the varieties. They are very hardy plants; and may be propagated either by ſlips or cuttings, or by ſeeds. The leaves have an aromatic ſmell, and a warm pungent taſte. Beſides the general virtues of aromatics, they are particularly recommended in humoural aſtmas, coughs, and other diſorders of the breaſt and lungs; and are ſaid notably to promote expectoration.

HYSTERICS, or HYSTERIC PASSION. See (*Index* ſubjoined to) MEDICINE.

HYSTERON PROTERON, in grammar and rhetoric, a ſpecies of the hyperbaton, wherein the proper order of conſtruction is ſo inverted, that the part of any ſentence which ſhould naturally come firſt is placed laſt: as in this of Terence, *Valet et vivit*, for *vivit et valet;* and in the following of Virgil, *Moriamur, & in media arma ruamus*, for *In media arma ruamus, & moriamur.*

HYSTRIX, in zoology, a genus of quadrupeds belonging to the order of glires, the characters of which are theſe: They have two fore-teeth, obliquely divided both in the upper and under jaw, beſides eight grinders; and the body is covered with quills or prickles. There are four ſpecies, viz.

1. The *criſtata*, or creſted porcupine, has four toes on the fore-feet, five toes on the hind-feet, a creſted head, a ſhort tail, and the upper lip is divided like that of a hare. The length of the body is about two feet, and the height about two feet and a half. The porcupine is covered with prickles, ſome of them nine or ten inches long, and about ¼ of an inch thick. Like the hedge-hog, he rolls himſelf up in a globular form, in which poſition he is proof againſt the attacks of the moſt rapacious animals. The prickles are exceedingly ſharp, and each of them has five large black and as many white rings, which ſucceed one another alternately from the root to the point. Theſe quills the animal can erect or let down at pleaſure; when irritated, he beats the ground with his hind-feet, erects his quills, ſhakes his tail, and makes a conſiderable rattling noiſe with his quills.

Moſt authors have aſſerted that the porcupine, when irritated, darts his quills to a conſiderable diſtance againſt the enemy, and that he will kill very large animals by this means. But M. Buffon, and ſome other late hiſtorians, aſſure that the animal poſſeſſes no ſuch power. M. Buffon frequently irritated the porcupine, but never ſaw any thing like this darting of his quills. He ſays indeed, that when the creature was much agitated with paſſion, ſome of the quills which adhered but ſlightly to the ſkin, would fall off, particularly from the tail; and this circumſtance, he imagines, has given riſe to the miſtake.

The porcupine, though originally a native of Africa and the Indies, can live and multiply in the more temperate climates of Spain and Italy. Pliny, and every other natural hiſtorian ſince the days of Ariſtotle, tells us, that the porcupine, like the bear, conceals itſelf during the winter, and that they bring forth their young in 80 days. But theſe circumſtances remain to this day uncertain. It is remarkable, that although this animal be very common in Italy, no perſon has ever given us a tolerable hiſtory of it. We only know in general, that the porcupine, in a domeſtic ſtate, is not a fierce or ill-natured animal; that with his fore-teeth, which are ſtrong and ſharp, he can cut through a ſtrong board; that he eats bread, fruits, roots, &c.; that he does conſiderable damage when he gets into a garden; that he grows fat, like moſt animals, about the end of ſummer; and that his fleſh is not bad food.

2. The *prehenſilis*, or *cuandu*, has four toes on the fore-feet, five on the hind-feet, and a long tail. It is conſiderably leſs than the former ſpecies; being only 17 inches long from the point of the muzzle to the origin of the tail, which is nine inches long; the legs and feet are covered with long browniſh hair; the reſt of the body is covered with quills interſperſed with long hairs; the quills are about five inches long, and about $\frac{1}{12}$ of an inch in diameter. He feeds upon birds and ſmall animals. He ſleeps in the day like the hedge-hog, and ſearches for his food in the night. He climbs trees, and ſupports himſelf by twiſting his tail round the branches. He is generally found in the high grounds of America from Braſil to Louiſiana, and the ſouthern parts of Canada. His fleſh is eſteemed very good eating.

3. The *dorſata* has four toes on the fore-feet, five on the hind-feet; and has quills only on the back, which are ſhort, and almoſt hid among the long hair. He is about two feet long. He is a native of Hudſon's-bay. The ſavages eat his fleſh, and make uſe of his ſkin as a fur, after taking off the prickles.

4. The *macroura*, has five toes both on the hind and fore-feet; his tail is very long, and the prickles are elevated. He is a native of Africa and the Eaſt-Indies.

I.

I, or *i*, the ninth letter and third vowel of the alphabet, is pronounced by throwing the breath ſuddenly againſt the palate, as it comes out of the larynx, with a ſmall hollowing of the tongue, and nearly the ſame opening of the lips and talk as in pronouncing *a* or *e*. Its ſound varies: in ſome words it is long, as *high*, *mind*, &c.; in others ſhort, as *bid*, *hid*, *ſin*, &c.; in others, again, it is pronounced like *y*, as in *collier*, *onion*, &c.; and in a few, it ſounds like *ee*, as in *machine*, *magazine*, &c. No Engliſh word ends in *i*, *e* being either added to it, or elſe the *i* turned into *y*.

But beſides the vowel, there is the *jod* conſonant; which, becauſe of its different pronunciation, has likewiſe a different form, thus J, j. In Engliſh, it has the ſoft ſound of *g*; nor is uſed, but when *g* ſoft is required before vowels, where *g* is uſually hard: thus we ſay, *jack*, *jet*, *join*, &c. inſtead of *gack*, *get*, *goin*, &c. which would be contrary to the genius of the Engliſh language.

I, uſed as a numeral, ſignifies no more than *one*, and ſtands for ſo many units as it is repeated times: thus I, one; II, two; III, three, &c.; and when put before a higher numeral, it ſubſtracts itſelf, as IV, four; IX, nine, &c. But when ſet after it, ſo many are added to the higher numeral, as there are I's added: thus VI is 5+1, or ſix; VII, 5+2, or ſeven; VIII, 5+3, or eight. The ancient Romans likewiſe uſed IↃ for for 500, CIↃ for 1000, IↃↃ for 5000, CCIↃↃ for 10,000, IↃↃↃ for 50,000, and CCCIↃↃↃ for 100,000. Farther than this, as Pliny obſerves, they did not go in their notation; but, when neceſſary, repeated the laſt number, as CCCIↃↃↃ, CCCIↃↃↃ, for 200,000; CCCIↃↃↃ, CCCIↃↃↃ, CCCIↃↃↃ, for 300,000; and ſo on.

The ancients ſometimes changed *i* into *u*; as *ducumus* for *decimus*; *maxumus* for *maximus*, &c. — According to Plato, the vowel *i* is proper to expreſs delicate but humble things, as in this verſe in Virgil, which abounds in *i*'s, and is generally admired:

Accipiunt inimicum imbrem, rimiſque fatiſcunt.

I, uſed as an abbreviature, is often ſubſtituted for the whole word JESUS, of which it is the firſt letter.

JABES-GALAAD, or JABESH-GILEAD, (anc. geogr.) a city of Judæa, lying beyond the river Jordan, called *Jabiſus* and *Jabiſſa* by Joſephus; the metropolis of Gilead. In Jerome's time, a village on an eminence, ſix miles from Pella.

JABLONSKI (Daniel Erneſt), a learned Poliſh Proteſtant divine, born at Dantzick in 1660. He became ſucceſſively miniſter of Magdeburg, Liſſa, Koningſberg, and Berlin; and was at length eccleſiaſtical counſellor, and preſident of the academy of ſciences at the latter. He took great pains to effect an union between the Lutherans and Calviniſts; and wrote ſome works which are in good eſteem, particularly Meditations on the origin of the Scriptures, &c. He died in 1741.

JABLONSKI (Theodore), counſellor of the court of Pruſſia, and ſecretary of the royal academy of ſciences at Berlin, was alſo a man of diſtinguiſhed merit. He loved the ſciences, and did them honour, without that ambition which is generally ſeen in men of learning: it was owing to this modeſty that the greateſt part of his works were publiſhed without his name. He publiſhed in 1711, a French and German dictionary; a Courſe of Morality, in 1713; a Dictionary of Arts and Sciences, in 1721; and tranſlated *Tacitus de moribus Germanorum* into High Dutch, in 1724.

JABNE (anc. geogr.), a town of Paleſtine, near Joppa; called *Jamnia* or *Jamnial*, by the Greeks and Romans. In Joſhua xv. it ſeems to be called *Jabneel;* but in 2 Chron. xxvi. *Jabne*. It was taken from the Philiſtines by Uzziah, who demoliſhed its fortifications. Its port, called *Jamnitarum portus*, lay between Joppa and Azotus.

JABOK (anc. geogr.), a river of the Peræa, the north boundary of the Amorites, running with an oblique courſe from the eaſt into the river Jordan.

JACCA, an ancient town of Spain, in the kingdom of Arragon, with a biſhop's ſee, and a fort; ſeated on a river of the ſame name, among the mountains of Jacca, which are part of the Pyrenees. W. Long. 0. 19. N. Lat. 44. 22.

JACK, in mechanics, a well-known inſtrument of common uſe for raiſing great weights of any kind.

The common kitchen-jack is a compound engine, where the weight is the power applied to overcome the friction of the parts and the weight with which the ſpit is charged; and a ſteady and uniform motion is obtained by means of the fly.

Jack, in the ſea-language, a ſort of flag or colours, diſplayed from a maſt erected on the outer end of a ſhip's bowſprit. In the Britiſh navy the jack is nothing more than a ſmall union flag, compoſed of the interſection of the red and white croſſes; but in merchant-ſhips this union is bordered with a red field. See the article Union.

Jack-*Flag*, in a ſhip, that hoiſted up at the ſpritſail top-maſt head.

Jack-*Daw*, the Engliſh name of a ſpecies of corvus. See Corvus.

This bird is very miſchievous to the farmer and gardener; and is of ſuch a thieviſh diſpoſition, that he will carry away much more than he can make uſe of. There is a method of deſtroying them by a kind of ſprings much uſed in England; and is ſo uſeful, that it ought to be made univerſal.—A ſtake of about five feet long is to be driven firmly into the ground, and made ſo faſt that it cannot move, and ſo ſharp in the point that the bird cannot ſettle upon it. Within a foot of the top there muſt be a hole bored thro' it, of three quarters of an inch diameter; through this hole is to be put a ſtick of about eight inches long; then a horſe-hair ſpringe or nooſe is to be made faſt to a thin hazel-wand, and this brought up to the place where the ſhort ſtick is placed, and carried with it through the hole, the remainder being left open under that ſtick. The other end of the hazel rod is to be put through a hole in the ſtake near the ground, and faſtened there. The ſtake is to be planted among the jack-daw's food, and he will naturally be led to ſettle on it; but finding the point too ſharp, he will deſcend to the little croſs ſtick. This will ſink with his weight, and the ſpringe will receive his leg, and hold him faſt.

JACKALL, in zoology. See Canis.

JACKSON (Thomas), an eminent Engliſh divine, was born at Witton in the biſhopric of Durham in 1579, of a good family. He commenced doctor of divinity at Oxford in 1622; and at laſt was made chaplain in ordinary, prebendary of Wincheſter, and dean of Peterborough. He was a very great ſcholar; and died in 1640. His performance upon the Creed, is a learned and valuable piece; which, with his other works, was publiſhed in 1673.

JACOB (Ben Hajim), a rabbi famous for the collection of the Maſorah in 1525; together with the text of the bible, the Chaldaic paraphraſe, and Rabbinical commentaries.

Jacob (Ben Naphthali), a famous rabbi of the 5th century: he was one of the principal maſſorets, and bred at the ſchool of Tiberias in Paleſtine with Ben Aſer, another principal maſſoret. The invention of points in Hebrew to ſerve for vowels, and of accents to facilitate the reading of that language, are aſcribed to theſe two rabbis; and ſaid to be done in an aſſembly of the Jews held at Tiberias, A. D. 476.

Jacob (Giles), an eminent law writer, born at Romſey in the county of Southampton, in 1686. He was bred under a conſiderable attorney; and is principally known for his *Law Dictionary* in one vol. folio, which has been often printed; a new and improved edition having been lately given by counſellors Ruffhead and Morgan. Mr Jacob alſo wrote two dramatic pieces; and a *Poetical Regiſter*, containing the lives and characters of Engliſh dramatic poets. The time of his death is not known.

JACOBÆUS (Oliger), a celebrated profeſſor of phyſic and philoſophy at Copenhagen, was born in 1651 at Arhuſen in the peninſula of Jutland, where his father was biſhop. Chriſtian V. intruſted him with the management of his grand cabinet of curioſities; and Frederic IV. in 1698, made him counſeller of his court of juſtice. He wrote many medical works, and ſome excellent poems.

JACOBINE Monks, the ſame with Dominicans.

JACOBITES, a term of reproach beſtowed on the perſons who, vindicating the doctrines of paſſive obedience and non-reſiſtance with reſpect to the arbitrary proceedings of princes, diſavow the revolution in 1688, and aſſert the ſuppoſed rights and adhere to the intereſts of the late abdicated king James and his family.

Jacobites, in church-hiſtory, a ſect of Chriſtians in Syria and Meſopotamia; ſo called, either from Jacob a Syrian who lived in the reign of the emperor Mauritius, or from one Jacob a monk who flouriſhed in the year 550.

The Jacobites are of two ſects, ſome following the rites of the Latin church, and others continuing ſeparated from the church of Rome. There is alſo a diviſion among the latter, who have two rival patriarchs. As to their belief, they hold but one nature in Jeſus Chriſt; with reſpect to purgatory and prayers for the dead, they are of the ſame opinion with the Greeks and other eaſtern Chriſtians: they conſecrate unleavened bread at the euchariſt, and are againſt confeſſion, believing that it is not of divine inſtitution.

JACOBUS, a gold coin, worth 25 ſhillings; ſo called from king James the firſt of England, in whoſe reign it was ſtruck. See Coin.

We uſually diſtinguiſh two kinds of *Jacobus*, the *old* and the *new;* the former valued at 25 ſhillings, weighing ſix pennyweight ten grains: the latter, called alſo *Carolus*, valued at 23 ſhillings; in weight five pennyweight twenty grains.

JAQUELOT. See Jaquelot.

JACULATOR, or SHOOTING-FISH. See CHÆTODON.

JAFFA, the modern name of the city of JOPPA in Judæa.

JAFNAPATAN, a ſea-port town, ſeated at the north-eaſt end of the iſland of Ceylon in the Eaſt Indies. The Dutch took it from the Portugueſe in 1658, and have continued in the poſſeſſion of it ſince that time. They export from thence great quantities of tobacco, and ſome elephants, which are accounted the moſt docile of any in the whole world. E. Long. 80. 25. N. Lat. 9. 30.

JAGENDORF, a town and caſtle of Sileſia, capital of a province of the ſame name, ſeated on the river Oppa. E. Long. 17. 47. N. Lat. 50. 4.

ST **JAGO**, a large river of South America, which riſes in the audience of Quito and Peru. It is navigable; and falls into the South Sea, after having watered a fertile country abounding in cotton-trees, and inhabited by wild Americans.

St JAGO, the largeſt, moſt populous and fertile of the Cape Verd iſlands on the coaſt of Africa, and the reſidence of the Portugueſe viceroy. It lies about 13 miles eaſtward from the iſland of Mayo, and abounds with high barren mountains; but the air, in the rainy ſeaſon, is very unwholeſome to ſtrangers. Its produce is ſugar, cotton, wine, and ſome excellent fruits. The animals are black cattle, horſes, aſſes, deer, goats, hogs, civet-cats, and ſome very pretty green monkeys with black faces.

St JAGO, a handſome and conſiderable town of South America, the capital of Chili, with a good harbour, a biſhop's ſee, and a royal audience. It is ſeated in a large and beautiful plain, abounding with all the neceſſaries of life, at the foot of the Cordilleras, on the river Mapocho, which runs acroſs it from eaſt to weſt. Here are ſeveral canals and a dyke, by means of which they water the gardens and cool the ſtreets.—It is very much ſubject to earthquakes. W. Long. 69. 35. S. Lat. 33. 40.

St JAGO *de Cuba*, a town of North America, ſituated on the ſouthern coaſt of the iſland of Cuba in the bottom of a bay with a good harbour, and on a river of the ſame name. W. Long. 76. 44. N. Lat. 20. 0.

JAGO *de los Cavalleros*, a town of America, and one of the principal of the iſland of Hiſpaniola. It is ſeated on the river Yague, in a fertile ſoil, but bad air. W. Long. 70. 5. N. Lat. 19. 40.

St JAGO *del Entero*, a town of South America, one of the moſt conſiderable of Tucuman, and the uſual reſidence of the inquiſitor of the province. It is ſeated on a large river, in a flat country, where there is game, tygers, guanacos, commonly called *camel-ſheep*, &c.

JAGO *de la Vega*, otherwiſe called *Spaniſh-town*, is the capital of the iſland of Jamaica, in America, where the aſſembly and the grand courts of juſtice are held. It is ſeated in a fine pleaſant valley, on the banks of the Rio Cobre. It was once a large, populous place, containing 2000 houſes, two churches, a monaſtery, and ſeveral private chapels; but it is now reduced to a ſmall compaſs, and has only one fine church, and a chapel, with about 500 inhabitants. Being an inland place, its trade is ſmall; but ſeveral wealthy merchants and gentlemen reſide there, living in a gay manner. There are a great number of coaches; and they have lately got a playhouſe, with good actors. It is ſeated near the ſouth-eaſt part of the iſland, in W. Long. 76. 45. N. Lat. 18. 20.

JAQUAR, a name given to the Braſilian once, a ſpecies of FELIS.—It grows to the ſize of a wolf: its hair of a bright tawny colour; the breaſt and belly whitiſh; the tail ſhorter than the body, the upper part deep tawny, marked irregularly with black ſpots. It inhabits the hotteſt parts of South America from the Iſthmus of Darien to Buenos Ayres; is fierce, and deſtructive to man and beaſt. Like the tiger, it plunges its head into the body of its prey, and ſucks out the blood before it devours it; makes a great noiſe like the howling of a hungry dog; and is a very cowardly animal, eaſily put to flight either by the ſhepherds dogs or by a lighted torch, being very fearful of fire. It lies in ambuſh near the ſides of rivers.—There is ſometimes ſeen a ſingular combat between this animal and the crocodile: when the jaquar comes to drink, the crocodile, ready to ſurpriſe any animal that approaches, raiſes its head out of the water; the former ſtrikes its claws into the eyes, the only penetrable part of this dreadful reptile, who immediately dives under water, pulling his enemy along with him, where they commonly both periſh.

JAIL-FEVER, a very dangerous diſtemper of the contagious kind, ariſing from the putreſcent diſpoſition of the blood and juices. See (the *Index* ſubjoined to) MEDICINE.

JALAP, in botany and the materia medica, the root of a ſpecies of convolvulus or bind-weed. See CONVOLVULUS.

This root is brought to us in thin tranſverſe ſlices from Xalapa, a province of New Spain. Such pieces ſhould be choſen as are moſt compact, hard, weighty, dark-coloured, and abound moſt with circular ſtriæ. Slices of bryony root are ſaid to be ſometimes mixed with jalap; but theſe may be eaſily diſtinguiſhed by their whiter colour and leſs compact texture. Jalap has no ſmell, and very little taſte upon the tongue; but when ſwallowed it affects the throat with a ſenſe of heat, and occaſions a plentiful diſcharge of ſaliva.—Taken in ſubſtance in a doſe of about half a dram, (leſs or more according to the circumſtances of the patient), in plethoric or cold phlegmatic habits, it proves an effectual and in general a ſafe purgative, performing its office mildly, ſeldom occaſioning nauſea or gripes which too frequently accompany the other ſtrong cathartics. In hypochondriacal diſorders, and hot bilious habits, it gripes violently if the jalap is good; but rarely takes due effect as a purge. An extract made by water purges almoſt univerſally, but weakly; and at the ſame time has a conſiderable effect by urine. The root remaining after this proceſs, gripes violently. The pure reſin prepared with ſpirit of wine occaſions moſt violent gripings and other terrible ſymptoms, but ſcarce proves at all cathartic; triturated with ſugar, or with almonds into the form of an emulſion, or diſſolved in ſpirit and mixed with ſyrups, it purges plentifully in a ſmall doſe, without occaſioning much diſorder. The part of the jalap remaining after the ſeparation of the reſin yields to water an extract which has no effect as a cathartic, but operates powerfully by urine.—Hoffman particularly cautions againſt giving jalap to children; and aſſures us, that it will deſtroy appetite, weaken the body, and perhaps occaſion even death: but herein he is contradicted by Geoffry; who obſerves, that children whoſe veſſels are lax, and the food ſoft and lubricating, bear theſe kinds of medicines better than adults.—Certain it is, however, that jalap, when given to children, moſt frequently proves emetic as well as cathartic.

JAMAICA, an iſland of the Weſt Indies, the largeſt of the Antilles, lying between 17° and 19° N. Lat. and between 76° and 79° W. Long.; in length near 170 miles, and about 60 in breadth. It approaches in its figure to an oval. The windward paſſage right before it hath the iſland of Cuba on the weſt, and Hiſpaniola on the eaſt, and is about 20 leagues in breadth.

This iſland was diſcovered by admiral Chriſtopher Columbus in his ſecond voyage, who landed upon it May 5. 1494; and was ſo much charmed with it, as always to prefer it to the reſt of the iſlands; in conſequence of which, his ſon choſe it for his dukedom. It was ſettled by Juan de Eſquivel A. D. 1509, who built the town, which, from the place of his birth, he called *Seville*, and 11 leagues farther to the eaſt ſtood Melilla. Oriſtan was on the ſouth ſide of the iſland, ſeated on what is now called *Blue Fields River*. All theſe are gone to decay; but St Jago, now Spaniſh Town, is ſtill the capital. The Spaniards held this country 160 years, and in their time the principal commodity was cacao; they had an immenſe ſtock of horſes, aſſes, and mules, and prodigious quantities of cattle. The Engliſh landed here under Penn and Venables, May 11. 1654, and quickly reduced the iſland. Cacao was alſo their principal commodity till the old trees decayed, and the new ones did not thrive; and then the planters from Barbadoes introduced ſugar-canes, which hath been the great ſtaple ever ſince.

The proſpect of this iſland from the ſea, by reaſon of its conſtant verdure, and many fair and ſafe bays, is wonderfully pleaſant. The coaſt, and for ſome miles within, the land is low; but removing farther, it riſes and becomes hilly. The whole iſle is divided by a ridge of mountains running eaſt and weſt, ſome riſing to a great height: and theſe are compoſed of rock, and a very hard clay; through which, however, the rains that fall inceſſantly upon them, have worn long and deep cavities, which they call *gullies*. Theſe mountains, however, are far from being unpleaſant, as they are crowned even to their ſummits by a variety of fine trees. There are alſo about a hundred rivers that iſſue from them on both ſides; and, though none of them are navigable for any thing but canoes, are both pleaſing and profitable in many other reſpects. The climate, like that of all countries between the tropics, is very warm towards the ſea, and in marſhy places unhealthy; but in more elevated ſituations, cooler; and, where people live temperately, to the full as wholeſome as in any part of the Weſt Indies. The rains fall heavy for about a fortnight in the months of May and October; and as they are the cauſe of fertility, are ſtyled ſeaſons. Thunder is pretty frequent, and ſometimes ſhowers of hail: but ice or ſnow, except on the tops of the mountains, are never ſeen; but on them, and at no very great height, the air is exceedingly cold.

The moſt eaſtern parts of this ridge are famous under the name of the *Blue Mountains*. This great chain of rugged rocks defends the ſouth ſide of the iſland from thoſe boiſterous north-weſt winds, which might be fatal to their produce. Their ſtreams, tho' ſmall, ſupply the inhabitants with good water, which is a great bleſſing, as their wells are generally brackiſh. The Spaniards were perſuaded that theſe hills abounded with metals: but we do not find that they wrought any mines; or if they did, it was only copper, of which they ſaid the bells in the church of St Jago were made. They have ſeveral hot ſprings, which have done great cures. The climate was certainly more temperate before the great earthquake; and the iſland was ſuppoſed to be out of the reach of hurricanes, which ſince then it hath ſeverely felt. The heat, however, is very much tempered by land and ſea breezes; and it is aſſerted, that the hotteſt time of the day is about eight in the morning. In the night, the wind blows from the land on all ſides, ſo that no ſhips can then enter their ports.

In an iſland ſo large as this, which contains above five millions of acres, it may be very reaſonably conceived that there are great variety of ſoils. Some of theſe are deep, black, and rich, and mixed with a kind of potter's earth; others ſhallow and ſandy; and ſome of a middle nature. There are many ſavannahs, or wide plains, without ſtones, in which the native Indians had luxuriant crops of maize, which the Spaniards turned into meadows, and kept in them prodigious herds of cattle. Some of theſe ſavannahs are to be met with even amongſt the mountains. All theſe different ſoils may be juſtly pronounced fertile, as they would certainly be found, if tolerably cultivated, and applied to proper purpoſes. A ſufficient proof of this will ariſe from a very curſory review of the natural and artificial produce of this ſpacious country.

It abounds in maize, pulſe, vegetables of all kinds, meadows of fine graſs, a variety of beautiful flowers, and as great a variety of oranges, lemons, citrons, and other rich fruits. Uſeful animals there are of all ſorts, horſes, aſſes, mules, black cattle of a large ſize, and ſheep, the fleſh of which is well taſted, though their wool is hairy and bad. Here are alſo goats and hogs in great plenty; ſea and river fiſh; wild, tame, and water fowl. Amongſt other commodities of great value, they have the ſugar-cane, cacao, indigo, pimento, cotton, ginger, and coffee; trees for timber and other uſes, ſuch as mahogany, manchineel, white wood, which no worm will touch, cedar, olives, and many more. Beſides theſe, they have fuſtick, red wood, and various other materials for dyeing. To theſe we may add a multitude of valuable drugs, ſuch as guaiacum, china, ſarſaparilla, caſſia, tamarinds, vanellas, and the prickle-pear or opuntia, which produces the cochineal; with no inconſiderable number of odoriferous gums. Near the coaſt they have ſalt-ponds, with which they ſupply their own conſumption, and might make any quantity they pleaſed.

As this iſland abounds with rich commodities, it is happy likewiſe in having a number of fine and ſafe ports. Point Morant, the eaſtern extremity of the iſland, hath a fair and commodious bay. Paſſing on to the ſouth, there is Port Royal: on a neck of land which forms one ſide of it, there ſtood once the faireſt town in the iſland; and the harbour is as fine a one as can be wiſhed, capable of holding a thouſand large veſſels, and ſtill the ſtation of our ſquadron. Old Harbour is alſo a convenient port, ſo is Maccary Bay;

and there are at leaſt twelve more between this and the weſtern extremity, which is Point Negrillo, where our ſhips of war lie when there is a war with Spain. On the north ſide there is Orange Bay, Cold Harbour, Rio Novo, Montego Bay, Port Antonio one of the fineſt in the iſland, and ſeveral others. The north-weſt winds, which ſometimes blow furiouſly on this coaſt, render the country on that ſide leſs fit for canes, but pimento thrives wonderfully; and certainly many other ſtaples might be raiſed in ſmall plantations, which are frequent in Barbadoes, and might be very advantageous here in many reſpects.

The town of Port Royal ſtood on a point of land running far out into the ſea, narrow, ſandy, and incapable of producing any thing. Yet the excellence of the port, the convenience of having ſhips of ſeven hundred tons coming cloſe up to their wharfs, and other advantages, gradually attracted inhabitants in ſuch a manner, that though many of their habitations were built on piles, there were near two thouſand houſes in the town in its moſt flouriſhing ſtate, and which let at high rents. The earthquake by which it was overthrown happened on the 7th of June 1692, and numbers of people periſhed in it. This earthquake was followed by an epidemic diſeaſe, of which upwards of three thouſand died: yet the place was rebuilt; but the greateſt part was reduced to aſhes by a fire that happened on the 9th of January 1703, and then the inhabitants removed moſtly to Kingſton. It was, however, rebuilt for the third time; and was riſing towards its former grandeur, when it was overwhelmed by the ſea, Auguſt 20. 1722. There is, notwithſtanding, a ſmall town there at this day. Hurricanes ſince that time have often happened, and occaſioned terrible devaſtations; yet they have been leſs frequent and leſs violent of late years, and the climate is alſo ſaid to be altered for the better.

In ſo large an iſland as this, it might be expected there ſhould be a conſiderable number of great towns; which, however, there is not. The reaſon of this is very obvious; for the wealth of the inhabitants ariſing from their plantations, of which there are at preſent about five hundred, and each of theſe containing ſome hundreds of inhabitants, it appears from hence that every plantation forms a village, and accounts ſufficiently for the diſpoſal of the greateſt part of the inhabitants. There are however ſome few towns; the largeſt of which is Kingſton, which ſtands on the harbour of Port Royal, contains about 1600 houſes, and is very populous. St Jago de la Vega, or, as it is uſually called, *Spaniſh Town*, is properly the capital of the iſland, being the reſidence of the governor, the place where the aſſembly meets, and is alſo the ſeat of the principal courts of juſtice.

The adminiſtration of public affairs is by a governor and council of royal appointment, and the repreſentatives of the people in the lower houſe of aſſembly. They meet at Spaniſh Town, and things are conducted with great order and dignity. The colony hath a conſiderable public revenue; of which the quit-rents, by a grant of the crown, make a part. Another branch ariſes from a tax or fine laid upon ſuch as keep fewer than three white to 100 black ſervants. This is preferring the eaſe to the ſecurity of the community, in reſpect to which it would have operated much more beneficially as a regulation. The iſland is divided into three counties, Middleſex, Surry, and Cornwall, containing 19 pariſhes, over each of which preſides a magiſtrate ſtyled a *cuſtos*, but theſe pariſhes in point of ſize are a kind kind of hundreds. Yet is this fine country, upon the whole, but thinly peopled, and indifferently cultivated; for though near a fourth part of the lands are patented, yet not above a ninth part is actually under cultivation. The commerce of Jamaica is very conſiderable, not only with all parts of Great Britain and Ireland, but with Africa, North and South America, the Weſt India iſlands, and the Spaniſh main, for the encouragement of which a late act was paſſed. The ſhips annually employed are upwards of 500 ſail. The number of inhabitants is very uncertain; ſome ſay about 30,000 or perhaps more whites, and about 170,000 negroes.

The following account of the exports of this iſland, in 1770, will contribute more than all that hath been ſaid, to ſhew the importance of Jamaica. They conſiſted in 2249 bales of cotton, which at 10 pounds per bale, the price in the iſland, amounts to 22,490 l.; 1873 hundred weight of coffee, at three pounds five ſhillings per hundred, 6088 l.; 2753 bags of ginger, at two pounds five ſhillings per bag, 6194 l.; 2211 hides, at ſeven ſhillings per hide, 773 l.; 15,796 hogſheads of rum, at ten pounds per hogſhead, 157,960 l. To Ireland, 679 hogſheads, at ten pounds per hogſhead, 6790 l. Mahogany, 15,282 pieces, and 8500 feet, 50,000 l. Of pimento, 2,089,734 pounds weight, 52,243 l. Sugar, 57,675 hogſheads, 6425 tierces, 52 barrels, at ſeventeen pounds ten ſhillings per hogſhead, twelve pounds per tierce, and four pounds per barrel, amounting in the whole to 1,086,620 l. Sarſaparilla, 205 bags, at ten pounds per bag, 2250 l. Exports to Great Britain and Ireland 1,391,210 l. To North America, 146,324 l. To the other iſlands, 595 l. Total of the exports, 1,538,730 l.

JAMBI, or **Jambis**, a ſea-port town and ſmall kingdom of Aſia, on the eaſtern coaſt of the iſland of Sumatra. It is a trading place. The Dutch have a fort here; and export pepper from thence, with the beſt ſort of canes. E. Long. 103. 55. S. Lat. 0. 30.

IAMBIC, in ancient poetry, a ſort of verſe, ſo called from its conſiſting either wholly, or in great part, of iambus's. See Iambus.

Ruddiman makes two kinds of iambic, viz. dimeter and trimeter; the former containing four feet, and the latter ſix. And as to the variety of their feet, they conſiſt wholly of iambus's, as in the two following verſes of Horace:

1 2 3 4 5 6
Dim. *Inar|ſit æ|ſtuo|ſius|*
Trim. *Suis | & i|pſa Ro|ma vi|ribus|ruit.*

Or, a dactylus, ſpondeus, anapeſtus, and ſometimes tribrachys, obtain in the odd places; and the tribrachys alſo in the even places, excepting the laſt. Examples of all which may be ſeen in Horace; as,

Dimeter.

1 2 3 4 5 6
Canidi|a tra|ctavit|dapes|
Vide|re prope|rantes domum|

Trimeter.

Quò quò|ſcele|ſti rui|tis aut|cur dex|teris.
Prius|que cœ|lum ſi|det in|ferius|mari.

Aliti|bus at|que cani|bus homi|cid' He|ctorem.
Pavidum|que lepo|r' aut ad|venam laqueo|gruem.

JAMBLICUS, the name of two celebrated Platonic philoſophers, one of whom was of Colchis, and the other of Apamea in Syria. The firſt, whom Julian equals to Plato, was the diſciple of Anatolius and Porphyry, and died under the reign of the emperor Conſtantine.—The ſecond alſo enjoyed great reputation. Julian wrote ſeveral letters to him, and it is ſaid he was poiſoned under the reign of Valens.—It is not known to which of the two we ought to attribute the works we have in Greek under the name of *Jamblicus*, viz. 1. The hiſtory of the life of Pythagoras, and the ſect of the Pythagoreans. 2. An exhortation to the ſtudy of philoſophy. 3. A piece againſt Porphyry's letter on the myſteries of the Egyptians.

IAMBUS, in the Greek and Latin proſody, a poetical foot, conſiſting of a ſhort ſyllable followed by a long one; as in

υ - υ - υ - υ -
Θεν, λεγω, *Dei*, *meas*.

Syllaba longa brevi ſubjecta vocatur iambus, as Horace expreſſes it; who alſo calls the iambus a ſwift, rapid foot, *pes citus*.

The word, according to ſome, took its riſe from Iambus, the ſon of Pan and Echo, who invented this foot; or, perhaps, who only uſed ſharp-biting expreſſions to Ceres, when afflicted for the death of Proſerpine. Others rather derive it from the Greek ιος, *venenum*, "poiſon;" or from ιαμβιζω, *maledico*, "I rail, or revile;" becauſe the verſes compoſed of iambus's were at firſt only uſed in ſatire.

JAMES (St.), called *the Great*, the ſon of Zebedee, and the brother of John the evangeliſt, was born at Bethſaida, in Galilee. He was called to be an apoſtle, together with St John, as they were mending their nets with their father Zebedee, who was a fiſherman; when Chriſt gave them the name of *Boanerges*, or *Sons of Thunder*. They then followed Chriſt, were witneſſes with St Peter of the transfiguration on mount Tabor, and accompanied our Lord in the garden of olives. It is believed that St James firſt preached the goſpel to the diſperſed Jews; and afterwards returned to Judea, where he preached at Jeruſalem, when the Jews raiſed up Herod Agrippa againſt him, who put him to a cruel death about the year 44. Thus St James was the firſt of the apoſtles who ſuffered martyrdom. St Clement of Alexandria relates, that his accuſer was ſo ſtruck with his conſtancy, that he became converted and ſuffered with him. There is a magnificent church at Jeruſalem which bears the name of *St James*, and belongs to the Armenians. The Spaniards pretend, that they had St James for their apoſtle, and boaſt of poſſeſſing his body; but Baronius, in his Annals, refutes their pretenſions.

JAMES (St.), called *the Leſs*, an apoſtle, the brother of Jude, and the ſon of Cleophas and Mary the ſiſter of the mother of our Lord, is called in Scripture the *Juſt*, and the *brother* of Jeſus, who appeared to him in particular after his reſurrection. He was the firſt biſhop of Jeruſalem, when Ananias II. high prieſt of the Jews, cauſed him to be condemned, and delivered him into the hands of the people and the Phariſees, who threw him down from the ſteps of the temple, when a fuller daſhed out his brains with a club, about the year 62. His life was ſo holy, that Joſephus conſiders the ruin of Jeruſalem as a puniſhment inflicted on that city for his death. He was the author of the epiſtle which bears his name.

JAMES, the name of ſeveral kings of Scotland and of Great Britain. See (*Hiſtories* of) SCOTLAND and BRITAIN.

JAMES I. king of Scotland in 1423, the firſt of the houſe of Stuart, was taken priſoner by the Engliſh in 1406, who were at war with Robert III. his father; and remained ſo till 1424, when he was ſet at liberty by John duke of Bedford regent of England during the minority of Henry VI. In 1437, this unfortunate prince was aſſaſſinated in his bed by the relations of thoſe whom he had puniſhed for mal-adminiſtration during his impriſonment.

JAMES II. king of Scotland, 1437, ſucceeded his father, being then but ſeven years of age; and was killed at the ſiege of Roxburgh in 1460, aged 29. This prince wrote, 1. A panegyric on his queen, before ſhe was married to him. 2. Scotch ſonnets: one of them, a lamentation while in England, is in manuſcript in the Bodleian library, and beſtows great praiſes on Gower and Chaucer. 3. *Rythmi Latini*. 4. On muſic.

JAMES III. king of Scotland, ſucceeded his father in 1460. He was a tyrannical prince; and having irritated his ſubjects, they rebelled againſt him, and he was ſlain by them in battle in 1488, aged 35.

JAMES IV. king of Scotland, ſucceeded his father in 1488. He was a pious and valiant prince; ſubdued his rebellious ſubjects; and afterwards, taking part with Louis XII. againſt Henry VIII. of England, he was ſlain in the battle of Flouden-Field in 1513, aged 41.

JAMES V. king of Scotland, in 1513, was but 18 months old when his father loſt his life. When of age, he aſſiſted Francis I. king of France, againſt the emperor Charles le Quint; for which ſervice Francis gave him his eldeſt daughter in marriage, in 1535. This princeſs died in two years; and James married Mary of Lorraine, daughter of Claud duke of Guiſe, and widow of Louis d'Orleans, by whom he had only one child, the unfortunate Mary queen of Scots, born only eight days before his death, which happened December 13. 1542. This was the firſt prince of his family who died a natural death, ſince its elevation to the throne. He wrote the celebrated ballad called *Chriſt's Kirk on the Green*, and other little poems, which, at leaſt, tradition reports to have been of his compoſition. They have a character of eaſe and libertiniſm, ſays Mr Walpole, which makes the tradition the more probable, and are to be found in a collection of Scottiſh poems called *The Evergreen;* the Gaber-luinzie Man is reckoned the beſt. There is ſomething very ludicrous in the young woman's diſtreſs when ſhe thought that her firſt favour had been thrown away on a beggar.

JAMES I. king of England in 1603, and VI. of Scotland in 1567, ſon of Mary queen of Scots; whom he ſucceeded in Scotland, as he did Elizabeth in England. Strongly attached to the Proteſtant religion, he ſignalized himſelf in its ſupport; which gave riſe to the horrid conſpiracy of the Papiſts to deſtroy him and all the Engliſh nobility by the Gunpowder Plot, diſcovered November 5. 1605. The following year, a political teſt of loyalty was required, which ſecured the king's perſon, by clearing the kingdom of thoſe diſaffected Roman-Catholic ſubjects who would not ſubmit to it. The chief glory of this king's reign conſiſted in the eſtabliſhment of new colonies, and the introduction of ſome manufactures. The nation enjoyed peace, and commerce flouriſhed during his reign. Yet his adminiſtration was deſpiſed both at home and abroad: for, being the head of the Proteſtant cauſe in Europe, he did not ſupport it in that great criſis, the war of Bohemia; abandoning his ſon-in-law the elector Palatine; negotiating when he ſhould have fought, deceived at the ſame time by the courts of Vienna and Madrid; continually ſending illuſtrious ambaſſadors to foreign powers, but never making a ſingle ally. He valued himſelf much upon his polemical writings; and ſo fond was he of theological diſputations, that to keep them alive, he founded, for this expreſs purpoſe, Chelſea-college; which was converted to a much better uſe by Charles II. His *Baſilicon Doron*, Commentary on the Revelation, writings againſt Bellarmine, and his *Dæmonologia*, or doctrine of witchcraft, are ſufficiently known. There is a collection of his writings and ſpeeches in one folio volume. Several other pieces of his are extant; ſome of them in the Caballa, others in manuſcript in the Britiſh Muſeum, and others in Howard's collection. He died in 1625, in the 59th year of his age, and 23d of his reign.

JAMES II. king of England, Scotland, &c. 1685, grandſon of James I. ſucceeded his brother Char. II. It is remarkable, that this prince wanted neither courage nor political abilities whilſt he was duke of York; on the contrary, he was eminent for both: but when he aſcended the throne, he was no longer the ſame man. A bigot from his infancy to the Romiſh religion and to its hierarchy, he ſacrificed every thing to eſtabliſh them, in direct contradiction to the experience he had acquired, during the long reign of his brother, of the genius and character of the people he was to govern. Guided by the jeſuit Peters his confeſſor, and the infamous chancellor Jeffries, he violated every law enacted for the ſecurity of the Proteſtant religion; and then, unable to face the reſentment of his injured ſubjects, he fled like a coward, inſtead of diſarming their rage by a diſmiſſion of his Popiſh miniſters and prieſts. He rather choſe to live and die a bigot, or, as he believed, a ſaint, than to ſupport the dignity of his anceſtors, or periſh beneath the ruins of his throne. The conſequence was the revolution in 1689. James II. died in France in 1710, aged 68. He wrote Memoirs of his own life and campaigns to the reſtoration; the original of which is preſerved in the Scotch college, at Paris. This piece is printed at the end of Ramſay's life of Marſhal Turenne. 2. Memoirs of the Engliſh affairs, chiefly naval, from the year 1660 to 1673. 3. The royal ſufferer, king James II. conſiſting of meditations, ſoliloquies, vows, &c. ſaid to be compoſed by his majeſty at St Germains. 4. Three letters; which were publiſhed by William Fuller, gent. in 1702, with other papers relating to the court of St Germains, and are ſaid in the title-page to be printed by command.

JAMES (Thomas), a learned Engliſh critic and divine, born about the year 1571. He recommended himſelf to the office of keeper of the public library at Oxford, by the arduous undertaking of publiſhing a catalogue of the MSS in each college-library at both univerſities. He was elected to this office in 1602, and held it 18 years, when he reſigned it to proſecute his ſtudies with more freedom. In the convocation held with the parliament at Oxford in 1625, of which he was a member, he moved to have proper commiſſioners appointed to collate the MSS. of the fathers in all the libraries in England, with the Popiſh editions, in order to detect the forgeries in the latter; but this propoſal not meeting with the deſired encouragement, he engaged in the laborious taſk himſelf, which he continued until his death in 1629. He left behind him a great number of learned works.

JAMES (Richard), nephew of the former, entered into orders in 1615: but, being a man of humour, of three ſermons preached before the univerſity, one concerning the obſervation of Lent was without a text, according to the moſt ancient manner; another againſt the text; and the third beſide it. About the year 1619, he travelled through Wales, Scotland, Shetland, into Greenland, and Ruſſia, of which he wrote obſervations. He aſſiſted Selden in compoſing his *Marmora Arundeliana*; and was very ſerviceable to Sir Robert Cotton, and his ſon Sir Thomas, in diſpoſing and ſettling their noble library. He died in 1638; and has an extraordinary character given him by Wood for learning and abilities.

Knights of St JAMES, a military order in Spain, firſt inſtituted about the year 1170 by Ferdinand II. king of Leon and Galicia. The greateſt dignity belonging to this order is that of Grand Maſter, which has been united to the crown of Spain. The knights are obliged to make proof of their deſcent from families that have been noble, for four generations, on both ſides; they muſt likewiſe make it appear, that their ſaid anceſtors have neither been Jews, heretics, nor Saracens; nor have ever been called into queſtion by the inquiſition. The novices are obliged to ſerve ſix months in the galleys, and to live a month in a monaſtery; they obſerve the rules of St Auſtin, making no vows but of poverty, obedience, and conjugal fidelity.

JAMES'*s Powder*, an antimonial medicine, ſomewhat of the nature of tartar emetic, prepared by the late Dr Robert James, phyſician in London, who died on the 23d of March 1776. His powder was found to be of conſiderable efficacy in ſome kinds of fevers; ſo that it is much to be regretted, that the inventor thought proper to conceal his method of preparing it even till his death.

JAMES-*Town*, in North America, was once the capital of Virginia, but now Williamſburg claims that honour. It is ſeated on a peninſula on the north ſide of James river; and conſiſts of about 80 houſes, chiefly for the entertainment of ſeafaring men; for the ſeat of the government, and the courts of juſtice, have been removed to Williamſburg, which is ſeven miles north of it. W. Long. 77. 30. N. Lat. 37. 0.

St JAMES'*s Day*, a feſtival of the Chriſtian church, obſerved on the 25th of July, in honour of St James the greater, ſon of Zebedee.

Epiſtle of St JAMES, a canonical book of the New Teſtament, being the firſt of the *catholic* or *general* epiſtles; which are ſo called, as not being written to one but to ſeveral Chriſtian churches.

This general epiſtle is addreſſed partly to the believing and partly to the infidel Jews; and is deſigned to correct the errors, ſoften the ungoverned zeal, and reform the indecent behaviour of the latter; and to comfort the former under the great hardſhips they then did, or ſhortly were to ſuffer, for the ſake of Chriſtianity.

JAMESONE (George), an excellent painter, juſtly termed the *Vandyke of Scotland*, was the ſon of Andrew Jameſone, an architect; and was born at Aberdeen, in 1586. He ſtudied under Rubens, at Antwerp; and, after his return, applied with indefatigable induſtry to portraits in oil, though he ſometimes practiſed in miniature, and alſo in hiſtory and landſcapes. His largeſt portraits were ſomewhat leſs than life. His earlieſt works are chiefly on board, afterwards on a fine linen cloth ſmoothly primed with a proper tone to help the harmony of his ſhadows. His excellence is ſaid to conſiſt in delicacy and ſoftneſs, with a clear and beautiful colouring; his ſhades not charged, but helped by varniſh, with little appearance of the pencil. When king Charles I. viſited Scotland in 1633, the magiſtrates of Edinburgh, knowing his majeſty's taſte, employed this artiſt to make drawings of the Scottiſh monarchs; with which the king was ſo pleaſed, that, inquiring for the painter, he ſat to him, and rewarded him with a diamond-ring from his own finger. It is obſervable, that Jameſone always drew himſelf with his hat on, either in imitation of his maſter Rubens, or on having been indulged in that liberty by the king when he ſat to him. Many of Jameſone's works are in both the colleges of Aberdeen; and the Sybils there he is ſaid to have drawn from living beauties in that city. His beſt works are from the year 1630 to his death, which happened at Edinburgh in 1644.

JAMYN (Amadis), a celebrated French poet in the 16th century. He is eſteemed the rival of Ronſard, who was his cotemporary and friend. He was ſecretary and chamber-reader in ordinary to Char. IX. and died about 1585. He wrote, 1. Poetical works, 2 vols. 2. Philoſophical diſcourſes to Paſicharis and Rodanthe, with ſeven academical diſcourſes. 3. A tranſlation of the Iliad of Homer, begun by Hugh Sabel, and finiſhed by Jamyn; with a tranſlation into French verſe of the three firſt books of the Odyſſey.

JANEIRO, a province of Braſil in South America, ſeated between the tropic of Capricorn, and 22° of S. Lat. It is bounded on the north by the province of Spirito Sancto, on the eaſt and ſouth by the Atlantic Ocean, and on the weſt by the mountains which ſeparate it from Guiara, in Spaniſh America. This is the moſt valuable province which the Portugueſe are maſters of; for they import from thence yearly great quantities of gold and precious ſtones, which they find in the mountains to a prodigious value.

JANICULUM, or JANICULARIS, a hill of Rome, added by Ancus Martius; the burial-place of Numa, and of Statius Cæcilius the poet: to the eaſt and ſouth, having the Tiber; to the weſt, the fields; to the north, a part of the Vatican. So called, either from an ancient city, (Virgil); or becauſe it was a *janua*, or gate, from which to iſſue out and make incurſions on the Tuſcans, (Verrius Flaccus.) Now called *Mons Aureus*, corruptly *Montorius*, from its ſparkling ſands. From this hill, on account of its height, is the moſt extenſive proſpect of Rome: but it is leſs inhabited, becauſe of its groſs air; neither is it reckoned among the ſeven hills. Hither the people retired, and were hence afterwards recalled by Q. Hortenſius the dictator, (Pliny.)

JANIZARIES, an order of infantry in the Turkiſh armies; reputed the grand ſeignior's foot-guards. Voſſius derives the word from *genizers*, which in the Turkiſh language ſignifies *novi homines* or *milites*. D'Herbelot tells us, that *jenitcheri* ſignifies a *new band*, or *troop*; and that the name was firſt given by Amurath I. called the *Conqueror*, who chooſing out one fifth part of the Chriſtian priſoners whom he had taken from the Greeks, and inſtructing them in the diſcipline of war and the doctrines of their religion, ſent them to Hagi Bektaſche (a perſon whoſe pretended piety rendered him extremely revered among the Turks), to the end that he might confer his bleſſing on them, and at the ſame time give them ſome mark to diſtinguiſh them from the reſt of the troops.—Bektaſche, after bleſſing them in his manner, cut off one of the ſleeves of the fur-gown which he had on, and put it on the head of the leader of this new militia; from which time, viz. the year of Chriſt 1361, they have ſtill retained the name *jenitcheri*, and the fur-cap.

As, in the Turkiſh army, the European troops are diſtinguiſhed from thoſe of Aſia; the janizaries are alſo diſtinguiſhed into *janizaries of Conſtantinople*, and *of Damaſcus*. Their pay is from two aſpers to twelve *per diem*; for when they have a child, or do any ſignal piece of ſervice, their pay is augmented. Their dreſs conſiſts of a dolyman, or long gown, with ſhort ſleeves, which is given them annually by the grand ſeignior on the firſt day of Ramazan. They wear no turban; but, in lieu of that, a kind of cap, which they call *zarcola*, and a long hood of the ſame ſtuff hanging on their ſhoulders. On ſolemn days they are adorned with feathers, which are ſtuck in a little caſe in the fore-part of the bonnet.—Their arms, in Europe, in time of war, are a ſabre, a carabine or muſquet, and a cartouch-box hanging on the left ſide. At Conſtantinople, in time of peace, they wear only a long ſtaff in their hand. In Aſia, where powder and fire-arms are more uncommon, they wear a bow and arrows, with a poinard, which they call *haniare*.—Though the janizaries are not prohibited marriage, yet they rarely marry, nor then but with the conſent of their officers; as imagining a married man to make a worſe ſoldier than a bachelor.—It was Oſman, or Ottoman, or, as others will have it, Amurath, who firſt inſtituted the order of janizaries. They were at firſt called *jaja*, that is, footmen, to diſtinguiſh them from the other Turks, the troops whereof conſiſted moſtly of cavalry. The number of janizaries is generally above 40,000; divided into 162 companies or chambers called *odas*, in which they live together at Conſtantinople as in a convent. They are of a ſuperior rank to all other ſoldiers, and are alſo more arrogant and factious, and it is by them that the public tranquillity is moſtly diſturbed. The government may therefore be ſaid to be in the hands of the janizaries. They have, however, ſome good qualities: they are em-

employed to eſcort travellers, and eſpecially ambaſſadors and perſons of high rank, on the road; in which caſe, they behave with the utmoſt zeal and fidelity.

JANSEN (Cornelius), biſhop of Ypres, one of the moſt learned divines of the 17th century, and principal of the ſect called from his name *Janſeniſts*. He was born in Holland of Catholic parents, and ſtudied at Louvain. Being ſent to tranſact ſome buſineſs of conſequence relating to the univerſity, into Spain, the Catholic king, viewing with a jealous eye the intriguing policy of France, engaged him to write a book to expoſe the French to the pope as no good Catholics, ſince they made no ſcruple of forming alliances with Proteſtant ſtates. Janſen performed this taſk in his *Mars Gallicus*; and was rewarded with a mitre, being promoted to the ſee of Ypres in 1635. He had, among other writings, before this, maintained a controverſy againſt the Proteſtants upon the points of grace and predeſtination; but his *Auguſtinus* was the principal labour of his life, on which he ſpent above 20 years. See the next article.

JANSENISTS, in church-hiſtory, a ſect of the Roman Catholics in France, who followed the opinions of Janſenius, biſhop of Ypres, and doctor of divinity of the univerſities of Louvain and Douay, in relation to grace and predeſtination.

In the year 1640, the two univerſities juſt mentioned, and particularly father Molina and father Leonard Celſus, thought fit to condemn the opinions of the Jeſuits on grace and free-will. This having ſet the controverſy on foot, Janſenius oppoſed to the doctrine of the Jeſuits the ſentiments of St Auguſtine; and wrote a treatiſe on grace, which he entitled *Auguſtinus*. This treatiſe was attacked by the Jeſuits, who accuſed Janſenius of maintaining dangerous and heretical opinions; and afterwards, in 1642, ohtained of pope Urban VIII. a formal condemnation of the treatiſe wrote by Janſenius: when the partiſans of Janſenius gave out that this bull was ſpurious, and compoſed by a perſon entirely devoted to the jeſuits. After the death of Urban VIII. the affair of Janſeniſm began to be more warmly controverted, and gave birth to an infinite number of polemical writings concerning grace. And what occaſioned ſome mirth, was the titles which each party gave to their writings: one writer publiſhed *The torch of St Auguſtine*, another found *Snuffers for St Auguſtine's torch*, and father Veron formed *A gag for the Janſeniſts*, &c. In the year 1650, 68 biſhops of France ſubſcribed a letter to pope Innocent X. to obtain an inquiry into and condemnation of the five following propoſitions, extracted from Janſenius's Auguſtinus: 1. Some of God's commandments are impoſſible to be obſerved by the righteous, even though they endeavour with all their power to accompliſh them. 2. In the ſtate of corrupted nature, we are incapable of reſiſting inward grace. 3. Merit and demerit in a ſtate of corrupted nature, does not depend on a liberty which excludes neceſſity, but on a liberty which excludes conſtraint. 4. The Semipelagians admitted the neceſſity of an inward preventing grace for the performance of each particular act, even for the beginning of faith; but they were heretics in maintaining that this grace was of ſuch a nature, that the will of man was able either to reſiſt or obey it. It is Semipelagianiſm to ſay, that Jeſus Chriſt died, or ſhed his blood, for all mankind in general.

In the year 1652, the pope appointed a congregation for examining into the diſpute in relation to grace. In this congregation Janſenius was condemned; and the bull of condemnation, publiſhed in May 1653, filled all the pulpits in Paris with violent outcries and alarms againſt the hereſy of the Janſeniſts. In the year 1656, pope Alexander VII. iſſued out another bull, in which he condemned the five propoſitions of Janſenius. However, the Janſeniſts affirm, that theſe propoſitions are not to be found in this book; but that ſome of his enemies having cauſed them to be printed on a ſheet, inſerted them in the book, and thereby deceived the pope. At laſt Clement XI. put an end to the diſpute by his conſtitution of July 17. 1705; in which, after having recited the conſtitutions of his predeceſſors in relation to this affair, he declares, "That in order to pay a proper obedience to the papal conſtitutions concerning the preſent queſtion, it is neceſſary to receive them with a reſpectful ſilence." The clergy of Paris, the ſame year, approved and accepted this bull, and none dared to oppoſe it.

This is the famous bull *Unigenitus*, ſo called from its beginning with the words *Unigenitus Dei Filius*, &c. which has occaſioned ſo much confuſion in France.

JANUARY, in chronology, the firſt month of the year, ſo called from JANUS, one of the ancient Roman deities, painted with two faces; one whereof was ſuppoſed to look towards the new year, and the other towards the old.—January was introduced into the year by Numa Pompilius; Romulus's year beginning in the month of March. The Chriſtians heretofore faſted on the firſt of January, by way of oppoſition to the ſuperſtitution of the heathens; who, in honour of Janus, obſerved this day with feaſtings, dancings, maſquerades, &c.

JANUS, in heathen worſhip, the firſt king of Italy, who, it is ſaid, received Saturn into his dominions, after his being driven from Arcadia by Jupiter. He tempered the manners of his ſubjects, and taught them civility; and from him they learned to improve the vine, to ſow corn, and to make bread. After his death, he was adored as a god. Romulus cauſed a temple to be erected to him, the gates of which were open in time of war, and ſhut in time of peace. This temple was ſhut up, for the firſt time, in the reign of Numa; the ſecond, after the firſt Punic war; and thrice under Auguſtus. Nero, Veſpaſian, and ſeveral others, obſerved the ſame ceremony; but we do not find that it was obſerved by the Chriſtian emperors.

This deity was thought to preſide over all new undertakings. Hence, in all ſacrifices, the firſt libations of wine and wheat were offered to Janus, and all prayers prefaced with a ſhort addreſs to him. January, the firſt month of the year was dedicated to and named from him. At this feſtival, the Romans offered cakes of new meal and ſalt, with new wine and frankincenſe. Then the conſuls for the new year ſolemnly entered on their office, all artificers and tradeſmen began their works, quarrels were laid aſide, mutual preſents were made, and the day concluded with mirth and joy.

Janus was repreſented with two faces, either to denote his prudence, or that he views at once the paſt and approaching years; he had a ſceptre in his right hand, and a key in his left, to ſignify his extenſive authority, and his invention of locks.

Tho' this is properly a Roman deity, the abbé la Pluche repreſents it as derived from the Egyptians, who made known the riſing of the dog-ſtar, which opened their ſolar year, with an image with a key in its hand, and two faces, one old and the other young, to tipify the old and new year.

JAPAN, a general name for a great number of iſlands lying between the eaſtern coaſt of Aſia and the weſtern one of America, and which all together form a large and potent empire. They extend from the 30th to the 41ſt degree of latitude, and from the 130th to the 147th of eaſt longitude.

Were South and North Britain divided by an arm of the ſea, Japan might be moſt aptly compared to England, Scotland, and Ireland, with their reſpective ſmaller iſlands, peninſulas, bays, channels, &c. all under the ſame monarch.

The Europeans call the empire *Japan*; but the inhabitants *Niphon*, from the greateſt iſland belonging to it; and the Chineſe *Ciphon*, probably on account of its eaſtern ſituation; theſe names ſignifying, in both languages, the *Baſis* or *Foundation of the Sun*. It was firſt diſcovered by the Portugueſe, ſome time betwixt the years 1535 and 1548.

Smollet's Present State of all Nations.

Moſt of the iſlands which compoſe it are ſurrounded with ſuch high craggy mountains, and ſuch ſhallow and boiſterous ſeas, that ſailing about them is extremely dangerous; and the creeks and bays are choaked up with ſuch rocks, ſhelves, and ſands, that it looks as if Providence had deſigned it to be a kind of little world by itſelf. Theſe ſeas have likewiſe many dangerous whirlpools, which are very difficult to paſs at low water, and will ſuck in and ſwallow up the largeſt veſſels, and all that comes within the reach of their vortex, daſhing them againſt the rocks at the bottom; inſomuch that ſome of them are never ſeen again, and others thrown upon the ſurface at ſome miles diſtance. Some of theſe whirlpools alſo make a noiſe terrible to hear.

The Chineſe pretend that the Japan iſlands were firſt peopled by themſelves: but it is more probable that the original inhabitants were a mixture of different nations, driven thither by thoſe tempeſtuous ſeas, and at different times; and this conjecture is confirmed by the great difference obſervable between the preſent inhabitants, in regard to feature, complexion, ſhapes, habits, cuſtoms, and language, notwithſtanding their having been ſo long united under one monarch.

As theſe iſlands lie in the fifth and ſixth climates, they would be much hotter in ſummer than England, were not the heats refreſhed by the winds which continually blow from the ſea around them, and to which they are much expoſed by the height of their ſituation: this circumſtance, however, not only renders their winters exceſſive cold, but the ſeaſons more inconſtant. They have great falls of ſnow in winter, which are commonly followed by hard froſts. The rains in ſummer are very violent, eſpecially in the months of June and July, which on that account are called *ſat-ſuki*, or *water-months*. The country is alſo much ſubject to dreadful thunders and lightnings, as well as ſtorms and hurricanes, which frequently do a great deal of damage.

The ſoil, though naturally barren and mountainous, by the induſtry of the inhabitants, not only ſupplies them with every neceſſary of life, but alſo furniſhes other countries with them; producing, beſides corn, the fineſt and whiteſt rice, and other grains, with a great variety of fruits, and vaſt numbers of cattle of all ſorts. Beſides rice, and a ſort of wheat and barley, with two ſorts of beans, they have Indian wheat, millet, and ſeveral other kinds, in great abundance. Their ſeas, lakes, and rivers, abound with fiſh; and their mountains, woods, and foreſts, are well ſtocked with horſes, elephants, deer, oxen, buffaloes, ſheep, hogs, and other uſeful animals. Some of their mountains alſo are enriched with mines of gold, ſilver, and copper, exquiſitely fine, beſides tin, lead, iron, and various other minerals and foſſils; whilſt others abound with ſeveral ſorts of marble and precious ſtones. Of theſe mountains, ſome may be juſtly ranked among the natural rarities of this country; one, in particular, in the great iſland of Niphon, is of ſuch prodigious height as to be eaſily ſeen forty leagues off at ſea, though its diſtance from the ſhore is about eighteen. Some authors think it exceeds the famous Peak of Teneriffe; but it may rather be called a cluſter or group of mountains, among which are no leſs than eight dreadful volcanoes, burning with incredible fury, and often laying waſte the country round about them: but, to make ſome amends, they afford great variety of medicinal waters, of different degrees of heat; one of theſe, mentioned by Varenius, is ſaid to be as hot as burning oil, and to ſcorch and conſume every thing thrown into it.

The many brooks and rivers that have their ſources among the mountains, form a great number of delightful caſcades, as well as ſome dreadful cataracts. Among the great variety of trees in the foreſts here, the cedars exceed all of that kind through India, for ſtraightneſs, height, and beauty. They abound in moſt of the iſlands, eſpecially the largeſt.

Their ſeas, beſides fiſh, furniſh them with great quantities of red and white coral, and ſome pearls of great value, beſides a variety of ſea-plants and ſhells; which laſt are not inferior to thoſe that are brought from Amboyna, the Molucca and other eaſtern iſlands.

The vaſt quantity of ſulphur, with which moſt of the Japan iſlands abound, makes them ſubject to frequent and dreadful earthquakes. The inhabitants are ſo accuſtomed to them, that they are ſcarcely alarmed at any, unleſs they chance to be very terrible indeed, and lay whole towns in ruins, which very often proves the caſe. On theſe occaſions, they have recourſe to extraordinary ſacrifices, and acts of worſhip to their deities or demons, according to the different notions of each ſect, and ſometimes even proceed to offer human victims; but in this caſe they only take ſome of the vileſt and moſt abandoned fellows they can meet with, becauſe they are only ſacrificed to the malevolent deities.

With reſpect to religion, that of the Japaneſe is allowed by all writers to have been downright heatheniſm and idolatry from time immemorial. They do not ſeem ſo much as to have any ſort of notion of a Supreme Creator; but believe the world to have exiſted from eternity, and that the gods they worſhip were men or beings that lived on earth ſeveral thouſands of years, and were afterwards, for their piety, mortification, and even by their voluntary death, raiſed to that height of power and dignity they have ever ſince enjoyed. They are divided, however, into various ſects; probably according to the various nations that firſt ſettled there. One of them is called the *ſect of Siutto*, which is that of their philoſophers and moraliſts, whoſe profeſſors, like the Chineſe literati, deſpiſe all notions of public worſhip and popular ſuperſtition. Every perſon here is at liberty to chooſe what ſect pleaſes him beſt, no compulſion being uſed by the government or by the parents. Moſt of the ſects believe a future ſtate of bliſs or miſery, though they are not agreed about the nature and duration of it: the generality, however, think that it will conſiſt in a tranſmigration of the ſoul from one body to another, more or leſs excellent and happy, according to their behaviour in their late ſtate; and that this revolution will continue, as well as the world, to eternal ages. All the different ſects, or at leaſt the prieſts and prieſteſſes of them, however divided in other reſpects, agree in regarding the five following negative precepts as abſolutely binding; 1. Not to kill, nor to eat any thing that is killed; 2. Not to ſteal; 3. Not to defile another man's bed; 4. Not to lie; 5. Not to drink wine. From the example of their two chief deities, Amida and Xaca, the Japaneſe have a notion of its being ſuch a meritorious thing to diſpatch one's ſelf, that great numbers of them embrace, in the moſt public manner, a voluntary death, either by drowning, hanging, or flinging themſelves down from a precipice, or by poiſon, dagger, or any other quick riddance. The followers of Xaca commonly drown themſelves; but thoſe of Amida ſhut themſelves up in ſome cloſe confined place, where they have juſt room to ſit, and, being immured on every ſide, have only a little hole to breathe through by means of a ſmall cane, and never ceaſe calling on that deity till they expire.

There is not a country in all the eaſt that abounds more with temples and monaſteries than this: not only cities and towns, but plains and mountains, and even deſarts, ſwarm with them; for the prieſts here, like thoſe of the church of Rome, are either ſecular or regular. The former live in private houſes of their own, allow themſelves one or two wives, and live on the income and offerings made to their reſpective temples and deities, and are at their own liberty as to the practice of abſtinence and other ſeverities: the regulars live in communities, under their reſpective ſuperiors, and lead more or leſs recluſe and auſtere lives, according to their ſects. Some of the monaſteries contain a thouſand, or even more of them, who, beſides a perpetual celibacy and other mortifications, are all bound to obſerve the five rules before mentioned. Both ſecular and regular are under the government of the dairo or high-prieſt, who is the head of all the religions and ſects in the empire. Beſides the multitude of idols in their temples, there is a great number of others ſet up in their other public buildings, in their piazzas and markets, ſtreets, and even public roads.

The Japaneſe have as great variety of feſtivals as of ſects and deities, which it would therefore be endleſs to deſcribe: they conſiſt in general in the anniverſary of their gods and of their dead relations.

Chriſtianity, if Popery deſerves that name, had once made a conſiderable progreſs in this country; but, about the year 1622, a dreadful perſecution was raiſed againſt the miſſionaries, and all that adhered to them, occaſioned partly by the indiſcreet zeal of the former, partly by the jealouſy of the unconverted nobles, but eſpecially of the Japaneſe prieſts, who could not, without the greateſt envy and regret, behold their old religion, with all its powerful attractives of profit, popular eſteem, and reſpect, daily loſing ground; but more particularly by the policy and treachery of the Dutch, who found effectual means to undermine them. All the Chriſtian converts were put to death; and the Europeans, except the Dutch, forbid to come within the Japaneſe dominions under the ſevereſt penalties.

With reſpect to the government of theſe iſlands, it is and has been for a long time monarchical; though formerly it ſeems to have been ſplit into a great number of petty kingdoms, which were at length all ſwallowed by one. The imperial dignity had been enjoyed, for a conſiderable time before the year 1500, by a regular ſucceſſion of princes, under the title of *dairos*, a name ſuppoſed to have been derived from Dairo the head of that family. Soon after that epoch, ſuch a dreadful civil war broke out, and laſted ſo many years, that the empire was quite ruined. During theſe diſtractions and confuſions, a common ſoldier, by name Tayckoy, a perſon of obſcure birth, but of an enterpriſing genius, found means to raiſe himſelf to the imperial dignity; having, in little more than three years time, by an uncommon ſhare of good fortune ſubdued all his competitors and opponents, and reduced all their cities and caſtles. The dairo, not being in a condition to obſtruct or put a ſtop to his progreſs, was forced to ſubmit to his terms; and might perhaps have been condemned to much harder, had not Tayckoy been apprehenſive leſt his ſoldiers, who ſtill revered their ancient natural monarch, ſhould have revolted in his favour. To prevent this, he granted him the ſupreme power in all religious matters, with great privileges, honours, and revenues annexed to it; whilſt himſelf remained inveſted with the whole civil and military power, and was acknowledged and proclaimed king of Japan. This great revolution happened in 1517, and Tayckoy reigned ſeveral years with great wiſdom and tranquillity; during which he made many wholeſome laws and regulations, which ſtill ſubſiſt, and are much admired to this day. At his death, he left the crown to his ſon Tayckoſſama, then a minor; but the treacherous prince under whoſe guardianſhip he was left, deprived him of his life before he came of age. By this murder, the crown paſſed to the family of Jejaſſama, in which it ſtill continues. Tayckoy and his ſucceſſors have contented themſelves with the title of *cubo*, which, under the dairos, was that of prime miniſter, whoſe office is now ſuppreſſed; ſo that the cubo, in all ſecular concerns, is quite as abſolute and deſpotic, and has as extenſive a power over the lives and fortunes of all his ſubjects, from the petty kings down to the loweſt perſons, as ever the dairos had. The dairo reſides conſtantly at Meaco, and the cubo at Jedo.

The Japaneſe traffic with the Chineſe, Koreans, and people of Jetzo: but, of the European nations, the Dutch alone are ſuffered to trade with them; having declared, as ſome ſay, after the expulſion of the Portugueſe, that they were no Chriſtians; but more probably on the merit of ſupplanting and aſſiſting in expelling the Portugueſe: for it is impoſſible that the Japaneſe can be ignorant that the Dutch profeſs Chriſtianity, as they trade to China; and we find the Japaneſe uſe as much caution in their commerce with the Dutch as if they were really Chriſtians.

At the ſeaſon that the Dutch fleet is expected, the governor of Nangaſaque places centinels on the hills to give notice of the approach of any ſhips. When they appear, a boat is ſent off to every ſhip, with a waiter or officer; and as ſoon as the ſhips come to an anchor, an expreſs is immediately diſpatched to court, before whoſe return the Dutch may not diſpoſe of any thing. In the mean time, the particulars of every ſhip's cargo are taken, with the name, age, ſtature, and office, of every man on board, which is tranſlated and printed in the Japaneſe language. When the expreſs is returned, the ſhips crew are permitted to come on ſhore, and are all muſtered before a Japaneſe commiſſary; and every perſon is called over aloud, and made to give an account of his age, quality, and office, to ſee if it agrees with the particulars given in by the Dutch: after this examination they are ſent on board again, and the ſails of the ſhip, with the guns, arms, ammunition, and helm, are brought on ſhore, and the hatches ſealed down by a Japaneſe officer; nor can they be opened, whatever the ſhip's crew may want, without a permiſſion from the governor, who always ſends a perſon to ſee what is taken out, and ſeal them down again; nor dare the Dutch ſailors light a candle or make any fire on board their ſhips, any more than on ſhore. The ſhips are allowed no communication with one another; nor is any officer or ſailor ſuffered to go on ſhore, except the perſons who are appointed to carry the company's preſent to the king at Jedo or Yeddo. His majeſty having accepted the preſent, and prepared another for the company, the Dutch officer is conveyed to Nangaſaque under a ſtrong guard as he came. This journey, and the tranſacting their mercantile affairs, uſually take up about three months and a half.

The Dutch, who attend the king on this occaſion, approach him on their knees, with their hands joined together, and carried to their foreheads, as the Japaneſe governors and miniſters alſo do.

While the Dutch ſhips lie in the road, none of the Japaneſe are allowed to go on board them to trade with the ſailors; and thoſe that carry proviſions on board are not ſuffered to take any money for them till the permiſſion to trade comes from court, and then they deliver in their accounts and are paid. After this, the Japaneſe permit ſix perſons from every veſſel to come on ſhore, and buy and ſell for themſelves, and ſtay four days, either in Diſnia or in the city, as they ſee fit; when theſe ſix men return on board, ſix others are allowed to go on ſhore and traffic in the like manner, and ſo on.

The goods are generally paid in bullion or pieces of ſilver, of ten or five crowns value, or ſmaller pieces by weight; for they have no coin, except ſome little pieces of copper.

After ſix weeks free trade, there is no further communication allowed of between the city of Nangaſaque and the Dutch in the iſland of Diſnia, or with the ſhipping; whereupon the fleet prepares to return, and the factory in Diſnia are confined to their little iſland again, until the ſeaſon of the year for traffic returns.

With reſpect to the character of the Japaneſe, they are generally very active, and of a quick apprehenſion and good underſtanding, modeſt, patient, and courteous, and excelling all the Orientals in docility. They are ſo juſt in their dealings, that one may abſolutely depend on their word; and, contrary to the Chineſe, diſdain to take the leaſt advantage of thoſe they deal with. They are all very induſtrious and laborious, and much given to ſtudy and reading. They affect a ſurpriſing neatneſs and decency in their eating, drinking, furniture, dreſs, and converſation; and have an abhorrence to intemperance, luxury, and defamation. Drunkenneſs and gluttony are as much deteſted by the rich and poor, as cheating and diſhoneſty. This is the bright ſide of their character. On the other hand, they are repreſented as proud, ambitious, cruel, and uncharitable; and ſo inſenſible of the miſeries of their fellow-creatures, that they will ſuffer them to periſh, rather than relieve them. They are likewiſe ſaid to be ſo paſſionate and revengeful, that they will make away with themſelves if they cannot find an opportunity of revenging an affront. They allow not only of polygamy, but alſo of fornication: but there is ſtill a more heinous and unnatural vice laid to their charge, viz. that of ſodomy, which is not only committed with impunity, both by prieſts and laiety, but without either brand or diſgrace. In their wars they are very fierce and cruel, ſeldom giving or aſking for quarter; and when a town is taken, they commonly deſtroy it by fire and ſword. Like the Chineſe, they are ſo given to aſtrology, that they ſcarce undertake any thing of moment, without conſulting ſome pretender to that art. There is a vaſt number of univerſities diſperſed all over the empire, in which the bonzas preſide, richly endowed, finely ſituated, and accommodated with all the conveniences of life, as well as with large libraries.

The Japaneſe laws and puniſhments are ſevere beyond all juſtice; and may be juſtly ſaid, like thoſe of the Spartan Draco, to be written in blood. They have few, if any, written laws, the emperor's will being the ſupreme one, and next to it that of the kings and princes in their reſpective dominions. The very lords of every diſtrict, and even the heads of every family, have power of life and death over all that are under them, and try and condemn them according to their will. There is ſcarcely any crime ſo ſmall, that is not puniſhed with death, except the offender be a petty king or prince, and even theſe are not always exempted. Every petty larceny, inſult, detraction, cheating of any kind, even at play, a lie or prevarication before a magiſtrate, are all capital, as well as the more heinous crimes of treaſon, murder, parricide, inceſt, rape, adultery. Their moſt common way of putting criminals to death, is by crucifixion with their heads downwards, boiling in oil, tearing them to pieces by horſes, or cutting them in pieces by the hangman. For the higheſt crimes, not only the criminal, but his parents alſo, brothers, and even children, are all put to death. The Japaneſe have but very little ſkill in phyſic and ſurgery. In the cure of diſeaſes they depend much on their medicinal waters, and on certain roots and plants, particularly the root ginſeng, brought from China. The operation of blood-letting is performed by pricking the belly with a fine needle, made either of gold or ſilver. By this acupuncture they not only aſſwage, but effectually cure, an endemic colicky diſorder common among them, and called *ſhenki*. The other diſeaſes to which they are moſt liable, are the dropſy, diarrhœa, ſmall-pox, bloody-flux; but the gout, ſtone, and gravel, are hardly known among them.

The Japaneſe are much addicted to poetry, muſic, and painting; the firſt is ſaid to be grand as to the ſtyle and imagery, loftineſs, and cadence; but, like that of the Chineſe, is not eaſily underſtood or reliſhed by the Europeans. The ſame may be ſaid of their muſic, both vocal and inſtrumental; the beſt of which, of either kind, would hardly be tolerable to a nice European ear. They are better painters than the Chineſe, but much inferior to the Europeans; moſt of their performances in that kind, are either in water-colours on paper, fine leather, &c. or in their japanning and fine porcelain-ware. What is moſt to be admired in their paintings, is the ſingular beauty of the colours, in many of which they greatly excel us.

They pretend, like the Chineſe, to have been the inventors of printing from time immemorial, and their method is the ſame with theirs on wooden blocks; but they excel them in the neatneſs of cutting them, as well as in the goodneſs of their ink and paper. They likewiſe lay claim to the invention of gunpowder; and are vaſtly ſuperior to the Chineſe in the uſe of all ſorts of fire, eſpecially of artillery, as well as the curiouſneſs of their fire-works.

Their manner of writing is much the ſame as that of the Chineſe, viz. in columns from top to bottom, and the columns beginning at the right and ending at the left hand. Their characters were alſo originally the ſame, but now differ conſiderably.

Their language hath ſome affinity with the Chineſe, though it appears from its various dialects to have been a kind of compound of that and other languages, derived from the various nations that firſt peopled thoſe iſlands. It is not only very regular, polite, elegant, and copious, but abounds with a great variety of ſynonima, adapted to the nature of the ſubject they are upon, whether ſublime, familiar, or low; and to the quality, age, and ſex, both of the ſpeaker and perſon ſpoken to.

The Japaneſe are commonly very ingenious in moſt handicraft trades; and excel even the Chineſe in ſeveral manufactures, particularly in the beauty, goodneſs, and variety of their ſilks, cottons, and other ſtuffs, and in their japan and porcelain wares. No eaſtern nation comes up to them in the tempering and fabricating of ſcymitars, ſwords, muſkets, and other ſuch weapons.

The Japaneſe architecture is much in the ſame taſte and ſtyle as that of the Chineſe, eſpecially as to their temples, palaces, and other public buildings; but in private ones they affect more plainneſs and neatneſs than ſhow: theſe laſt, being moſtly built of wood, make their cities exceedingly liable to conflagrations, which, wherever they happen, generally reduce the greateſt part of them to aſhes, they having neither engines nor any other method of ſtopping the progreſs of the flames. The gardens about their houſes are adorned with a variety of flowers, trees, verdure, baths, terraces, and other embelliſhments. The furniture and decorations of the houſes of perſons of diſtinction, conſiſt in japan-work of various colours, curious paintings, beds, couches, ſkreens, cabinets, tables, a variety of porcelain jars, vaſes, tea-equipage, and other veſſels and figures, together with ſwords, guns, ſcymitars, and other arms. Their retinues are more or leſs numerous and ſplendid, according to their rank; but there are few of the lords who have leſs than 50 or 60 men richly clad and armed, ſome on foot, but moſt on horſeback. As for their petty kings and princes, they are ſeldom ſeen without 300 or 200 at leaſt, when they either wait on the emperor, which is one half of the year, or attend him abroad. The Japaneſe dreſs is much like that of the Chineſe, only ſomewhat more elegant and neat, and moſt commonly of ſilk or cotton. They wear nothing on their heads either winter or ſummer, though they ſhave themſelves cloſe all over, except one lock, which is left hanging on the top by way of ornament: but to guard themſelves from ſun or rain, they always carry an umbrella in one hand; and, if rich enough, have them held over their heads by a ſervant. The poorer ſort have, inſtead of that, either a fan or ſhort ſkreen. The women of faſhion, eſpecially the young ones, adorn themſelves with flowers, feathers, pearls, &c. but are ſeldom ſeen abroad, or even at home, to any but thoſe of the family, without a veil.

The proper colour here for feſtivals is black, for mourning white. Inſtead of riſing at the approach of a ſuperior, they ſet themſelves down; and inſtead of bowing or proſtrating when they ſalute, they ſtand upright. They chooſe to have their teeth and nails of a ſhining black, and to let the latter grow to an exceſſive length. The chief food of the Japaneſe is rice, pulſe, fruits, roots, herbs, eating very little fleſh, and that only of ſuch beaſts as they take in hunting. Inſtead of knives, forks, and ſpoons, they make uſe of the ſame ſorts of ſmall ſticks as the Chineſe. Their common drink is either water or tea; but they have other liquors, ſome diſtilled from rice or wheat, others made of their grains boiled with ſugar or honey, or of fruits, or tapped from the palm, birch, and other trees.

After marriage, the wife is confined to her own apartment, from whence ſhe hardly ever ſtirs, except once a-year to the funeral-rites of her family; nor is ſhe permitted to ſee any man, except perhaps ſome very near relation, and that as ſeldom as can be. The wives, as well as in China and other parts of the eaſt, bring no portion with them, but are rather bought by the huſband of their parents and relations. The bridegroom moſt commonly ſees his bride for the firſt time upon her being brought to his houſe from the place of the nuptial ceremony: for in the temple where it is performed ſhe is covered over with a veil, which reaches from the head to the feet. A huſband can put his wives to a more or leſs ſevere death, if they give him the leaſt cauſe of jealouſy, by being ſeen barely to converſe with another man, or ſuffering one to come into their apartment.

The Japaneſe, both poor and rich, make an annual proceſſion to the ſepulchres of their dead relations, with ſongs and muſic; carrying money, victuals, cloathing, &c. as preſents to relieve their various wants in the other world.

When a prince or great man dies, there are commonly about 10, 20, or more youths of his houſehold, and ſuch as were his greateſt favourites, who put themſelves to a voluntary death, at the place where the body is buried or burned: as ſoon as the funeral pile, conſiſting of odoriferous woods, gums, ſpices, oils, and other ingredients, is ſet on fire, the relations and friends of the deceaſed throw their preſents into it, ſuch as cloaths, arms, victuals, money, ſweet herbs, flowers, and other things which they imagine will be of uſe to him in the other world. Thoſe of the middle or lower rank commonly bury their dead, without any other burning than that of ſome odoriferous woods, gums, &c. The ſepulchres into which the bones and aſhes of perſons of rank are depoſited, are generally very magnificent, and ſituated at ſome diſtance from the towns.

JAPAN *Earth*. See TERRA *Japonica*.

JAPANNING, the art of varniſhing and drawing figures on wood, in the ſame manner as is done by the natives of Japan in the Eaſt Indies.

The ſubſtances which admit of being japanned are almoſt every kind that are dry and rigid, or not too flexible; as wood, metals, leather, and paper prepared.

Wood and metals do not require any other preparation, but to have their ſurface perfectly even and clean: but leather ſhould be ſecurely ſtrained either on frames, or on boards; as its bending or forming folds would otherwiſe crack and force off the coats of varniſh: and paper ſhould be treated in the ſame manner, and have a previous ſtrong coat of ſome kind of ſize; but it is rarely made the ſubject of japanning till it is converted into *papier machè*, or wrought by other means into ſuch form, that its original ſtate, particularly with reſpect to flexibility, is loſt.

One principal variation from the method formerly uſed in japanning is, the uſing or omitting any priming or undercoat on the work to be japanned. In the older practice, ſuch priming was always uſed; and is at preſent retained in the French manner of japanning coaches and ſnuff-boxes of the *papier machè*: but in the Birmingham manufacture here, it has been always rejected. The advantage of uſing ſuch priming or undercoat is, that it makes a ſaving in the quantity of varniſh uſed; becauſe the matter of which the priming is compoſed fills up the inequalities of the body to be varniſhed; and makes it eaſy, by means of rubbing and water-poliſhing, to gain an even ſurface for the varniſh: and this was therefore ſuch a convenience in the caſe of wood, as the giving a hardneſs and firmneſs to the ground was alſo in the caſe of leather, that it became an eſtabliſhed method; and is therefore retained even in the inſtance of the *papier machè*, by the French, who applied the received method of japanning to that kind of work on its introduction. There is nevertheleſs this inconvenience always attending the uſe of an undercoat of ſize, that the japan coats of varniſh and colour will be conſtantly liable to be cracked and peeled off by any violence, and will not endure near ſo long as the bodies japanned in the ſame manner, but without any ſuch priming; as may be eaſily obſerved in comparing the wear of the Paris and Birmingham ſnuff-boxes; which latter, when good of their kind, never peel or crack, or ſuffer any damage, unleſs by great violence, and ſuch a continued rubbing as waſtes away the ſubſtance of the varniſh; while the japan coats of the Pariſian crack and fly off in flakes, whenever any knock or fall, particularly near the edges, expoſes them to be injured. But the Birmingham manufacturers, who originally practiſed the japanning only on metals, to which the reaſon above given for the uſe of priming did not extend, and who took up this art of themſelves as an invention, of courſe omitted at firſt the uſe of any ſuch undercoat; and not finding it more neceſſary in the inſtance of *papier machè*, than on metals, continue ſtill to reject it. On which account, the boxes of their manufacture are, with regard to the wear, greatly better than the French.

The laying on the colours in gum-water, inſtead of varniſh, is alſo another variation from the method of japanning formerly practiſed: but the much greater ſtrength of the work, where they are laid on in varniſh or oil, has occaſioned this way to be exploded with the greateſt reaſon in all regular manufactures: however, they who may practiſe japanning on cabinets, or other ſuch pieces as are not expoſed to much wear and violence, for their amuſement only, and conſequently may not find it worth their while to encumber themſelves with the preparations neceſſary for the other methods, may paint with water-colours on an undercoat laid on the wood, or other ſubſtance of which the piece to be japanned is formed; and then finiſh with the proper coats of varniſh, according to the methods below taught: and if the colours are tempered with the ſtrongeſt iſinglaſs ſize and honey, inſtead of gum-water, and laid on very flat and even, the work will not be much inferior in appearance to that done by the other method, and will laſt as long as the old japan.

Of JAPAN *Grounds*.—The proper grounds are either ſuch as are formed by the varniſh and colour, where the whole is to remain of one ſimple colour; or by the varniſh either coloured, or without colour, on which ſome painting or other decoration is afterwards to be laid. It is neceſſary, however, before we proceed to ſpeak of the particular grounds, to ſhew the manner of laying on the priming or undercoat, where any ſuch is uſed.

This priming is of the ſame nature with that called *clear-coating*, or vulgarly *clear-coaling*, practiſed erroneouſly by the houſe-painters; and conſiſts only in laying on and drying in the moſt even manner, a compoſition of ſize and whiting, or ſometimes lime inſtead of the latter. The common ſize has been generally uſed for this purpoſe: but where the work is of a nicer kind, it is better to employ the glover's or the parchment ſize; and if a third of iſinglaſs be added, it will be ſtill better, and, if not laid on too thick, much leſs liable to peel and crack. The work ſhould be prepared for this priming, by being well ſmoothed with the fiſh-ſkin or glaſs-ſhaver; and, being made thoroughly clean, ſhould be bruſhed over once or twice with hot ſize, diluted with two thirds of water, if it be of the common ſtrength. The priming ſhould then be laid on with a bruſh as even as poſſible; and ſhould be formed of a ſize, whoſe conſiſtence is betwixt the common kind and glue, mixed with as much whiting as will give it a ſufficient body of colour to hide the ſurface of whatever it is laid upon, but not more.

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If the ſurface be very clean, on which the priming is uſed, two coats of it, laid on in this manner, will be ſufficient; but if, on trial with a fine rag wet, it will not receive a proper water poliſh, on account of any inequalities not ſufficiently filled up and covered, two or more coats muſt be given it; and whether a greater or leſs number be uſed, the work ſhould be ſmoothed, after the laſt coat but one is dry, by rubbing it with the Dutch ruſhes. When the laſt coat is dry, the water poliſh ſhould be given, by paſſing over every part of it with a fine rag gently moiſtened, till the whole appear perfectly plain and even. The priming will then be completed, and the work ready to receive the painting or coloured varniſh; the reſt of the proceedings being the ſame in this caſe as where no priming is uſed.

When wood or leather is to be japanned, and no priming is uſed, the beſt preparation is to lay two or three coats of coarſe varniſh compoſed in the following manner:

" Take of rectified ſpirit of wine one pint, and of coarſe ſeed-lac and reſin each two ounces. Diſſolve the ſeed-lac and reſin in the ſpirit; and then ſtrain off the varniſh."

This varniſh, as well as all others formed of ſpirit of wine, muſt be laid on in a warm place; and, if it can be conveniently managed, the piece of work to be varniſhed ſhould be made warm likewiſe: and for the ſame reaſon all dampneſs ſhould be avoided; for either cold or moiſture chills this kind of varniſh, and prevents its taking proper hold of the ſubſtance on which it is laid.

When the work is ſo prepared, or by the priming with the compoſition of ſize and whiting above deſcribed, the proper japan ground muſt be laid on, which is much the beſt formed of ſhell-lac varniſh, and the colour deſired, if white be not in queſtion, which demands a peculiar treatment; or great brightneſs be not required, when alſo other means muſt be purſued.

The colours uſed with the ſhell-lac varniſh may be any pigments whatever which give the teint of the ground deſired; and they may be mixed together to form browns or any compound colours.

As metals never require to be undercoated with whiting, they may be treated in the ſame manner as wood or leather, when the under-coat is omitted, except in the inſtances particularly ſpoken of below.

White JAPAN *Grounds*.—The forming a ground perfectly white, and of the firſt degree of hardneſs, remains hitherto a deſideratum, or matter ſought for, in the art of japanning, as there are no ſubſtances which form a very hard varniſh, but what have too much colour not to deprave the whiteneſs, when laid on of a due thickneſs over the work.

The neareſt approach, however, to a perfect white varniſh, already known, is made by the following compoſition.

" Take flake white, or white lead, waſhed over and ground up with a ſixth of its weight of ſtarch, and then dried; and temper it properly for ſpreading with the maſtich varniſh prepared as under the article VARNISH.

" Lay theſe on the body to be japanned, prepared either with or without the under-coat of whiting, in the manner as above ordered; and then varniſh it over with five or ſix coats of the following varniſh:

" Provide any quantity of the beſt ſeed-lac; and pick out of it all the cleareſt and whiteſt grains, reſerving the more coloured and fouler parts for the coarſe varniſhes, ſuch as that uſed for priming or preparing wood or leather. Take of this picked ſeed-lac two ounces, and of gum-animi three ounces; and diſſolve them, being previouſly reduced to a groſs powder, in about a quart of ſpirit of wine; and ſtrain off the clear varniſh."

The ſeed-lac will yet give a ſlight tinge to this compoſition; but cannot be omitted where the varniſh is wanted to be hard; though, when a ſofter will anſwer the end, the proportion may be diminiſhed, and a little crude turpentine added to the gum-animi to take off the bitterneſs.

A very good varniſh, free entirely from all bitterneſs, may be formed by diſſolving as much gum-animi as the oil will take, in old nut or poppy oil; which muſt be made to boil gently when the gum is put into it. The ground of white colour itſelf may be laid on in this varniſh, and then a coat or two of it may be put over the ground; but it muſt be well diluted with oil of turpentine when it is uſed. This, though free from brittleneſs, is nevertheleſs liable to ſuffer by being indented or bruiſed by any ſlight ſtrokes; and it will not well bear any poliſh, but may be brought to a very ſmooth ſurface without, if it be judiciouſly managed in the laying it on. It is likewiſe ſomewhat tedious in drying, and will require ſome time where ſeveral coats are laid on; as the laſt ought not to contain much oil of turpentine.

Blue JAPAN *Grounds*.—Blue japan grounds may be formed of bright Pruſſian blue, or of verditer glazed over by Pruſſian blue, or of ſmalt. The colour may be beſt mixed with ſhell-lac varniſh, and brought to a poliſhing ſtate by five or ſix coats of varniſh of ſeed-lac: but the varniſh, nevertheleſs, will ſomewhat injure the colour by giving to a true blue a caſt of green, and fouling in ſome degree a warm blue by the yellow it contains: where, therefore, a bright blue is required, and a leſs degree of hardneſs can be diſpenſed with, the method before directed in the caſe of white grounds muſt be purſued.

Red JAPAN *Grounds*.—For a ſcarlet japan ground, vermilion may be uſed: but the vermilion has a glaring effect, that renders it much leſs beautiful than the crimſon produced by glazing it over with carmine or fine lake; or even with roſe-pink, which has a very good effect uſed for this purpoſe. For a very bright crimſon, nevertheleſs, inſtead of glazing with carmine, the Indian lake ſhould be uſed, diſſolved in the ſpirit of which the varniſh is compounded, which it readily admits of when good: and, in this caſe, inſtead of glazing with the ſhell-lac varniſh, the upper or poliſhing coats need only be uſed; as they will equally receive and convey the tinge of the Indian lake, which may be actually diſſolved by ſpirit of wine: and this will be found a much cheaper method than the uſing carmine. If, nevertheleſs, the higheſt degree of brightneſs be required, the white varniſhes muſt be uſed.

Yellow JAPAN *Grounds.*—For bright yellow grounds, the king's yellow, or the turpeth mineral, ſhould be employed, either alone or mixed with fine Dutch pink: and the effect may be ſtill more heightened by diſſolving powdered turmeric-root in the ſpirit of wine of which the upper or poliſhing coat is made; which ſpirit of wine muſt be ſtrained from off the dregs, before the ſeed-lac be added to it to form the varniſh.

The ſeed-lac varniſh is not equally injurious here, and with greens, as in the caſe of other colours; becauſe, being only tinged with a reddiſh yellow, it is little more than an addition to the force of the colours.

Yellow grounds may be likewiſe formed of the Dutch pink only; which, when good, will not be wanting in brightneſs, though extremely cheap.

Green JAPAN *Grounds.*—Green grounds may be produced by mixing the king's yellow and bright Pruſſian blue, or rather the turpeth mineral and Pruſſian blue; and a cheap, but fouler kind, by verdigriſe with a little of the abovementioned yellows, or Dutch pink. But where a very bright green is wanted, the cryſtals of verdigriſe, called *diſtilled verdigriſe*, ſhould be employed; and to heighten the effect, they ſhould be laid on a ground of leaf-gold, which renders the colour extremely brilliant and pleaſing.

They may any of them be uſed ſucceſsfully with good ſeed-lac varniſh, for the reaſon before given; but will be ſtill brighter with white varniſh.

Orange-coloured JAPAN *Grounds.*—Orange-coloured japan grounds may be formed by mixing vermilion or red-lead with king's yellow, or Dutch pink; or the orange-lake, which will make a brighter orange ground than can be produced by any mixture.

Purple JAPAN *Grounds.*——Purple japan grounds may be produced by the mixture of lake and Pruſſian blue; or a fouler kind, by vermilion and Pruſſian blue. They may be treated as the reſt, with reſpect to the varniſh.

Black JAPAN *Grounds to be produced without Heat.*—Black grounds may be formed by either ivory-black, or lamp-black: but the former is preferable, where it is perfectly good.

Theſe may be always laid on with ſhell-lac varniſh; and have their upper or poliſhing coats of common ſeed-lac varniſh, as the tinge or foulneſs of the varniſh can be here no injury.

Common black JAPAN *Grounds on Iron or Copper, produced by means of Heat.*——For forming the common black japan grounds by means of heat, the piece of work to be japanned muſt be painted over with drying oil; and, when it is of a moderate dryneſs, muſt be put into a ſtove of ſuch degree of heat as will change the oil black, without burning it ſo as to deſtroy or weaken its tenacity. The ſtove ſhould not be too hot when the work is put into it, nor the heat increaſed too faſt; either of which errors would make it bliſter: but the ſlower the heat is augmented, and the longer it is continued, provided it be reſtrained within the due degree, the harder will be the coat of japan. This kind of varniſh requires no poliſh, having received, when properly managed, a ſufficient one from the heat.

The fine Tortoiſe-ſhell JAPAN *Ground, produced by means of Heat.*—The beſt kind of tortoiſe-ſhell ground produced by heat is not leſs valuable for its great hardneſs, and enduring to be made hotter than boiling water without damage, than for its beautiful appearance. It is to be made by means of a varniſh prepared in the following manner:

"Take of good linſeed-oil one gallon, and of umbre half-a-pound: boil them together till the oil become very brown and thick: ſtrain it then through a coarſe cloth, and ſet it again to boil; in which ſtate it muſt be continued till it acquire a pitchy conſiſtence; when it will be fit for uſe."

Having prepared thus the varniſh, clean well the iron or copper plate, or other piece which is to be japanned; and then lay vermilion tempered with ſhell-lac varniſh, or with drying oil diluted with oil of turpentine, very thinly, on the places intended to imitate the more tranſparent parts of the tortoiſe-ſhell. When the vermilion is dry, bruſh over the whole with the black varniſh, tempered to a due conſiſtence with oil of turpentine; and when it is ſet and firm, put the work into a ſtove, where it may undergo a very ſtrong heat, and muſt be continued a conſiderable time; if even three weeks or a month, it will be the better.

This was given amongſt other receipts by Kunkel; but appears to have been neglected till it was revived with great ſucceſs in the Birmingham manufactures, where it was not only the ground of ſnuff-boxes, dreſſing-boxes, and other ſuch leſſer pieces, but of thoſe beautiful tea-waiters which have been ſo juſtly eſteemed and admired in ſeveral parts of Europe where they have been ſent. This ground may be decorated with painting and gilding, in the ſame manner as any other varniſhed ſurface, which had beſt be done after the ground has been duly hardened by the hot ſtove; but it is well to give a ſecond annealing with a more gentle heat after it is finiſhed.

Method of painting JAPAN *Work.*—Japan work ought properly to be painted with colours in varniſh; though, in order for the greater diſpatch, and, in ſome very nice works in ſmall, for the freer uſe of the pencil, the colours are ſometimes tempered in oil; which ſhould previouſly have a fourth part of its weight of gum-animi diſſolved in it; or, in default of that, of the gums ſandarac or maſtic. When the oil is thus uſed, it ſhould be well diluted with ſpirit of turpentine, that the colours may be laid more evenly and thin; by which means, fewer of the poliſhing or upper-coats of varniſh become neceſſary.

In ſome inſtances, water-colours are laid on grounds of gold, in the manner of other paintings; and are beſt, when ſo uſed, in their proper appearance, without any varniſh over them; and they are alſo ſometimes ſo managed as to have the effect of emboſſed work. The colours employed in this way, for painting, are beſt prepared by means of iſinglaſs ſize corrected with honey or ſugar-candy. The body of which the emboſſed work is raiſed, need not, however, be tinged with the exterior colour; but may be beſt formed of very ſtrong gum-water, thickened to a proper conſiſtence by bole-armenian and whiting in equal parts; which being laid on in the proper figure, and repaired when dry, may be then painted with the proper colours tempered in the iſinglaſs ſize, or in the general manner with ſhell-lac varniſh.

Manner of Varniſhing JAPAN *Work*.—The laſt and finiſhing part of japanning lies in the laying on and poliſhing the outer coats of varniſh; which are neceſſary, as well in the pieces that have only one ſimple ground of colour, as with thoſe that are painted. This is in general beſt done with common ſeed-lac varniſh, except in the inſtances and on thoſe occaſions where we have already ſhewn other methods to be more expedient: and the ſame reaſons which decide as to the fitneſs or impropriety of the varniſhes, with reſpect to the colours of the ground, hold equally with regard to thoſe of the painting: for where brightneſs is the moſt material point, and a tinge of yellow will injure it, ſeed-lac muſt give way to the whiter gums; but where hardneſs, and a greater tenacity, are moſt eſſential, it muſt be adhered to; and where both are ſo neceſſary, that it is proper one ſhould give way to the other in a certain degree reciprocally, a mixed varniſh muſt be adopted.

This mixed varniſh, as we have already obſerved, ſhould be made of the picked ſeed-lac. The common ſeed-lac varniſh, which is the moſt uſeful preparation of the kind hitherto invented, may be thus made:

“ Take of ſeed-lac three ounces, and put it into water to free it from the ſticks and filth that are freqently intermixed with it; and which muſt be done by ſtirring it about, and then pouring off the water, and adding freſh quantities in order to repeat the operation, till it be freed from all impurities, as it very effectually may be by this means. Dry it then, and powder it groſsly, and put it, with a pint of rectified ſpirit of wine, into a bottle, of which it will not fill above two-thirds. Shake the mixture well together; and place the bottle in a gentle heat, till the ſeed appear to be diſſolved; the ſhaking being in the mean time repeated as often as may be convenient: and then pour off all that can be obtained clear by this method, and ſtrain the remainder through a coarſe cloth. The varniſh thus prepared muſt be kept for uſe in a bottle well ſtopt.”

When the ſpirit of wine is very ſtrong, it will diſſolve a greater proportion of the ſeed-lac: but this will ſaturate the common, which is ſeldom of a ſtrength ſufficient for making varniſhes in perfection. As the chilling, which is the moſt inconvenient accident attending thoſe of this kind, is prevented, or produced more frequently, according to the ſtrength of the ſpirit; we ſhall therefore take this opportunity of ſhewing a method by which weaker rectified ſpirits may with great eaſe, at any time, be freed from the phlegm, and rendered of the firſt degree of ſtrength.

“ Take a pint of the common rectified ſpirit of wine, and put it into a bottle, of which it will not fill above three parts. Add to it half an ounce of pearl-aſhes, ſalt of tartar, or any other alkaline ſalt, heated red-hot, and powdered, as well as it can be without much loſs of its heat. Shake the mixture frequently for the ſpace of half an hour; before which time, a great part of the phlegm will be ſeparated from the ſpirit, and will appear, together with the undiſſolved part of the ſalts, in the bottom of the bottle. Let the ſpirit then be poured off, or freed from the phlegm and ſalts, by means of a tritorium or ſeparating funnel; and let half an ounce of the pearl-aſhes, heated and powdered as before, be added to it, and the ſame treatment repeated. This may be done a third time, if the quantity of phlegm ſeparated by the addition of the pearl-aſhes appear conſiderable. An ounce of alum reduced to powder and made hot, but not burnt, muſt then be put into the ſpirit, and ſuffered to remain ſome hours; the bottle being frequently ſhaken: after which, the ſpirit, being poured off from it, will be fit for uſe.”

The addition of the alum is neceſſary, to neutralize the remains of the alkaline ſalt or pearl-aſhes; which would otherwiſe greatly deprave the ſpirit with reſpect to varniſhes and lacquer, where vegetable colours are concerned; and muſt conſequently render another diſtillation neceſſary.

The manner of uſing the ſeed-lac or white varniſhes is the ſame, except with regard to the ſubſtance uſed in poliſhing; which, where a pure white or great clearneſs of other colours is in queſtion, ſhould be itſelf white: whereas the browner ſorts of poliſhing duſt, as being cheaper, and doing their buſineſs with greater diſpatch, may be uſed in other caſes. The pieces of work to be varniſhed ſhould be placed near a fire, or in a room where there is a ſtove, and made perfectly dry; and then the varniſh may be rubbed over them by the proper bruſhes made for that purpoſe, beginning in the middle, and paſſing the bruſh to one end; and then with another ſtroke from the middle, paſſing it to the other. But no part ſhould be croſſed or twice paſſed over, in forming one coat, where it can poſſibly be avoided. When one coat is dry, another muſt be laid over it; and this muſt be continued at leaſt five or ſix times, or more, if on trial there be not a ſufficient thickneſs of varniſh to bear the poliſh, without laying bare the painting or the ground colour underneath.

When a ſufficient number of coats is thus laid on, the work is fit to be poliſhed: which muſt be done, in common caſes, by rubbing it with a rag dipped in Tripoli or pumice-ſtone, commonly called *rotten ſtone*, finely powdered: but towards the end of the rubbing, a little oil of any kind ſhould be uſed along with the powder; and when the work appears ſufficiently bright and gloſſy, it ſhould be well rubbed with the oil alone, to clean it from the powder, and give it a ſtill brighter luſtre.

In the caſe of white grounds, inſtead of the Tripoli or pumice-ſtone, fine putty or whiting muſt be uſed; both which ſhould be waſhed over to prevent the danger of damaging the work from any ſand or other gritty matter that may happen to be commixed with them.

It is a great improvement of all kinds of japan work, to harden the varniſh by means of heat; which, in every degree that it can be applied ſhort of what would burn or calcine the matter, tends to give it a more firm and ſtrong texture. Where metals form the body, therefore, a very hot ſtove may be uſed, and the pieces of work may be continued in it a conſiderable time; eſpecially if the heat be gradually increaſed: but where wood is in queſtion, heat muſt be ſparingly uſed, as it would otherwiſe warp or ſhrink the body, ſo as to injure the general figure.

JAQUELOT (Iſaac), a celebrated French Proteſtant divine, born in 1647 at Vaſſy in Champagne, where his father was miniſter. The revocation of the edict of Nantz obliging him to quit France, he took refuge firſt at Heidelberg, and then at the Hague, where he procured an appointment in the Walloon church. Here he continued till that capital was taken by the king of Pruſſia, who, hearing him preach, made him his French miniſter in ordinary at Berlin; to which city he removed in 1702. While he lived at Berlin, he entered into a warm controverſy with M. Bayle on the doctrine advanced in his dictionary favouring manichæiſm, which continued until death impoſed ſilence on both parties: and it was in this diſpute that M. Jaquelot openly declared in favour of the Remonſtrants. He wrote, among other works, 1. *Diſſertations ſur l'exiſtence de Dieu.* 2. *Diſſertations ſur le Meſſie.* 3. *Lettres a Meſſieures les Prelats de l'Egliſe Gallicane.* He was employed in finiſhing an important work upon the divine authority of the holy ſcriptures, when he died ſuddenly, in 1708, aged 61.

JAR, or Jarr, an earthen pot or pitcher, with a big belly and two handles.—The word comes from Spaniſh *jarra*, or *jarro*, which ſignify the ſame.

Jar is uſed for a ſort of meaſure or fixed quantity of divers things.—The *jar* of oil is from 18 to 26 gallons; the *jar* of green ginger, is about 100 pound weight.

JARCHI (Solomon), otherwiſe *Raſchi* and *Iſaaki Solomon*, a famous rabbi, born at Troyes in Champagne, who flouriſhed in the 12th century. He was a perfect maſter of the talmud and gemara; and he filled the poſtils of the bible with ſo many talmudical reveries, as totally extinguiſhed both the literal and moral ſenſe of it. A great part of his commentaries are printed in Hebrew, and ſome have been tranſlated into Latin by the Chriſtians. They are all greatly eſteemed by the Jews, who have beſtowed on the author the title of *prince of commentators*.

JARIMUTH, Jarmuth, or *Jerimoth*, Joſh. xv. a town reckoned to the tribe of Judah, four miles from Eleutheropolis, weſtward, (Jerome). Thought to be the ſame with Ramoth and Remeth, Joſhua xix. and Nehem. x. 2. (Reland).

JARNAC, a town of France, in Orleanois and in Angumois, remarkable for a victory gained by Henry III. over the Huguenots in 1569. It is ſeated on the river Charente, in W. Long. 0. 13. N. Lat. 45. 40.

JAROSLOW, a handſome town of Poland, in the palatinate of Ruſſia, with a ſtrong citadel. It is remarkable for its great fair, its handſome buildings, and a battle gained by the Swedes in 1656, after which they took the town. It is ſeated on the river Saine, in E. Long. 22. 23. N. Lat. 49. 58.

JASHER (The book of). This is a book which Joſhua mentions, and refers to, in the following paſſage: "And the ſun ſtood ſtill, and the moon ſtayed, until the people had avenged themſelves upon their enemies: is not this written in the book of Jaſher?"

It is difficult to determine what this *book of Jaſher*, or "the upright," is. St Jerom and the Jews believed it to be Geneſis, or ſome other book of the Pentateuch, wherein God foretold he would do wonderful things in favour of his people. Huetius ſuppoſes it was a book of morality, in which it was ſaid that God would ſubvert the courſe of nature in favour of thoſe who put their truſt in him. Others pretend, it was public annals, or records, which were ſtyled *juſtice* or *upright*, becauſe they contained a faithful account of the hiſtory of the Iſraelites. Grotius believes, that this book was nothing elſe but a ſong, made to celebrate this miracle and this victory. This ſeems the more probable opinion, becauſe the words cited by Joſhua as taken from this work, "Sun, ſtand thou ſtill upon Gibeon, and thou moon in the valley of Ajalon," are ſuch poetical expreſſions as do not ſuit with hiſtorical memoirs; beſides that in the 2d book of Samuel (i. 18.) mention is made of a book under the ſame title, on account of a ſong made on the death of Saul and Jonathan.

JASMINE. See Jasminum.

Arabian Jasmine. See Nyctanthes.

JASMINUM, Jasmine, or *Jeſſamine-tree*; a genus of the monogynia order, belonging to the diandria claſs of plants.

Species. 1. The officinalis, or common white jaſmine, hath ſhrubby long ſlender ſtalks and branches, riſing upon ſupport 15 or 20 feet high, with numerous white flowers from the joints and ends, of a very fragrant odour. There is a variety with white-ſtripped, and another with yellow-ſtripped leaves. 2. The fruticans, or ſhrubby yellow jaſmine, hath ſhrubby, angular, trailing ſtalks and branches, riſing upon ſupport eight or ten feet high; trifoliate and ſimple alternate leaves; with yellow flowers from the ſides and ends of the branches, appearing in June; frequently producing berries of a black colour. This ſpecies is remarkable for ſending up many ſuckers from its roots; often ſo plentifully as to overſpread the ground, if not taken up annually. 3. The humilis, or dwarf yellow jaſmine, hath ſhrubby firm ſtalks, and angular branches, of low, ſomewhat robuſt and buſhy growth; broad, trifoliate, and pinnated leaves; and large yellow flowers in July, ſometimes ſucceeded by berries. 4. The grandiflorum, or great-flowered Catalonian jaſmine, hath a ſhrubby firm upright ſtem, branching out into a ſpreading head from about three to ſix or eight feet high, with large flowers of a bluſh-red colour without, and white within, appearing from July to November. Of this there is a variety with ſemi-double flowers, having two ſeries of petals. 5. The azoricum, or azorian white jaſmine, hath ſhrubby, long ſlender ſtalks and branches, riſing upon ſupport 15 or 20 feet high, with pretty large flowers of a pure white colour; coming out in looſe bunches from the ends of the branches, and appearing moſt part of the ſummer and autumn. 6. The odoratiſſimum, or moſt ſweet-ſcented yellow Indian jaſmine, hath a ſhrubby upright ſtalk branching erect, without ſupport, ſix or eight feet high, with bright yellow flowers in bunches from the ends of the branches; flowering from July till October, and emitting a moſt fragrant odour.

Culture. The three firſt ſpecies are ſufficiently hardy to thrive in this climate without any ſhelter. They may be eaſily propagated by layers and cuttings; and the ſtripped varieties by grafting or budding on ſtocks of the common kind.—The other three ſpecies, which are tender, may alſo be increaſed by layers, or ſeeds, or by grafting and budding them upon the common white and ſhrubby yellow jaſmine. They require ſhelter in a green-houſe in winter, and therefore muſt always be kept in pots to move them out and in occaſionally. The pots muſt be filled with light, rich earth, frequently watered in ſummer, and about once a week in winter, but always moderately during that ſeaſon. Prune off all the decayed wood at any time when it appears, and ſhorten or retrench the rambling ſhoots as you ſee occaſion, to preſerve the heads ſomewhat regular; managing them in other reſpects as the common green-houſe plants.

JASON, the Greek hero who undertook the Argonautic expedition, the hiſtory of which is obſcured by fabulous traditions, flouriſhed about 937 B. C.

JASPER, in natural hiſtory, a genus of ſcrupi, of a complex irregular ſtructure, of a great variety of colours, and emulating the appearance of the finer marbles, or ſemipellucid gems.

The great characteriſtic of jaſpers is, that they all readily ſtrike fire with ſteel, and make not the leaſt efferveſcence with aquafortis.

Jaſpers, though commonly reckoned among the precious ſtones, ought undoubtedly to be ranged among the ſcrupi; being only opake cryſtalline maſſes, variouſly debaſed with an earthy admixture: and to this laſt ingredient it is that they owe all their variety of colours, as white, green, red, brown, and bluiſh.

The ſeveral kinds of nephritic ſtone, and the lapis divinus or jade, are all genuine jaſpers; but the hard, bright, green jaſper of the Eaſt Indies, ſeems to be the true kind. It is found in maſſes of various ſizes and ſhapes: but the more uſual ſtandard as to ſize is between four and ſix inches in diameter; tho' there are maſſes of it found of a foot or more in diameter, and others no larger than a horſe-bean. It is generally ſimple and unmixed; but if it be variegated at all, it is always with white; and this is diſpoſed not in ſtreaks or veins, but in clouds. It is capable of a very fine poliſh; and, when the white clouds are well diſpoſed, is very beautiful; and, in pieces not too thick, is tolerably pellucid when held up againſt the light.

JASPONYX, in natural hiſtory, the pureſt horn coloured onyx, with beautiful green zones, which are compoſed of the genuine matter of the fineſt jaſpers. See Jasper and Onyx.

JATROPHA, the cassada-plant; a genus of the monodelphia order, belonging to the monœcia claſs of plants. There are ſeven ſpecies; the moſt remarkable of which is the manihot or manioc, the root of which is naturally poiſonous, but may be deprived of that quality, and made into bread; and as ſuch is uſed both in Africa and America, though it hath been diſputed whether the plant is really a native of the latter country, or imported to it from Africa. The ſhrub riſes ſeven or eight feet high, with a thin bark, that is grey, red, or violet, according to the different colours of the wood which it covers. The trunk and branches are filled with ſmall prominences or knots, exhibiting the veſtigia of the fallen leaves; for as the tree increaſes in height, the leaves relinquiſh the bottom of the branches, and are only to be found near the top. The wood is ſoft and brittle. The plant is better propagated by layers than from ſeed; at leaſt, little of the root proper for eating is to be obtained by the latter method. The principal root produces ſuckers, in number from four to ſeven, and of different length and thickneſs, according to the age of the tree and goodneſs of the ſoil. The bark of the roots is like that of the trunk, grey, when the wood is grey; red, when red; white, when white: but the inſide or heart is always white, and of the conſiſtence of turnip.

The roots of white manioc are ripe in eight months; thoſe of the other kind require 14 or 18 months to attain their full ſize and maturity. When ripe, they are plucked out of the earth by tearing up the whole tree, which never fails to be accompanied by the root; and if in that operation any of the offsets ſhould be ſeparated from the main root, which is eaſily obſerved, they take them up with a hoe. It requires no great force to pluck up theſe ſhrubs; for, beſides that the ſoil is of a ſoft nature, the roots do not penetrate very deep into it.

When plucked up, the negroes deſtined for this work grate or raſp the bark with a blunt knife, as is done to turnips, and then throw them into a tub full of water. They are then reduced to a powder or meal, reſembling the coarſe ſawings of wood: this is effected by rubbing the root very forcibly againſt a copper file or grater, about 15 or 18 inches long, and 10 or 12 broad, that is faſtened by ſmall nails upon a plank of timber, three feet and a half long and one broad. The negro, who files, puts one end of the plank into a wooden trough or tub, and holds the other againſt his ſtomach; at his ſide is a baſket, containing roots that are raſped, waſhed, and fit for being filed; one of theſe he takes in each hand, and paſſes it violently upon the file or grater, till it is reduced to a rough powder.

All the roots being grated in this manner, they take the powder and put it into a preſs, with a view to ſqueeze out the juice, which is regarded as a very ſtrong poiſon, not only for men, but for beaſts alſo, who drink of it, or chance to eat of theſe roots before the juice is expreſſed. It is remarkable, that animals which die in conſequence of having ſwallowed any quantity of this ſubſtance, have their breaſts prodigiouſly ſwelled, without any viſible alteration on the noble parts. Some have hence argued, that the juice in queſtion is not eſſentially a poiſon; but that, poſſeſſing a ſuperfluity of nouriſhment, it proves an overmatch to the digeſtive faculties, and thus proves mortal.

Beſides this ſuper-abundance of nouriſhment, ſays father Labat, a part of its malignity conſiſts in its coldneſs, which ſtops the circulation, benumbs the animal-ſpirits, and at length cauſes death: hence the beſt antidote againſt this poiſon is heat and violent motion. The patient, after ſwallowing large quantities of oil, to excite a nauſea and vomiting, is made to run as quick as he can, and drink plentifully of the ſtrongeſt ſpirits; in fine, every method is uſed to excite violent heat, to rouſe the ſpirits, and put the blood in motion.

Animals which have accuſtomed themſelves inſenſibly to the juice of manioc, feel no inconvenience from the root of it, but rather the contrary. It is in this manner that the Turks, by a gradual and conſtant uſe, have rendered opium a harmleſs and even exhilarating medicine.

The juice of manioc loſes its malignity when heated. The natives of the Weſt-Indies, who uſe it in all their ſauces, feel no ſort of inconvenience from it, becauſe they never uſe it till after being boiled. Of the ſame juice they make ſtarch, by drying it in the ſun, where it becomes as white as ſnow, and is frequently made into cakes, which are as delicate as if made with the fineſt wheat-flour.

When the manioc is ſufficiently preſſed, they either make it into bread, called *caſſada*, or into flour for preſerving. For the firſt-mentioned purpoſe, they have a plate of iron, two feet broad and half an inch thick; this they place upon a tripod, or on ſtones, and kindle a fire below it. When ſufficiently heated, ſo as not to admit of the touch, they lay on the whole ſurface about the thickneſs of three fingers of manioc, which has been previouſly preſſed and ſifted. The heap falls down in proportion as it roaſts, and the parts join and incorporate. This compreſſion and incorporation is aided by the perſon who roaſts, ſlightly paſſing a piece of wood over the plate. When the ſide of the cake next the plate is ſufficiently done, that is, adheres, and the colour, formerly very white, becomes red, it is turned; and the other ſide allowed to roaſt till the ſame ſymptoms appear. When roaſted, it is laid in the ſun for two or three hours, with a view to diſſipate any poiſonous humidity, which may ſtill lurk in the root under this new form.

The inſide of caſſada is as white as ſnow, the ſides of a pale gold colour; the ſubſtance, which is very nouriſhing, and of eaſy digeſtion, may be preſerved ſeven or eight months, or more, provided it is kept dry and ſometimes expoſed to the ſun. When dipped in water, or put in ſoup, caſſada ſwells up to a great height, which ſeems to prove its great abundance in ſubſtance.

The other mode of preparation, however, is moſt common, as being more convenient for preſerving, diſtributing to the negroes, and tranſporting from place to place. The manioc, in this caſe, is put into a pan or ſtove that is but ſlightly heated, where it is continually turned, like coffee-beans, with a ſmall wooden inſtrument contrived for that purpoſe. This motion prevents it from ſticking to the pan; ſo that, when dried and roaſted, it has the appearance of thick red grains of ſalt. This mode of preparation is much more expeditious than the former. When dried, it is put in granaries, where it may be preſerved whole years, if kept dry, or put into a ſtove every ſix months.

This ſubſtance may be eat quite dry, as crumbled bread, or as the Turks eat roaſted rice. When moiſtened, it ſwells prodigiouſly.

This latter method of preparing manioc is never practiſed by the natives, who uſe only caſſada, which they prepare once every day, or oftener, as occaſion requires; for they eat it quite hot, as being then more delicate and agreeable to the taſte. Before their intercourſe with the Europeans had procured them iron plates, they made their caſſada upon large flat ſtones, whoſe thickneſs they adjuſted to that purpoſe. In default of copper files or grates, they made uſe of a plank of wood, in which were fixed very ſmall ſharp bits of pebbles.

One ſort of manioc is ſaid to be exempt from the poiſonous quality poſſeſſed by the juice of the others. It is called *camoniac*, that is, chief of maniocs: in fact, its wood, leaves, and roots, are larger and thicker than the others, and it is eaten without danger, or any precaution; but as it is longer of growing and ripening, and the roots yield much leſs meal, becauſe lighter and more ſpungy, it is generally neglected.

The ſmall bits of manioc which have eſcaped the grater, and the clods which have not paſſed the ſieve, are not uſeleſs. They are dried in the ſtove after the flour is roaſted, and then pounded in a mortar to a fine white powder, with which they make ſoup. It is likewiſe uſed for making a kind of thick coarſe caſſada, which is roaſted till almoſt burnt; of this, fermented with molaſſes and Weſt-India potatoes, they prepare a much eſteemed drink or beverage called *ouycou*. This liquor, the favourite drink of the natives, is ſometimes made extremely ſtrong, eſpecially on any great occaſion, as a feaſt; with this they get intoxicated, and, remembering their old quarrels, maſſacre and murder each other. Such of the inhabitants and workmen as have not wine, drink ouycou. It is of a red colour, ſtrong, nouriſhing, refreſhing, and eaſily inebriates the inhabitants, who ſoon accuſtom themſelves to it as eaſily as beer.—The leaves of manioc are uſed in both Indies, as thoſe of ſpinnage are with us.

JAVA, a large iſland of the Eaſt Indies, lying between 105° and 116° E. Long. and from 6° to 8° S. Lat. extending in length 700 miles, and in breadth about 100. It is ſituated to the ſouth of Borneo, and ſouth-eaſt from the peninſula of Malacca, having Sumatra lying before it, from which it is ſeparated by a narrow paſſage, now ſo famous in the world by the name of the *Straits of Sunda*. The country is mountainous and woody in the middle; but a flat coaſt, full of bogs and marſhes, renders the air unhealthful. It produces pepper, indigo, ſugar, tobacco, rice, coffee, cocoa-nuts, plaintains, cardamoms, and other tropical fruits. Gold alſo, but in no great quantities, hath been found in it. It is diverſified by many mountains, woods, and rivers; in all which nature has very bountifully beſtowed her treaſures. The mountains are many of them ſo high as to be ſeen at the diſtance of three or four leagues. That which is called the *Blue Mountain* is by far the higheſt of them all, and ſeen the fartheſt off at ſea. They have frequent and very terrible earthquakes in this iſland, which ſhake the city of Batavia and places adjacent, to ſuch a degree, that the fall of the houſes is expected every moment. The waters in the road are exceſſively agitated, inſomuch that their motion reſembles that of a boiling pot; and in ſome places the earth opens, which affords a ſtrange and terrible ſpectacle. The inhabitants are of opinion, that theſe earthquakes proceed from the mountain Parang, which is full of ſulphur, ſaltpetre, and bitumen. The fruits and plants of this iſland are all in their ſeveral kinds excellent, and almoſt out of number. There are abundance of foreſts ſcattered over it, in which are all kinds of wild beaſts, ſuch as buffaloes, tygers, rhinoceroſes, and wild horſes, with an infinite variety of ſerpents, ſome of them of an enormous ſize. Crocodiles are prodigiouſly large in Java, and are found chiefly about the mouths of rivers; for, being amphibious animals, they delight moſtly in marſhes and ſavannahs. This creature, like the tortoiſe, lays its eggs in the hot ſands, without taking any further care of them; and the ſun hatches them at the proper ſeaſon, when they run inſtantly into the water. There is, in ſhort, no kind of animal wanting here: fowls they have of all ſorts, and exquiſitely good, eſpecially peacocks, partridges, pheaſants, wood-pigeons: and, for curioſity, they have the Indian bat, which differs little in form from ours; but its wings, when extended, meaſure a full yard, and the body of it is of the ſize of a rat. They have fiſh in great plenty, and very good; ſo that for the value of three-pence there may be enough bought to dine ſix or ſeven men. They have likewiſe a multitude of tortoiſes, the fleſh of which is very little inferior to veal, and there are many who think it better.

It is ſaid, that there are in the iſland upwards of 40 great towns, which, from the number of their inhabitants, would, in any other part of the world, merit the title of *cities;* and more than 4,500 villages, beſides hamlets, and ſtraggling houſes, lying very near each other, upon the ſea-coaſt, and in the neighbourhood of great towns: ſo that, upon a fair and moderate computation, there are within the bounds of the whole iſland, taking in perſons of both ſexes, and of all ranks and ages, more than thirty millions of ſouls; ſo that it is thrice as populous as France, which, though twice as big, is not computed to have more than twenty millions of inhabitants.

There are a great many princes in the iſland, of which the moſt conſiderable are, the emperor of Materan, who reſides at Kataſura, and the kings of Bantam and Japara. Upon the firſt of theſe many of the petty princes are dependant; but the Dutch are abſolute maſters of the greateſt part of the iſland, particularly of the north coaſt, though there are ſome of the princes beyond the mountains, on the ſouth coaſt, who ſtill maintain their independency. The natives of the country, who are eſtabliſhed in the neighbourhood of Batavia, and for a tract of about 40 leagues along the mountains of the country of Bantam, are immediately ſubject to the governor-general. The company ſend droſſards, or commiſſaries, among them, who adminiſter juſtice and take care of the public revenues.

The city of Batavia is the capital not only of this iſland, but of all the Dutch dominions in India. It is an exceeding fine city, ſituated in the latitude of 6° ſouth, at the mouth of the river Jucatra, and in the boſom of a large commodious bay, which may be conſidered not only as one of the ſafeſt harbours in India, but in the world. The city is ſurrounded by a rampart, 21 feet thick, covered on the outſide with ſtone, and fortified with 22 baſtions. This rampart is environed by a ditch 45 yards over, and full of water, eſpecially when the tides are high, in the ſpring. The avenues to the town are defended by ſeveral forts, each of which is well furniſhed with excellent braſs cannon: no perſon is ſuffered to go beyond theſe forts without a paſſport. The river Jucatra paſſes through the midſt of the town, and forms 15 canals of running water, all faced with free-ſtone, and adorned with trees that are ever green: over theſe canals are 56 bridges, beſides thoſe which lie without the town. The ſtreets are all perfectly ſtraight, and each, generally ſpeaking, 30 feet broad. The houſes are built of ſtone, after the manner of thoſe in Holland. The city is about a league and a half in circumference, and has five gates; but there are ten times the number of houſes without that there are within it. There is a very fine town-houſe, four Calviniſt churches, beſides other places of worſhip for all ſorts of religions, a ſpin-huys or houſe of correction, an orphan-houſe, a magazine of ſea-ſtores, ſeveral for ſpices, with wharfs and cord-manufactures, and many other public buildings. The garriſon conſiſts commonly of between 2000 and 3000 men. Beſides the forts mentioned above, there is the citadel of Batavia, a very fine regular fortification, ſituated at the mouth of the river, and flanked with four baſtions; two of which command the ſea, and the other two the town. It is in this citadel that the governor-general of the Indies has his palace; over-againſt which is that of the director-general, who is the next perſon to the governor. The counſellors, and other principal officers of the company, have alſo their apartments there; as have likewiſe the phyſician, the ſurgeon, and the apothecary. There are in it, beſides, arſenals and magazines, furniſhed with ammunition for many years. The city of Batavia is not only inhabited by Dutch, French, Portugueſe, and other Europeans, eſtabliſhed here on account of trade; but alſo by a vaſt number of Indians of different nations, Javaneſe, Chineſe, Malayans, Negroes, Amboyneſe, Armenians, natives of the iſle of Bali, Mardykers or Topaſſes, Macaſſers, Timors, Bougis, &c. Of the Chineſe, there are, it is ſaid, about 100,000 in the iſland; of which, near 30,000 reſided in the city till the year 1740, when the Dutch, pretending that they were in a plot againſt them, ſent a body of troops into their quarter, and demanded their arms, which the Chineſe readily delivered up; and the next day the governor ſent another body, with orders to murder and maſſacre every one of the Chineſe, men, women, and children. Some relate there were 20,000, others 30,000, that were put to death, without any manner of trial: and yet the barbarous governor, who was the inſtrument of this cruel proceeding, had the aſſurance to embark for Europe, imagining he had amaſſed wealth enough to ſecure him againſt any proſecution in Holland; but the Dutch, finding themſelves deteſted and abhorred by all mankind for this piece of tyranny, endeavoured to throw the odium of it upon the governor, though he had the hands of all the council of Batavia, except one, to the order for the maſſacre. The ſtates, therefore, diſpatched a packet to the Cape of Good Hope, containing orders to apprehend the governor, and ſend him back to Batavia to be tried. He was accordingly apprehended at the Cape; but has never been heard of ſince. It is ſuppoſed, he was thrown over-board in his paſſage to Batavia, that there might be no farther inquiries into the matter; and, it is ſaid, all the wealth this merciful gentleman had amaſſed, and ſent over before him in four ſhips, was caſt away in the paſſage.

Beſides the garriſon here, the Dutch, it is ſaid, have about 15,000 men in the iſland, either Dutch, or formed out of the ſeveral nations they have enſlaved;

ſlaved; and they have a fleet of between 20 and 30 men of war, with which they give law to every power on the coaſt of Aſia and Africa, and to all the European powers that viſit the Indian Ocean, unleſs we ſhould now except the Britiſh: it was, however, but a little before the revolution, that they expelled us from our ſettlement at Bantam.

JAVELIN, in antiquity, a ſort of ſpear five feet and an half long; the ſhaft of which was of wood, with a ſteel point.—Every ſoldier in the Roman armies had ſeven of theſe, which were very light and ſlender.

JAVELLO (Chryſoſtome), a learned Italian Dominican of the 16th century, taught philoſophy and theology at Bologna, and died about the year 1540. He wrote a work on philoſophy, another on politics, and another on Chriſtian œconomy, which are eſteemed; with notes on Pomponatius, and other works, printed in 3 vols folio.

JAWER, a city of Sileſia, capital of a province of the ſame name, with a citadel, and a large ſquare ſurrounded with piazzas. It is 12 miles ſouth-eaſt of Lignitz, 30 ſouth-weſt of Breſlau, and 87 eaſt of Prague. E. Long. 16. 29. N. Lat. 50. 56.

JAUNDICE. See (the *Index* ſubjoined to) MEDICINE.

JAW, in anatomy. See there, n° 19, 25.

Locked JAW, in medicine. See (the *Index* ſubjoined to) MEDICINE.

JAY (Guy Michael le), a French gentleman, who diſtinguiſhed himſelf by cauſing a polyglot bible to be printed at his own expence in 10 vols folio: but he ruined himſelf by that impreſſion, firſt becauſe he would not ſuffer it to appear under the name of cardinal Richelieu, who, after the example of cardinal Ximenes, was ambitious of eternizing his name by this means; and next, becauſe he made it too dear for the Engliſh market; on which Dr Walton undertook his polyglot bible, which, being more commodious, reduced the price of Mr le Jay's. After the death of his wife, M. le Jay took orders, was made dean of Vezelay in the Nivernois, and Lewis XIV. gave him the poſt of counſellor of ſtate.

JAZER, or JASER, (anc. geog.), a Levitical city in the territory of the Amorrhites beyond Jordan, 10 miles to the weſt, or rather ſouth-weſt, of Philadelphia, and 15 miles from Eſebon; and therefore ſituated between Philadelphia and Heſhbon, on the eaſt border of the tribe of Gad, ſuppoſed to be the *Jazorem* of Joſephus. In Jeremiah xlviii. mention is made of the ſea of Jazer, that is a lake; taken either for an effuſion or overflowing of the Arnon, or a lake thro' which it paſſes, or from which it takes its riſe.

IBERIS, SCIATICA CRESS, or *Candy-tuft*; a genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants.

Species. 1. The umbellata, or common candy-tuft, hath herbaceous, ſhort, round, and very branchy ſtalks of tufty growth, from about ſix to eight or ten inches high; ſmall ſpear-ſhaped leaves, the lower ones ſerrated, the upper entire; and all the ſtalks and branches terminated by umbellate cluſters of flowers of different colours in the varieties. 2. The amara, or bitter candy-tuft, hath ſtalks branching like the former, which riſe from eight to ten or twelve inches high; ſmall, ſpear-ſhaped, and ſlightly indented leaves; and all the branches terminated by racemoſe bunches of white flowers in June and July. 3. The ſempervirens, commonly called *tree candy-tuft*, hath low underſhrubby ſtalks very branchy and buſhy, riſing to the height of 10 or 12 inches, with white flowers in umbels at the ends of the branches, appearing great part of the ſummer. 4. The ſemperflorens, or ever-flowering ſhrubby iberis, hath low underſhrubby ſtalks very branchy, growing to the height of 18 inches, with white flowers in umbels at the ends of the branches, appearing at all times of the year.

Culture. The two firſt kinds, being hardy annuals, may be ſowed in any common ſoil in the month of March, or from that time till midſummer, and will thus afford a ſucceſſion of flowers from June to September, which are ſucceeded by great plenty of ſeeds. The other two are ſomewhat tender; and therefore muſt be planted in pots, in order to be ſheltered from the winter froſts. They are eaſily propagated by ſlips or cuttings.

IBEX, in zoology. See CAPRA.

IBIS, in ornithology. See TANTALUS.

IBYCUS, a Greek lyric poet, of whoſe works there are only a few fragments remaining, flouriſhed 550 B. C. It is ſaid, that he was aſſaſſinated by robbers; and that, when dying, he called upon ſome cranes he ſaw flying to bear witneſs. Some time after, one of the murderers ſeeing ſome cranes, ſaid to his companions, "There are the witneſſes of Ibycus's death:" which being reported to the magiſtrates, the aſſaſſins were put to the torture, and having confeſſed the fact, were hanged. Thence aroſe the proverb *Ibyci Grues*.

ICE, in phyſiology, a ſolid, tranſparent, and brittle body, formed of ſome fluid, particularly water, by means of cold. See FROST.

The younger Lemery obſerves, that ice is only a re-eſtabliſhment of the parts of water in their natural ſtate; that the mere abſence of fire is ſufficient to account for this re-eſtabliſhment; and that the fluidity of water is a real fuſion, like that of metals expoſed to the fire; differing only in this, that a greater quantity of fire is neceſſary to the one than the other. Galileo was the firſt that obſerved ice to be lighter than the water which compoſed it: and hence it happens, that ice floats upon water, its ſpecific gravity being to that of water as eight to nine. This rarefaction of ice ſeems to be owing to the air-bubbles produced in water by freezing; and which, being conſiderably large in proportion to the water frozen, render the body ſo much ſpecifically lighter: theſe air-bubbles, during their production, acquire a great expanſive power, ſo as to burſt the containing veſſels, tho' ever ſo ſtrong. See CONGELATION, COLD, &c.

M. Mairan, in a diſſertation on ice, attributes the increaſe of its bulk chiefly to a different arrangement of the parts of the water from which it is formed; the icy ſkin on the water being compoſed of filaments which are found to be conſtantly and regularly joined at an angle of 60°; and which, by this angular diſpoſition, occupy a greater volume than if they were parallel. He found the augmentation of the volume of water by freezing, in different trials, a 14th, an 18th, a 19th, and, when the water was previouſly purged of air, only a 22d part: that ice, even after its formation, continues to expand by cold; for, after water had been frozen to ſome thickneſs, the fluid part being let out by a hole in the bottom of the veſſel, a continuance of the cold made the ice convex; and a piece of ice which was at firſt only a 14th part ſpecifically lighter than water, on being expoſed ſome days to the froſt, became a 12th part lighter. To this cauſe he attributes the burſting of ice on ponds.

Wax, reſins, and animal-fats, made fluid by fire, inſtead of expanding like watery liquors, ſhrink in their return to ſolidity: for ſolid pieces of the ſame bodies ſink to the bottom of the reſpective fluids; a proof that theſe bodies are more denſe in their ſolid than in their fluid ſtate. The oils which congeal by cold, as oil-olive, and the eſſential oil of aniſeeds, appear alſo to ſhrink in their congelation. Hence, the different diſpoſitions of different kinds of trees to be burſt by, or to reſiſt, ſtrong froſts, are by ſome attributed to the juices with which the tree abounds; being in the one caſe watery, and in the other reſinous or oily.

Ice-*Houſe*, a building contrived to preſerve ice for the uſe of a family in the ſummer-ſeaſon.

Ice-houſes are more generally uſed in warm countries than with us; particularly in Italy, where the meaneſt perſon who rents a houſe, has his vault or cellar for ice.

As to the ſituation, it ought to be placed upon a dry ſpot of ground; becauſe wherever there is moiſture, the ice will melt: therefore in all ſtrong lands which retain the wet, too much pains cannot be taken to make drains all round them. The place ſhould alſo be elevated, and as much expoſed to the ſun and air as poſſible.

As to the figure of the building, that may be according to the fancy of the owner; but a circular form is moſt proper for the well in which the ice is to be preſerved, which ſhould be of a ſize and depth proportionable to the quantity to be kept: for it is proper to have it large enough to contain ice for two years conſumption; ſo that if a mild winter ſhould happen, in which little or no ice is to be had, there may be a ſtock to ſupply the want. At the bottom of the well, there ſhould be a ſpace of about two feet deep, left to receive any moiſture that may drain from the ice; over this ſpace ſhould be placed a ſtrong wooden grate, and from thence a ſmall drain ſhould be laid under ground to carry off the wet. The ſides of the well ſhould be built with brick or ſtone, at leaſt two bricks thick; for the thicker it is, the leſs danger there will be of the well being affected by any external cauſe. When the wall is brought up within three feet of the ſurface, there ſhould be another outer arch or wall begun, which ſhould be carried up to the height of the top of the intended arch of the well; and if there be a ſecond arch turned over this wall, it will add to the goodneſs of the houſe: the roof muſt be high enough above the inner arch to admit of a door-way to get out the ice. If the building is to be covered with ſlates or tiles, reeds ſhould be laid conſiderably thick under them, to keep out the ſun and external air; and if theſe reeds are laid the thickneſs of ſix or eight inches, and plaſtered over with lime and hair, there will be no danger of the heat getting through them. The external wall may be built in what form the proprietor pleaſes; and as theſe ice-houſes are placed in gardens, they are ſometimes ſo contrived as to have an handſome alcove-ſeat in front, with a ſmall door behind it, through which a perſon might enter to take out the ice; and a large door on the other ſide, fronting the north, with a porch wide enough for a ſmall cart to back, in order to ſhoot down the ice near the mouth of the well, which need not be more than two feet diameter, and a ſtone ſo contrived as to ſhut it up in the exacteſt manner: all the vacant ſpace above and between this and the large door ſhould be filled up with barley-ſtraw. The building thus finiſhed, ſhould have time to dry before the ice is put into it.

It is to be obſerved, that upon the wooden grate, at the bottom of the well, there ſhould be laid ſome ſmall faggots; and if upon theſe a layer of reeds is placed ſmooth for the ice to lie upon, it will be better than ſtraw, which is commonly uſed. As to the choice of the ice, the thinner it is, the eaſier it may be broken to powder; for the ſmaller it is broken, the better it will unite when put into the well. In putting it in, care muſt be taken to ram it as cloſe as poſſible; and alſo to allow a vacancy of two inches, all round, next the ſide of the well, to give paſſage to any moiſture occaſioned by the melting of ſome of the ice. When the ice is put into the well, if a little ſalt-petre be mixed with it at every ten inches or a foot in thickneſs, it will cauſe it to unite more cloſely into a ſolid maſs.

Ice-*Iſland*, a name given by ſailors to a great quantity of ice collected into one huge ſolid maſs, and floating about upon the ſeas near or within the Polar Circles.—Many of theſe fluctuating iſlands are met with on the coaſts of Spitzbergen, to the great danger of the ſhipping employed in the Greenland fiſhery. Towards the South Pole, they are ſtill more numerous and formidable; but for a particular account of theſe iſlands and their formation, ſee the articles North-*Sea* and South-*Sea*.

ICELAND, a large iſland lying in the northern part of the Atlantic Ocean, between 63 and 68 degrees of north latitude, and between 10 and 26 degrees of weſt longitude, its greateſt length being about 700 miles, and its breadth 300.

1
General account of the country.

This country lying partly within the frigid zone, and being liable to be ſurrounded with vaſt quantities of ice which come from the Polar Seas, is on account of the coldneſs of its climate very inhoſpitable; but much more ſo for other reaſons. It is exceedingly ſubject to earthquakes; and ſo full of volcanoes, that the little part of it which appears fit for the habitation of man ſeems almoſt totally laid waſte by them. The beſt account that hath yet appeared of the iſland of Iceland is in a late publication intitled, “Letters on Iceland, &c. written by Uno Von Troil, D.D. firſt chaplain to his Swediſh majeſty.” This gentleman ſailed from London on the 12th of July 1772, in company with Mr Banks, Dr Solander, and Dr James Lind of Edinburgh, in a ſhip for which L. 100 Sterling was paid every month. After viſiting the weſtern iſles of Scotland, they arrived on the 28th of Auguſt at Iceland, where they caſt anchor at Beſſeſtedr or Beſſaſtadr, lying in about 64° 6′ N. Lat. in the weſtern part of the iſland. The country had to them the moſt diſmal appearance that can be conceived. “ Imagine to yourſelf (ſays Dr Troil,) a country, which from one end to the other preſents to your view only barren mountains, whoſe ſummits are covered with eternal ſnow, and between them fields divided by vitrified cliffs, whoſe high and ſharp points ſeem to vie with each other to deprive you of the ſight of a little graſs which ſcantily ſprings up among them. Theſe ſame dreary rocks likewiſe conceal the few ſcattered habitations of the natives, and no where a ſingle tree appears which might afford ſhelter to friendſhip and innocence. The proſpect before us, though not pleaſing, was uncommon and ſurpriſing. Whatever preſented itſelf to our view bore the marks of devaſtation; and our eyes, accuſtomed to behold the pleaſing coaſts of England, now ſaw nothing but the veſtiges of the operation of a fire, Heaven knows how ancient!

"On our landing, we found two tracts of lava, called *gorde* and *hualeyre-hraun*, (for what we and the Italians call *lava*, is called in Iceland *hraun*, from *hrinna*, "to flow"), of which the laſt was particularly remarkable, ſince we find there a whole field covered with lava, which muſt have been liquefied in the higheſt degree; and whole mountains of turf. Chance had directed us exactly to a ſpot on which we could better than on any other part of Iceland conſider the operations of a fire which had laid waſte a ſtretch of 10 or 12 miles (A).

2 Mount Hecla deſcribed.

"We had now ſeen almoſt all the effects of a volcano except the crater from whence the fire proceeded; and in order to examine this likewiſe, we undertook a journey of 12 days to mount Hecla itſelf. We travelled 50 or 60 miles, (300 or 360 Engliſh ones,) over an uninterrupted track of lava, and had at laſt the pleaſure of being the firſt who ever reached the ſummit of this celebrated volcano. The reaſon that no one has been there before is partly founded in ſuperſtition, and partly in the extreme difficulty of the aſcent before the laſt diſcharge of fire, which happened in 1766. This mountain has been more taken notice of than many others in the country of as great extent, partly from its having vomited fire more frequently, and partly from its ſituation, which expoſes it to the ſight of ſhips ſailing to Greenland and North America. It is ſituated in the ſouhern part of the iſland, about four miles from the ſea-coaſt, and is divided into three points at the top; the higheſt of which is that in the middle; and is, according to an exact obſervation with Ramſden's barometer, 5000 feet higher than the ſea. We made uſe of our horſes, but were obliged to quit them at the firſt opening from which the fire had burſt. This was a place ſurrounded with lofty glazed walls, and filled with high glazed cliffs, which I cannot compare with any thing I ever ſaw before.

"A little higher up, we found a large quantity of grit and ſtones; and ſtill farther on, another opening, which, though not deep, deſcended lower down than that of the higheſt point. We thought we plainly obſerved marks of hot boiling water in this place. Not far from thence the mountains began to be covered with ſnow, ſome ſmall ſpots excepted, which were bare. We could not at firſt diſcern the cauſe of this difference, but ſoon found that it proceeded from the vapour which aroſe from the mountain. As we aſcended higher, theſe ſpots became larger; and about 200 yards from the ſummit, we found a hole of about one yard and a half in diameter, from which ſo hot a ſteam exhaled, that it prevented us from aſcertaining the degree of heat with the thermometer.

"The cold now began to be very intenſe, as Fahrenheit's thermometer, which was at 54 at the foot of the mountain fell to 24. The wind was alſo become ſo violent, that we were ſometimes obliged to lie down, to avoid being thrown into the moſt dreadful precipices by its fury.

"We were now arrived at one of the higheſt ſummits, when our conductor who did not take great pleaſure in the walk, endeavoured to perſuade us that this was the higheſt part of the mountains. We had juſt finiſhed our obſervations, and found by them that Ramſden's barometer ſtood at 24.238, and the thermometer fixed to it at 27, when happily the clouds divided, and we diſcovered a ſtill higher ſummit. Here we experienced at one and the ſame time a high degree of heat and cold; for in the air Fahrenheit's thermometer was conſtantly at 24, and when we ſet it down on the ground it roſe to 153. The barometer was here at 22.247.—We could not ſafely remain here for any long time, though we were very much inclined to it; and therefore deſcended, after having conſidered the laſt opening there, one of the ſides of which was entirely overturned, and the other quite covered with aſhes and grit. In our return we obſerved three conſiderable openings, in one of which every thing looked as red as brick. From another the lava had flowed in a ſtream of about 50 yards in breadth, and at ſome diſtance from thence the ſtream divided into three broad arms. Further on we found a large circular opening, at the bottom of which we obſerved a mountain in the form of a ſugar-loaf, in throwing up of which the fire ſeemed to have exhauſted itſelf.

"The mountain does not conſiſt of lava, but chiefly of ſand, grit, and aſhes; which are thrown up with the ſtones partly melted and partly diſcoloured by the fire. We likewiſe found ſeveral ſorts of pumice, and among them one piece with ſome ſulphur in it. The pumice was ſometimes ſo much burnt, that it was as light as tow; their form and colour was ſometimes very fine, but at the ſame time ſo ſoft, that it was difficult to remove them from one place to another. Of the common lava we found both large pieces and ſmall bits; as likewiſe a quantity of black jaſper burned at the extremities, and reſembling trees and branches. Among the ſtones thrown out of the mountain we ſaw ſome ſlate of a ſtrong red colour. In one place the lava had taken the form of chimney-ſtalks half-broken down.

3 Sympt preceding the eruptions.

"It ſcarcely ever happens that any of the Iceland volcanoes begin to throw out fire unexpectedly. For beſides a loud rumbling noiſe which is heard at a conſiderable diſtance, for ſeveral days preceding any eruption, and a roaring and cracking in the part from whence the fire is going to burſt forth, many fiery meteors are obſerved, but unattended in general with any violent concuſſion of the earth, though ſometimes earth-

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(A) The miles mentioned by Dr Troil are always Swediſh, ten and an half of which are equal to a degree on one of the great circles on the globe; and therefore one Swediſh mile is nearly equal to ſix Engliſh miles. Ten or twelve ſuch miles are, conſequently, equal to 60 or 70 Engliſh ones.

earthquakes, of which the hiſtory of the country affords ſeveral inſtances, have accompanied theſe dreadful conflagrations.—It is likewiſe conſidered as a ſign of an impending eruption, when ſmall lakes, rivulets, and ſtreams, dry up. Some perſons believe, that it does not a little contribute to haſten the eruption, when the mountain is ſo covered with ice that the holes are ſtopped up through which the exhalations formerly found a free paſſage; and though it is by no means probable that this contributes much to it, it cannot be denied that the fire is generally contained in theſe mountains covered with ice, or, as the Icelanders call them, *jokuls*.

" The ſign of an eruption going to take place immediately, is the burſting of the maſs of ice with a dreadful noiſe. Flames then burſt forth, and lightning and balls of fire iſſue from the ſmoke. With the flames proceed a number of larger and ſmaller ſtones, which are ſometimes thrown to an incredible diſtance. A round ſtone about a Swediſh ell (two feet) in diameter was thrown from Hecla, in the laſt eruption, to the diſtance of near ſix Engliſh miles. Egbert Olasſen alſo relates, that at the laſt eruption of Kattlegiaa, another volcano, a ſtone which weighed 290 pounds was thrown to the diſtance of 24 Engliſh miles. A quantity of white pumice-ſtone is alſo thrown up, with the boiling waters; and it is conjectured with great probability that the latter proceed from the ſea, as a quantity of ſalt ſufficient to load ſeveral horſes has frequently been found after the mountain has ceaſed to burn.—Then follow generally brown or black pumice ſtone, ſand, aſhes, and lava.

4 Caves and clefts form- by the uptions.

" The lava is ſeldom found near the opening; but rather tufa, or looſe aſhes and grit; and indeed the greater part of the Icelandic mountains conſiſt of this matter, which, when it is grown cold, generally takes an arched form. The upper cruſt frequently grows hard and ſolid, whilſt the melted matter beneath it continues liquid; this forms great cavities, whoſe walls, bed, and roof, are of lava, and where great quantities of ſtalactite of lava are found. There are a great number of theſe caves in Iceland, ſome of which are very large, and are made uſe of by the inhabitants for ſheltering their cattle. The largeſt in the iſland is 5034 feet long, from 50 to 54 in breadth, and between 34 and 36 in height.

" Among the traces left by the eruptions of the Iceland volcanoes, are ſome prodigious clefts, the largeſt of which is called *Almenneggiaa*, near the water of Tingalla in the ſouth-weſtern part of the iſland. It is 105 feet in breadth, and of great length. The direction of the chaſm itſelf is from north to ſouth. Its weſtern wall, from which the other has been perpendicularly divided is 107 feet ſix inches in height, and conſiſts of many ſtrata (each of which is about 10 inches in height) of lava grown cold at different times, as may eaſily be diſcovered by the apparent cruſt which is full of bliſters, of a darker brown, and not ſo much compreſſed as the remaining part of the maſs of lava. The eaſtern wall is only 45 feet 4 inches in height; and that part of it which is directly oppoſite to the higheſt part of the other ſide is no more than 36 feet five inches high.

5 ſtory of erup- s.

" The eruptions of the Iceland volcanoes are no leſs terrible and deſtructive than thoſe of Veſuvius and Ætna. The firſt mentioned in the ancient records happened in the ninth century, immediately after the arrival of the Norwegians on the iſland; and produced a lava three miles in length, and two and a half in breadth. After this there is no mention made of eruptions till the year 1000, when Chriſtianity was introduced. At a time when the chiefs of the country were aſſembled to conſult about the reception of the Chriſtian religion, information was brought that an eruption of fire had happened. The heathens conſidered this as a proof of the wrath of the gods, on which account they were reſolved to refuſe the new religion; but this reſolution was over-ruled by one of the aſſembly aſking, " On whom did the gods diſplay their wrath, when thoſe rocks on which we now ſtand were on fire?"—In 1311, 22 farms were deſtroyed by eruptions, and 70 more in 1366. Hecla deſtroyed two in 1374; ſeven in 1390; and 18 in one day in 1436. In the ſame manner five farms were deſtroyed in 1660, and many more in 1693. In 1727, 600 ſheep and 150 horſes were deſtroyed by the flood and pieces of ice which ruſhed down the ſide of a volcano during an eruption. In 1728, many farms were deſtroyed, and a large lake entirely dried up. Into this lake the ſtreams of fire that rolled from the mountains flowed during ſome years, and formed a tract of lava four miles in length, and one and a half in breadth. In 1755 ſix pariſhes were deſtroyed; and, in the laſt eruption of Hecla, a tract of many miles was laid waſte.

6 Lightning proceeds from the flame of the mountain.

" In the eruption of 1755, a flaſh of lightning was ſeen to burſt from the flame, and pierced through the cliffs which intercepted its way. The ſame lightning in one place killed eleven horſes, three of which were in a ſtable. A farmer was alſo killed by it near the door of his room: his upper cloaths, which were woollen, remained entirely unhurt; but his ſhirt and waiſtcoat, which were both of linen, were burnt; and when his clothes were pulled off, it was found that the fleſh and ſkin on his right ſide were conſumed to the very bones. The maid-ſervant who wanted to aſſiſt him in ſaving the cattle was likewiſe ſtruck by the lightning; but did not die till ſome days after, during which time ſhe ſuffered inexpreſſible torture. It is likewiſe ſaid that her cloaths were ſinged by the glutinous fires which cleaved to her body.

7 Account of the hot ſprings of Iceland.

" Iceland abounds with hot and boiling ſprings, ſome of which ſpout up into the air to a ſurpriſing height. All the jets d'eau which have been contrived with ſo much art, and at ſuch an enormous expence, cannot by any means be compared with theſe wonders of nature in Iceland. The water-works at Herenhauſen throw up a ſingle column of water of half a quarter of a yard in circumference to a height of about 70 feet; thoſe at the Winterkaſten at Caſſel, throw it up, but in a much thinner column, 130 feet; and the jet d'eau at St Cloud, which is thought the greateſt of all the French water-works, caſts up a thin column 80 feet into the air: but ſome ſprings in Iceland pour forth columns of water ſeveral feet in thickneſs to the height of many fathoms; and many affirm, of ſeveral hundred feet.

" Theſe ſprings are unequal in their degrees of heat; but we have obſerved none under 188 degrees of Fahrenheit's thermometer, in ſome it is 192, 193, 212, and in one ſmall vein of water 213 degrees. From ſome the water flows gently, and the ſpring is then called *laug*, a "bath;" from others it ſpouts with a great noiſe, and is then called *hver*, or *kittel*. It is very common for ſome of theſe ſpouting ſprings to cloſe up, and others to appear in their ſtead. All theſe hot waters have an incruſting quality, ſo that we very commonly find the exterior ſurface from whence it burſts forth covered with a kind of rind, which almoſt reſembles chaſed work, and which we at firſt took for lime, but which was afterwards found by Mr Bergman to be of a ſiliceous or flinty nature. In ſome places the water taſtes of ſulphur, in others not; but when drank as ſoon as it is cold, taſtes like common boiled water. The inhabitants uſe it at particular times for dyeing; and were they to adopt proper regulations, it might be of ſtill greater uſe. Victuals may alſo be boiled in it, and milk held over its ſteam becomes ſweet: owing, moſt probably, to the exceſſive heat of the water, as the ſame effect is produced by boiling it a long time over the fire. They have begun to make ſalt by boiling ſea-water over it, which when it is refined, is very pure and good. The cows which drink this hot water yield a great deal of milk. Egbert Olafsen relates, that the water does not become turbid when alkali is thrown into it, nor does it change the colour of ſyrup of violets. Horrebow aſſerts, that if you fill a bottle at one of the ſpouting ſprings, the water will boil over two or three times while the ſpring throws forth its water; and if corked too ſoon, the bottle will burſt.

8
A particular deſcription of one named *Geyſer*.

"Among the many hot ſprings to be met with in Iceland, ſeveral bear the name of *geyſer;* the following is a deſcription of the moſt remarkable of that name, and in the whole iſland. It is about two days journey from Hecla, near a farm called *Haukadal*. Here a poet would have an opportunity of painting whatever nature has of beautiful and terrible, united in one picture, by delineating this ſurpriſing phenomenon. Repreſent to yourſelf a large field, where you ſee on one ſide, at a great diſtance, high mountains covered with ice, whoſe ſummits are generally wrapped in clouds, ſo that their ſharp and unequal points become inviſible. This loſs, however, is compenſated by a certain wind, which cauſes the clouds to ſink, and cover the mountain itſelf when its ſummit appears as it were to reſt on the clouds. On the other ſide Hecla is ſeen, with its three points covered with ice, riſing above the clouds, and, with the ſmoke which aſcends from it, forming other clouds at ſome diſtance from the real ones: and on another ſide is a ridge of high rocks, at the foot of which boiling water from time to time iſſues forth; and further on extends a marſh of about three Engliſh miles in circumference, where are 40 or 50 boiling ſprings, from which a vapour aſcends to a prodigious height.—In the midſt of theſe is the greateſt ſpring *geyſer*, which deſerves a more exact and particular account. In travelling to the place about an Engliſh mile and an half from the *hver*, from which the ridge of rocks ſtill divided us, we heard a loud roaring noiſe, like the ruſhing of a torrent precipitating itſelf from ſtupendous rocks. We aſked our guide what it meant; he anſwered, it was *geyſer* roaring; and we ſoon ſaw with our naked eyes what before ſeemed almoſt incredible.

"The depth of the opening or pipe from which the water guſhes cannot well be determined; for ſometimes the water ſunk down ſeveral fathoms, and ſome ſeconds paſſed before a ſtone which was thrown into the aperture reached the ſurface of the water. The opening itſelf was perfectly round, and 19 feet in diameter, and terminated in a baſon 59 feet in diameter. Both the pipe and the baſon were covered with a rough ſtalactic rind, which had been formed by the force of the water: the outermoſt border of the baſon is nine feet and an inch higher than the pipe itſelf. The water here ſpouted ſeveral times a-day, but always by ſtarts; and after certain intervals. The people who lived in the neigbourhood told us, that they roſe higher in cold and bad weather than at other times; and Egbert Olafsen and ſeveral others affirm, that it has ſpouted to the height of 60 fathoms. Moſt probably they gueſſed only by the eye, and on that account their calculation may be a little extravagant; and indeed it is to be doubted whether the water was ever thrown up ſo high, though probably it ſometimes mounts higher than when we obſerved it. The method we took to obſerve the height was as follows. Every one in company wrote down, at each time that the water ſpouted, how high it appeared to him to be thrown, and we afterwards choſe the medium. The firſt column marks the ſpoutings of the water, in the order in which they followed one another; the ſecond, the time when theſe effuſions happened; the the third, the height to which the water roſe; and the laſt, how long each ſpouting of water continued.

N°	Time	Height	Duration
1	At VI 42 m.	30 feet	0 20 ſeconds
2	———--51	6	0 20
3	—--VII 16	6	0 10
4	———--31	12	0 15
5	———--51	60	0 6
6	—VIII. 17	24	0 30
7	———--29	18	0 40
8	———--36	12	0 40

The pipe was now for the firſt time full of water, which ran ſlowly into the baſon.

9	——IX. 25	48	1 10
10	-——X. 16	24	1 00

"At 35 minutes after twelve we heard as it were three diſcharges of a gun under ground, which made it ſhake: the water flowed over immediately, but inſtantly ſunk again. At eight minutes after two, the water flowed over the border of the baſon. At 15 minutes after three, we again heard ſeveral ſubterranean noiſes, though not ſo ſtrong as before. At 43 minutes after four, the water flowed over very ſtrongly during the ſpace of a minute. In ſix minutes after, we heard many loud ſubterraneous diſcharges, not only near the ſpring, but alſo from the neighbouring ridge of rocks where the water ſpouted. At 51 minutes after ſix, the fountain ſpouted up to the height of 92 feet, and continued to do ſo for four minutes. After this great effort, it ſunk down very low into the pipe, and was entirely quiet during ſeveral minutes; but ſoon began to bubble again: it was not, however, thrown up into the air, but only to the top of the pipe.

"The force of the vapours which throw up theſe waters is exceſſive; it not only prevents the ſtones which are thrown into the opening from ſinking, but even throws them up to a very great height, together with the water. When the baſon was full, we placed ourſelves before the ſun in ſuch a manner that we could ſee our ſhadows in the water; when every one obſerved round the ſhadow of his own head (though not round that of the heads of others,) a circle of almoſt the ſame colours which compoſe the rainbow, and round this another bright circle. This moſt probably proceeded from the vapours exhaling from the water.

"Not far from this place, another ſpring at the foot of the neighbouring ridge of rocks ſpouted water to the height of one or two yards each time. The opening through which this water iſſued, was not ſo wide as the other: we imagined it poſſible to ſtop up the hole entirely by throwing large ſtones into it, and even flattered ourſelves that our attempt had ſucceeded: but, to our aſtoniſhment, the water guſhed forth in a very violent manner. We haſtened to the pipe, and found all the ſtones thrown aſide, and the water playing freely through its former channel. In theſe large ſprings the waters were hot in the higheſt degree, and taſted a little of ſulphur; but in other reſpects it was pure and clear. In the ſmaller ſprings of the neighboorhood the water was tainted: in ſome, it was as muddy as that of a clay-pit; in others, as white as milk; and, in ſome few, as red as blood.

9 ccount of baſaltic lars. "Iceland abounds with pillars of baſaltes, which the lower ſort of people imagine have been piled upon each other by the giants, who made uſe of ſupernatural force to effect it. They have generally from three to ſeven ſides; and are from four to ſix feet in thickneſs, and from 12 to 16 yards in length, without any horizontal diviſions. But ſometimes they are only from ſix inches to one foot in height, and they are then very regular, inſomuch that they are ſometimes made uſe of for windows and door-poſts. In ſome places they only peep out here and there among the lava, or more frequently among the tufa; in other places they are quite overthrown, and pieces of broken pillars only make their appearance. Sometimes they extend without interruption for two or three miles in length. In one mountain they have a ſingular appearance: on the top the pillars lie horizontally, in the middle they are ſloping; the loweſt are perfectly perpendicular; and in ſome parts they are bent into a ſemicircular figure. The matter of the Iceland baſaltes ſeems to be the ſame with that of STAFFA; though in ſome it is more porous, and inclines to a grey. Some we obſerved which were of a blackiſh grey, and compoſed of ſeveral joints. Another time we obſerved a kind of porous glaſſy ſtone, conſequently a lava, which was ſo indiſtinctly divided, that we were for ſome time at a loſs to determine whether it was baſaltes or not, though at laſt we all agreed that it was."

10 unt of imate. The climate of Iceland is not unwholeſome or naturally ſubject to exceſſive colds, notwithſtanding its northerly ſituation. There have been inſtances indeed of Fahreinheit's thermometer ſinking to 24° below the freezing point in winter, and riſing to 104° in ſummer. Since the year 1749, obſervations have been made on the weather; and the reſult of theſe obſervations hath been unfavourable, as the coldneſs of the climate is thought to be on the increaſe, and of conſequence the country is in danger of becoming unfit for the habitation of the human race. Wood, which formerly grew in great quantities all over the iſland, cannot now be raiſed. Even the hardy firs of Norway cannot be reared in this iſland. They ſeemed indeed to thrive till they were about two feet high; but then their tops withered, and they ceaſed to grow. This is owing chiefly to the ſtorms and hurricanes which frequently happen in the months of May and June, and which are very unfavourable to vegetation of every kind. In 1772, governor Thodal ſowed a little barley, which grew very briſkly; but, a ſhort time before it was to be reaped, a violent ſtorm ſo effectually deſtroyed it, that only a few grains were found ſcattered about. Beſides theſe violent winds, this iſland lies under another diſadvantage, owing to the floating ice already mentioned, with which the coaſts are often beſet. This ice comes on by degrees, always with an eaſterly wind, and frequently in ſuch quantities as to fill up all the gulphs on the north-weſt ſide of the iſland, and even covers the ſea as far as the eye can reach; it alſo ſometimes drives to other ſhores. It generally comes in January, and goes away in March. Sometimes it only reaches the land in April; and, remaining there for a long time, does an incredible deal of miſchief. It conſiſts partly of mountains of ice, ſaid to be ſometimes 60 fathoms in height; and partly of field-ice, which is neither ſo thick nor ſo much dreaded. Sometimes theſe enormous maſſes are grounded in ſhoal-water; and in theſe caſes they remain for many months, nay years, undiſſolved, chilling the atmoſphere for a great way round. When many ſuch bulky and lofty ice-maſſes are floating together, the wood which is often found drifting between them, is ſo much chafed, and preſſed with ſuch violence together, that it ſometimes takes fire; which circumſtance has occaſioned fabulous accounts of the ice being in flames.

11 Deſtructive effects of the ice.

In 1753 and 1754, this ice occaſioned ſuch a violent cold, that horſes and ſheep dropped down dead by reaſon of it, as well as for want of food; horſes were obſerved to feed upon dead cattle, and the ſheep eat of each other's wool. In 1755, towards the end of the month of May, the waters were frozen over in one night to the thickneſs of an inch and five lines. In 1756, on the 26th of June, ſnow fell to the depth of a yard, and continued falling through the months of July and Auguſt. In the year following it froze very hard towards the end of May and beginning of June, in the ſouth part of the iſland, which occaſioned a great ſcarcity of graſs. Theſe froſts are generally followed by a famine, many examples of which are to be found in the Icelandic chronicles. Beſides theſe calamities, a number of bears annually arrive with the ice, which commit great ravages among the ſheep. The Icelanders attempt to deſtroy theſe intruders as ſoon as they get ſight of them. Sometimes they aſſemble together, and drive them back to the ice, with which they often float off again. For want of fire-arms, they are obliged to uſe ſpears on theſe occaſions. The government alſo encourages the deſtruction of theſe animals, by paying a premium of 10 dollars for every bear that is killed, and purchaſing the ſkin of him who killed it.

Thunder and lightning are ſeldom heard in Iceland, except in the neighbourhood of volcanoes. Aurora Borealis is very frequent and ſtrong. It moſt commonly appears in dry weather; though there are not wanting inſtances of its being ſeen before or after rain, or even during the time of it. The lunar halo, which prognoſticates bad weather, is likewiſe very frequent here; as are alſo parhelions, which appear from one to nine in number at a time. Theſe parhelions are obſerved chiefly at the approach of the Greenland ice, when an intenſe degree of froſt is produced, and the frozen vapours fill the air. Fire-balls, ſometimes round, and ſometimes oval, are obſerved, and a kind of *ignis fatuus* which attaches itſelf to men and beaſts; and comets are alſo frequently mentioned in their chronicles. This laſt circumſtance deſerves the attention of aſtronomers.

Iceland, beſides all the inconveniencies already mentioned, has two very terrible ones, called by the natives *ſkrida* and *ſnioflodi:* the name of the firſt imports large pieces of a mountain tumbling down and deſtroying the lands and houſes which lie at the foot of it: this happened in 1554, when a whole farm was ruined, and 13 people buried alive. The other word ſignifies the effects of a prodigious quantity of ſnow, which covers the tops of the mountains, rolling down in immenſe maſſes, and doing a great deal of damage: of this there was an inſtance in 1699, during the night, when two farms were buried, with all their inhabitants and cattle. This laſt accident Iceland has in common with all very mountainous countries, particularly Switzerland.

12
History of the iſland.

At what time the iſland of Iceland was firſt peopled is uncertain. An Engliſh colony indeed is ſaid to have been ſettled there in the beginning of the fifth century; but of this there are not ſufficient proofs. There is, however, reaſon to ſuppoſe, that the Engliſh and Iriſh were acquainted with this country under another name, long before the arrival of the Norwegians; for the celebrated Bede gives a pretty accurate deſcription of the iſland. But of theſe original inhabitants we cannot pretend to ſay any thing, as the Iceland chronicles go no farther back than the arrival of the Norwegians. What they relate is to the following purpoſe.

Naddodr, a famous pirate, was driven on the coaſt of Iceland in 861, and named the country *Snio-land*, "Snow-land," on account of the great quantities of ſnow with which he perceived the mountains covered. He did not remain there long; but, on his return, extolled the country to ſuch a degree, that one Garder Suafarſon, an enterpriſing Swede, was encouraged by his account to go in ſearch of it in 864. He ſailed quite round the iſland, and gave it the name of *Gardalſholmur*, or Garder's-iſland. Having remained in Iceland during the winter, he returned in the ſpring to Norway, where he deſcribed the new-diſcovered iſland as a pleaſant well-wooded country. This excited a deſire in Floke, another Swede, reputed the greateſt navigator of his time, to undertake a voyage thither. As the compaſs was then unknown, he took three ravens on board to employ them on the diſcovery. By the way he viſited his friends at Ferro; and having ſailed farther to the northwaed, he let fly one of his ravens, which returned to Ferro. Some time after, he diſmiſſed the ſecond, which returned to the ſhip again, as he could find no land. The laſt trial proved more ſucceſsful; the third raven took his flight to Iceland, where the ſhip arrived a few days after. Floke ſtaid here the whole winter with his company; and, becauſe he found a great deal of floating ice on the north ſide, he gave the country the name of *Iceland*, which it has ever ſince retained.

When they returned to Norway in the following ſpring, Floke, and thoſe that had been with him, made a very different deſcription of the country. Floke deſcribed it as a wretched place; while one of his companions, named *Thorulfr*, praiſed it ſo highly, that he affirmed butter dropped from every plant; which extravagant commendation procured him the name of *Thorulfr-ſmior*, or Butter-Thorulfr.

From this time there are no accounts of any voyages to Iceland, till Ingolfr and his friend Leifr undertook one in 874. They ſpent the winter on the iſland, and determined to ſettle there for the future. Ingolfr returned to Norway, to provide whatever might be neceſſary for the comfortable eſtabliſhment of a colony, and Leifr in the mean time went to aſſiſt in the war in England. After an interval of four years, they again met in Iceland, the one bringing with him a conſiderable number of people, with the neceſſary tools and inſtruments for making the country habitable; and the other imported his acquired treaſures. After this period, many people went there to ſettle; and, in the ſpace of 60 years, the whole iſland was inhabited. The tyranny of Harold king of Norway contributed not a little to the population of Iceland; and ſo great was the emigration of his ſubjects, that he was at laſt obliged to iſſue an order that no one ſhould ſail from Norway to Iceland, without paying four ounces of fine ſilver to the king.

Beſides the Norwegians, new colonies arrived from different nations, between whom wars ſoon commenced; and the Icelandic hiſtories are full of the accounts of their battles. To prevent theſe conflicts for the future, a kind of chief was choſen in 928, upon whom great powers were conferred. This man was the ſpeaker in all their public deliberations; pronounced ſentence in difficult and intricate caſes; decided all diſputes; and publiſhed new laws, after they had been received and approved of by the people at large: but he had no power to make laws, without the approbation and conſent of the reſt. He therefore aſſembled the chiefs, whenever the circumſtances ſeemed to require it; and, after they had deliberated among themſelves, he repreſented the opinion of the majority to the people, whoſe aſſent was neceſſary before it could be conſidered as a law. His authority among the chiefs and leaders, however, was inconſiderable, as he was choſen by them, and retained his place no longer than while he preſerved their confidence.

This inſtitution did not prove ſufficient to reſtrain the turbulent ſpirits of the Icelanders. They openly waged war with each other; and, by their inteſtine conflicts, ſo weakened all parties, that the whole became at laſt a prey to a few arbitrary and enterpriſing men; who, as is too generally the caſe, wantonly abuſed their power to the oppreſſion of their countrymen, and the diſgrace of humanity. Notwithſtanding theſe troubles, however, the Icelanders remained free from a foreign yoke till 1261; when the greateſt part of them put themſelves under the protection of Hakans king of Norway, promiſing to pay him tribute upon certain conditions agreed on between them; and the reſt followed their example in 1264. Afterwards, Iceland, together with Norway, became ſubject to Denmark. For a long time the care of the iſland was committed to a governor, who commonly went there once a-year; though, according to his inſtructions, he ought to have reſided in Iceland. As the country ſuffered incredibly through the abſence of its governors, it was reſolved a few years ago that they ſhould reſide there, and have their ſeat at Beſſeſſtedr, one of the old royal domains. He has under him a bailiff, two laymen, a ſheriff, and 21 *ſyſſelmen*, or magiſtrates who ſuperintend ſmall diſtricts; and almoſt every thing is decided according to the laws of Denmark.

13 Manners &c. of the Icelanders.

At the firſt ſettlement of the Norwegians in Iceland, they lived in the ſame manner as they had done in their own country, namely, by war and piracy. Their ſituation with regard to the kings of Norway, however, ſoon obliged them to apply to other ſtates, in order to learn as much of the knowledge of government and politics as was neceſſary to preſerve their colony from ſubjugation to a foreign yoke. For this purpoſe they often ſailed to Norway, Denmark, Sweden, England, and Scotland. The travellers, at their return, were obliged to give an account to their chiefs of the ſtate of thoſe kingdoms through which they paſſed. For this reaſon, hiſtory, and what related to ſcience, was held in high repute as long as the republican form of government laſted; and the great number of hiſtories to be met with in the country, ſhew at leaſt the deſire of the Icelanders to be inſtructed. To ſecure themſelves, therefore, againſt their powerful neighbours, they were obliged to enlarge their hiſtorical knowledge. They likewiſe took great pains in ſtudying perfectly their own laws, for the maintenance and protection of their internal ſecurity. Thus Iceland, at a time when ignorance and obſcurity overwhelmed the reſt of Europe, was enabled to produce a conſiderable number of poets and hiſtorians. When the Chriſtian religion was introduced about the end of the 10th century, more were found converſant in the law than could have been expected, conſidering the extent of the country, and the number of its inhabitants. Fiſhing was followed among them; but they devoted their attention conſiderably more to agriculture, which has ſince entirely ceaſed.

Two things have principally contributed towards producing a great change both in their character and way of life, viz. the progreſs of the Chriſtian religion, and their ſubjection firſt to Norway, and afterwards to Denmark. For if religion, on one ſide, commanded them to deſiſt from their ravages and warlike expeditions; the ſecular power, on the other, deprived them of the neceſſary forces for the execution of them: and, ſince this time, we find no farther traces of their heroic deeds, except thoſe which are preſerved in their hiſtories.

The modern Icelanders apply themſelves to fiſhing and breeding of cattle. They are middle-ſized and well-made, though not very ſtrong; and the women are in general ill-featured. Vices are much leſs common among them, than in other parts where luxury and riches have corrupted the morals of the people. Though their poverty diſables them from imitating the hoſpitality of their anceſtors in all reſpects, yet they continue to ſhew their inclination it: they cheerfully give away the little they have to ſpare, and expreſs the utmoſt joy and ſatisfaction if you are pleaſed with their gift. They are uncommonly obliging and faithful, and extremely attached to government. They are very zealous in their religion. An Icelander never paſſes a river or any other dangerous place, without previouſly taking off his hat, and imploring the divine protection; and he is always thankful for the protection of the Deity, when he has paſſed the danger in ſafety. They have an inexpreſſible attachment to their native country, and are nowhere ſo happy. An Icelander therefore rarely ſettles in Copenhagen, tho' ever ſuch advantageous terms ſhould be offered him. On the other hand, we cannot aſcribe any great induſtry or ingenuity to theſe people. They work on in the way to which they have all along been accuſtomed, without thinking of improvements. They are not cheerful in converſation, but ſimple and credulous; and have no averſion againſt a bottle, if they can find an opportunity. When they meet together, their chief paſtime conſiſts in reading their hiſtory. The maſter of the houſe makes the beginning, and the reſt continue in their turns when he is tired. Some of them know theſe ſtories by heart; others have them in print, and others in writing. Beſides this, they are great players at cheſs and cards, but only for their amuſement, ſince they never play for money: which, however, ſeems to have been formerly in uſe among them; ſince, by one of their old laws, a fine is impoſed upon thoſe who play for money.

14 Their dreſs.

The modern Icelanders have made very little alteration in their dreſs from what was formerly in uſe. The men all wear a linen ſhirt next to the ſkin, with a ſhort jacket, and a pair of wide breeches over it. When they travel, another ſhort coat is put over all. The whole is made of coarſe black cloth, called *wadmal;* but ſome wear clothes of a white colour. On their head they wear large three-cornered hats, and on their feet Iceland ſhoes and worſted ſtockings. Some of them indeed have ſhoes from Copenhagen; but, as they are rather too dear for them, they generally make their own ſhoes, ſometimes of the hide of oxen, but more frequently of ſheep's leather. They make them by cutting a ſquare piece of leather, rather wider than the length of the foot; this they ſew up at the toes, and behind at the heel, and tie it on with leather-thongs. Theſe ſhoes are convenient enough where the country is level; but it would be very difficult for us who are not accuſtomed to walk with them amongſt the rocks and ſtones, though the Icelanders do it with great eaſe.

The women are likewiſe dreſſed in black wadmal. They wear a bodice over their ſhifts, which are ſewed up at the boſom; and above this a jacket laced before, with long narrow ſleeves reaching down to the wriſts. In the opening on the ſide of the ſleeve, they have buttons of chaſed ſilver, with a plate fixed to each button; on which the lover, when he buys them in order to preſent them to his miſtreſs, takes care to have his name engraved along with hers. At the top of the jacket a little black collar is fixed, of about three inches broad, of velvet or ſilk, and frequently trimmed with gold cord. The petticoat is likewiſe of wadmal, and reaches down to the ankles. Round the top of it is a girdle of ſilver or ſome other metal, to which they faſten the apron, which is alſo of wadmal, and ornamented at top with buttons of chaſed ſilver. Over all this they wear an upper-dreſs nearly reſembling that of the Swediſh peaſants; with this difference, that it is wider at bottom: this is cloſe at the neck and wriſts, and a hand's-breadth ſhorter than the petticoat. It is adorned with a facing down to the bottom, which looks like cut velvet, and is generally wove by the Icelandic women. On their fingers they wear gold, ſilver, or braſs rings. Their head-dreſs conſiſts of ſeveral cloths wrapped round the head almoſt as high again as the face. It is tied faſt with a handkerchief, and ſerves more for warmth than ornament. Girls are not allowed to wear this head-dreſs till they are marriageable. At their weddings they are adorned in a very particular manner: the bride wears, cloſe to the face, round her head-dreſs, a crown of ſilver gilt. She has two chains round her neck, one of which hangs down very low before, and the other reſts on her ſhoulders. Beſides theſe, ſhe wears a leſſer chain, from whence generally hangs a little heart, which may be opened to put ſome kind of perfume in it. This dreſs is worn by all the Icelandic women without exception: only with this difference, that the poorer ſort have it of coarſe wadmal, with ornaments of braſs; and thoſe that are in eaſier circumſtances have it of broad cloth, with ſilver ornaments gilt.

15 Houſes.

The houſes of the Icelanders are very indifferent, but the worſt are ſaid to be on the ſouth ſide of the iſland. In ſome parts they are built of drift-wood, in others of lava, almoſt in the ſame manner as the ſtone-walls we make for incloſures, with moſs ſtuffed between the pieces of lava. In ſome houſes the walls are wainſcotted on the inſide. The roof is covered with ſods, laid over rafting, or ſometimes over the ribs of whales; the walls are about three yards high, and the entrance ſomewhat lower. Inſtead of glaſs, the windows are made of the chorion and amnios of ſheep, or the membranes which ſurround the womb of the ewe. Theſe are ſtretched on a hoop, and laid over a hole in the roof. In the poorer ſort of houſes they employ for the windows the inner membrane of the ſtomach of animals, which is leſs tranſparent than the others.

16 Diet.

As the iſland of Iceland produces no kind of grain, the inhabitants of conſequence have no bread but what is imported; and which being too dear for common uſe, is reſerved for weddings and other entertainments. The following liſt of their viands is taken from Troil's Letters.

“ 1. Flour of *fialgras*, (lichen iſlandicus, or rock-graſs). The plant is firſt waſhed, and then cut into ſmall pieces by ſome; though the greater number dry it by fire or in the ſun, then put it into a bag in which it is well beaten, and laſtly work it into a flour by ſtamping.

“ 2. Flour of *komſyrg*, (polygonum biſtorta), is prepared in the ſame manner, as well as the two other ſorts of wild corn *melur* (*Arundo arenaria*, and *Arundo foliorum lateribus convolutis*), by ſeparating it from the chaff, pounding, and laſtly grinding it.

“ 3. *Surt ſmoer*, (ſour butter). The Icelanders ſeldom make uſe of freſh or ſalt butter, but let it grow ſour before they eat it. In this manner it may be kept for 20 years, or even longer; and the Icelanders look upon it as more wholeſome and palatable than the butter uſed among other nations. It is reckoned better the older it grows, and one pound of it then is valued as much as two of freſh butter.

“ 3. *Striug*, or whey boiled to the conſiſtence of ſour milk, and preſerved for the winter.

“ 4. Fiſh of all kinds, both dried in the ſun and in the air, and either ſalted or frozen. Thoſe prepared in the laſt manner are preferred by many.

“ 5. The fleſh of bears, ſheep, and birds, which is partly ſalted, partly hung or ſmoked, and ſome preſerved in caſks with ſour or fermented whey poured over it.

“ 6. *Miſoſt*, or whey boiled to cheeſe, which is very good. But the art of making other kinds of good cheeſe is loſt, tho' ſome tolerably palatable is ſold in the eaſt quarter of Iceland.

“ 7. *Beina-ſtriug*, bones and cartilages of beef and mutton, and likewiſe bones of cod, boiled in whey till they are quite diſſolved: they are then left to ferment, and are eat with milk.

“ 8. *Skyr*. The curds from which the whey is ſqueezed are preſerved in caſks or other veſſels; they are ſometimes mixed with black crow-berries or juniper-berries, and are likewiſe eat with new milk.

“ 9. *Syra*, is ſour whey kept in caſks, and left to ferment; which, however, is not reckoned fit for uſe till a year old.

“ 10. *Blanda*, is a liquor made of water, to which a twelfth part of ſyra is added. In winter, it is mixed with the juice of thyme, and of the black crow-berries.

“ 11. They likewiſe eat many vegetables, ſome of which grow wild, and ſome are cultivated; alſo ſhell-fiſh and muſhrooms.”

The Icelanders in general eat three meals a-day, at ſeven in the morning, two in the afternoon, and nine at night. In the morning and evening they commonly eat curds mixed with new milk, and ſometimes with juniper or crow berries. In ſome parts, they alſo have pottage made of rock-graſs, which is very palatable, or curdled milk boiled till it becomes of a red colour, or new milk boiled a long time. At dinner, their food conſiſts of dried fiſh, with plenty of ſour butter; they alſo ſometimes eat freſh fiſh, and, when poſſible, a little bread and cheeſe with them. It is reported by ſome, that they do not eat any fiſh till it is quite rotten; this report perhaps proceeds from their being fond of it when a little tainted: they however frequently eat fiſh which is quite freſh, though, in the ſame manner as the reſt of their food, often without ſalt.

Their common beveridge is milk, either warm from the cow, or cold, and ſometimes boiled: they likewiſe uſe butter-milk with or without water. On the

Fig. 7.

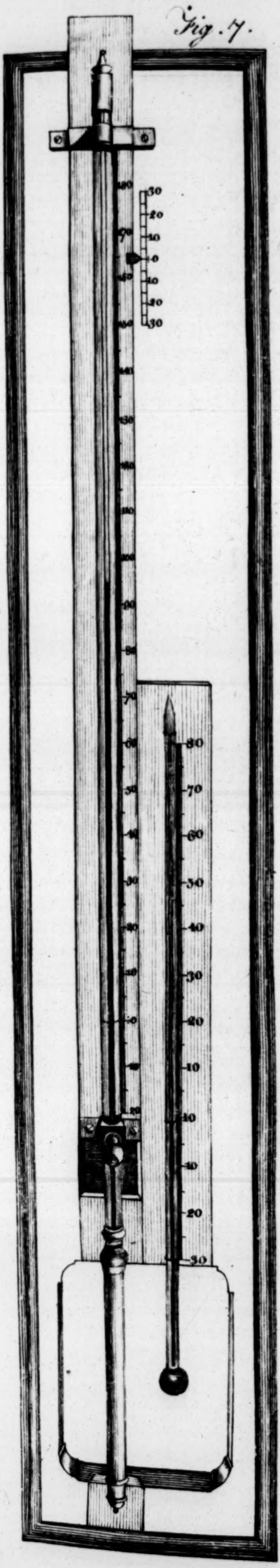
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Fig. 6.

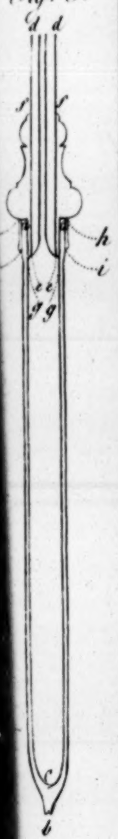
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Fig. 2.

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Fig. 4.

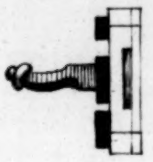


Fig. 1.

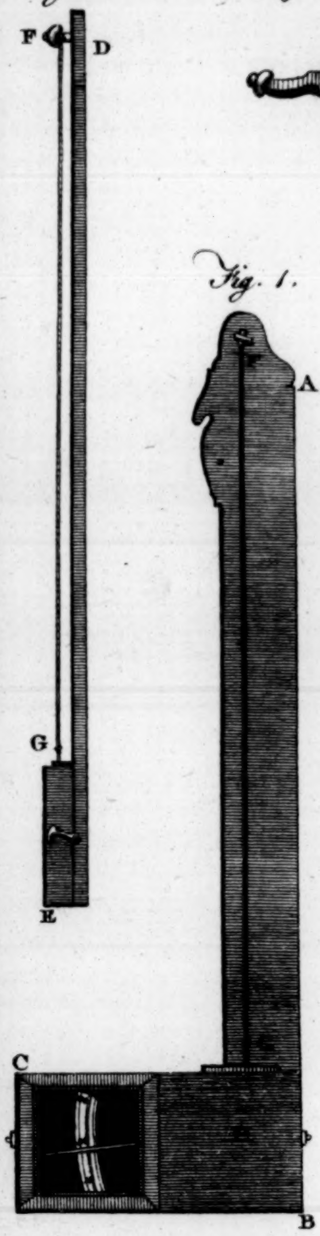


Fig. 9. Boiling FOUNTAIN. See ICELAND. N°. 8.

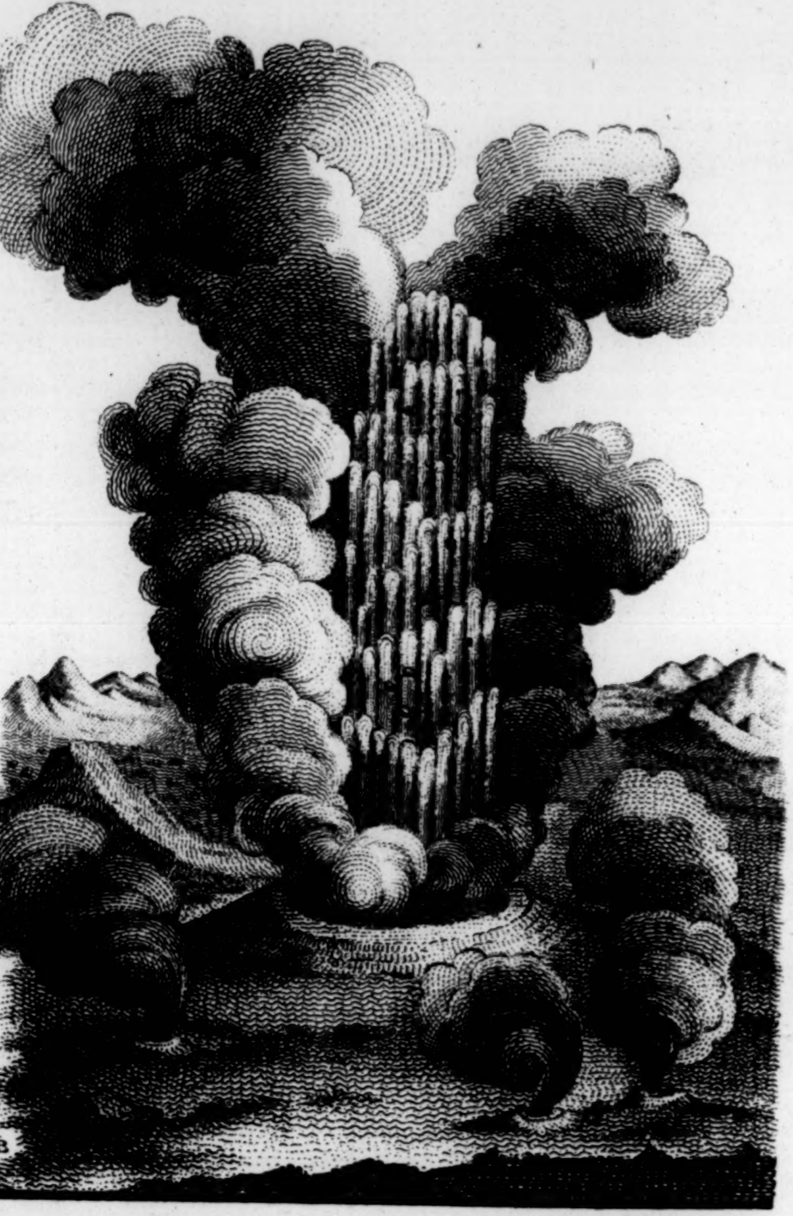


Fig. 5.

Fig. 3.

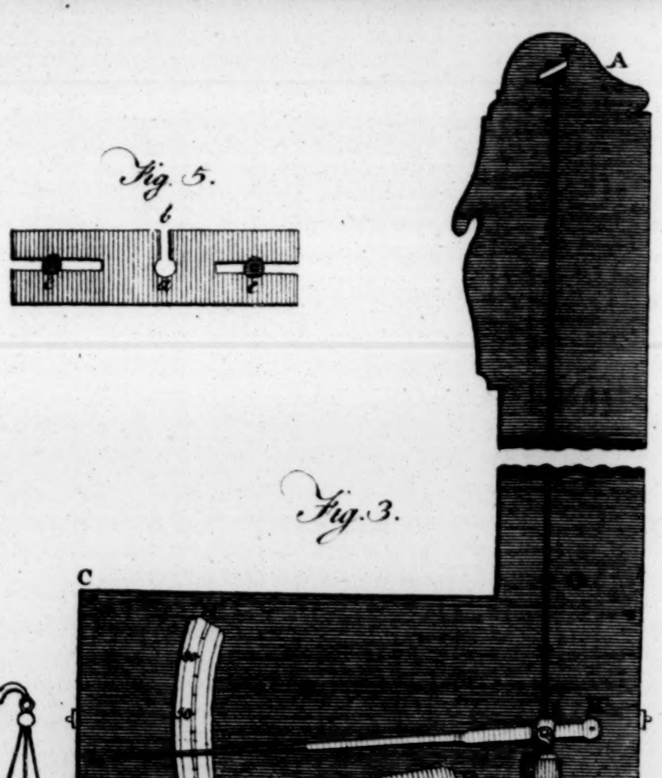
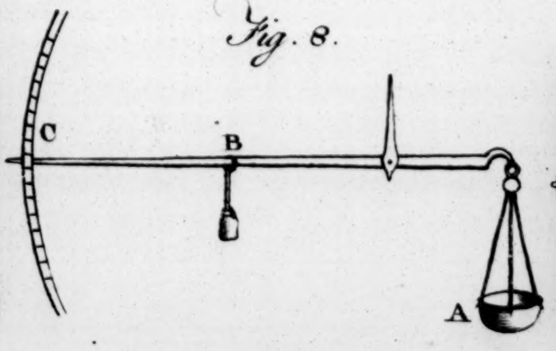


Fig. 8.



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coaſts they generally drink blanda and ſour milk; which is ſold after it is ſkimmed, at two fifths of a rixdollar per caſk: ſome likewiſe ſend for beer from Copenhagen, and ſome brew their own. A few of the principal inhabitants alſo have claret and coffee. The common people ſometimes drink a kind of tea, which they make from the leaves of the *dryas octopetala*, and the *veronica officinalis*.

17 mploy- ent, ma- ufactures, c.

On the coaſts, the men employ themſelves in fiſhing, both ſummer and winter. On their return home, when they have drawn and cleaned their fiſh, they give them to their wives, whoſe care it is to dry them. In the winter, when the inclemency of the weather prevents them from fiſhing, they are obliged to take care of their cattle and ſpin wool. In ſummer, they mow the graſs, dig turf, provide fuel, go in ſearch of ſheep and goats that were gone aſtray, and kill cattle. They prepare leather with the *ſpiraca ulmaria* inſtead of bark. Some few work in gold and ſilver; and others are inſtructed in mechanics, in which they are tolerable proficients. The women prepare the fiſh, take care of the cattle, manage the milk and wool, ſew, ſpin, and gather eggs and down. When they work in the evening, they uſe, inſtead of an hour-glaſs, a lamp with a wick made of epilobium dipt in train oil, which is contrived to burn four, ſix, or eight hours.

Among the common people of Iceland, time is not reckoned by the courſe of the ſun, but by the work they have done, and which is preſcribed by law. According to this preſcription, a man is to mow as much hay in one day as grows on 30 fathoms of manured ſoil, or 40 fathoms of land which has not been manured; or he is to dig 700 pieces of turf eight feet long and three broad. If as much ſnow falls as reaches to the horſes bellies, a man is required daily to clear a piece of ground ſufficient for 100 ſheep. A woman is to rake together as much hay as three men can mow, or to weave three yards of wadmal a-day.

The wages of a man are fixed at four dollars, and 12 yards of wadmal; and thoſe of a woman at two dollars, and five yards of wadmal. When men are ſent a-fiſhing out of the country, there is allowed to each man by law, from the 25th of September to the 14th of May, ſix pounds of butter, and 18 pounds of dried fiſh every week. This may ſeem to be too great an allowance; but it muſt be remembered that they have nothing elſe to live upon. When they are at home, and can get milk, &c. every man receives only five pounds of dried fiſh and three quarters of a pound of butter a-week.

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The food and manner of life of the Icelanders by no means contribute to their longevity. It is very rare indeed to ſee an inhabitant of Iceland exceed the age of 50 or 60; and the greater part are attacked by grievous diſeaſes before middle age. Of theſe the ſcurvy and elephantiaſis or leproſy are the worſt. They are alſo ſubject to the gout in their hands, owing to their frequent employment in fiſhing, and handling the wet fiſhing-tackle in cold weather. St Anthony's fire, the jaundice, pleuriſy, and lowneſs of ſpirits, are frequent complaints in this country. The ſmall-pox is alſo exceedingly fatal, and not long ago deſtroyed 16,000 perſons. By theſe diſeaſes, and the frequent famines with which the country has been afflicted, the inhabitants are reduced to a much fewer number than they formerly were, inſomuch that it is computed they do not in all exceed 60,000.

19 Commerce and revenue.

The exports of Iceland conſiſt of dried fiſh, ſalted mutton and lamb, beef, butter, tallow, train-oil, coarſe woollen cloth, ſtockings, gloves, raw wool, ſheep-ſkins, lamb-ſkins, fox-furs of various colours, eider down, feathers, and formerly ſulphur; but there is no longer a demand for this mineral. On the other hand, the Icelanders import timber, fiſhing-lines and hooks, tobacco, bread, horſe-ſhoes, brandy, wine, ſalt, linen, a little ſilk, and a few other neceſſaries, as well as ſuperfluities for the better ſort. The whole trade of Iceland is engroſſed by a monopoly of Danes, indulged with an excluſive charter. This company maintains factories at all the harbours of Iceland, where they exchange their foreign goods for the merchandize of the country; and, as the balance is in favour of the Icelanders, pay the overplus in Daniſh money, which is the only current coin in this iſland. All their accounts and payments are adjuſted according to the number of fiſh: two pounds of fiſh are worth two ſkillings in ſpecie, and 48 fiſh amount to one rixdollar. A Daniſh crown is computed at 30 fiſh: what falls under the value of 12 fiſh, cannot be paid in money; but muſt be bartered either for fiſh or roll-tobacco, an ell of which is equal to one fiſh. The weights and meaſures of the Icelanders are nearly the ſame with thoſe uſed in Denmark.

The Icelanders being neither numerous nor warlike, and altogether unprovided with arms, ammunition, garriſons, or fleets, are in no condition to defend themſelves from invaſion; but depend entirely on the protection of his Daniſh majeſty, to whom they are ſubject.

The revenues which he draws from this iſland conſiſt of the income of divers eſtates, as royal demeſne, amounting to about 8000 dollars per annum; of the money paid by the company for an excluſive trade, to the value of 20,000 dollars; and of a fixed proportion in the tythes of fiſh, paid in ſome particular diſtricts.

ICENI, the ancient name of the people of Suffolk, Norfolk, Cambridgeſhire, and Huntingdonſhire, in England.

ICH-DIEN. See HERALDRY, chap. iv. ſect. 2.

ICHNEUMON, in zoology. See VIVERRA.

ICHNEUMON, is alſo the name of a genus of flies of the hymenoptera order. It has no tongue; the antennæ have above 30 joints; the abdomen, in moſt of the ſpecies, is petiolated; and it has a ſting in the tail incloſed in a double-valved cylindrical ſheath. There are 77 ſpecies, principally diſtinguiſhed by their colour.—Theſe flies are ſometimes at great pains to deſtroy and carry the caterpillars in whoſe bodies they intend to lay their eggs, to places where it is proper thoſe eggs ſhould be hatched. There is one ſpecies, whoſe worm produced from the egg can never ſucceed, unleſs it is both bred in the body of a caterpillar, and alſo have that habitation buried under ground. For this purpoſe, the parent-fly, when the time of laying her eggs is come, forms a hole in the ground, which ſhe covers with a little clod of earth, that no duſt may fall in to fill it up; when this is done, ſhe goes out in queſt of a caterpillar proper for her purpoſe. Dr Liſter aſſures us, that he has often ſeen one of theſe flies ſeize a caterpillar much larger than herſelf; and though this has been at a conſiderable diſtance from her hole, ſhe has with great labour dragged the creature to it. As ſoon as ſhe has arrived there with her load, ſhe takes off the little pellet of earth from the mouth of the hole, and going down to ſee that all is ready for the reception of the new gueſt, ſhe returns out of it and draws in the caterpillar, which ſhe leaves there after giving it ſuch wounds as, though they do not cauſe immediate death, yet diſable the creature ſo as to make its eſcape impracticable. When the creature is thus lodged, ſhe depoſits her eggs in the fleſh; after which ſhe ſtops up the orifice of the hole very firmly with ſeveral pellets of dirt, and with duſt carefully rammed in between, and will even fly up into gummy and reſinous trees in order to get a cement to hold all firmly together. When the hole is thus filled up even with the ſurface of the reſt of the ground, ſhe draws a leaf or two to the place, and laying them over the mouth flies away. There is after this no more care taken; but the young worms are hatched from the eggs, and feed on the fleſh of the caterpillar till they are fully grown. They then change into the nymph-ſtate, and come out of that in form of their parent-flies, in which ſtate they uſually make their way out of the ground. Some of theſe ichneumons make the bodies of other ſmaller flies the places of hatching their eggs. They may be often met with flying with one of theſe ſmall flies in their legs, the head of it being held cloſe to their bellies. If they are watched on this occaſion, they will uſually be found to carry thoſe flies to certain holes in the ground reſembling worm-holes. The firſt that they carry ſerves as a nidus for their eggs: the reſt are for food to the young ones while in the ſtate of worms; theſe being too voracious to be ſubſiſted long on the body of one fly, and therefore their parents carry them more every day. The old ones on this occaſion crawl backwards into the holes, dragging the flies in after them. When their young worms have fed ſufficiently, they are converted into nymphæ; the caſes of which are made up of the wings, legs, and other hard parts of the flies they had been feeding upon.

ICHNOGRAPHY, in perſpective, the view of any thing cut off by a plane, parallel to the horizon, juſt at the baſe of it.—The word is derived from the Greek ιχνος, *footſtep*, and γραφω, *I write*, as being a deſcription of the footſteps or traces of a work.

Among painters it ſignifies a deſcription of images or of ancient ſtatues of marble and copper, of buſts and ſemi-buſts, of paintings in freſco, moſaic works, and ancient pieces of miniature.

ICHOGLANS, the grand ſignior's pages ſerving in the ſeraglio.—Theſe are the children of Chriſtian parents, either taken in war, purchaſed, or ſent in preſents from the viceroys and governors of diſtant provinces; they are the moſt ſprightly, beautiful, and well-made that can be met with; and are always reviewed and approved of by the grand ſignior himſelf, before they are admitted into the ſeraglios of Pera, Conſtantinople, or Adrianople, being the three colleges where they are educated, or fitted for employments, according to the opinion the court entertains of them.

ICHOR, properly ſignifies a thin watery humour like ſerum; but is ſometimes uſed for a thicker kind flowing from ulcers, called alſo *ſanies*.

ICHTHYOCOLLA, Isinglass, a preparation from the fiſh known by the name of *huſo*. See Accipenser. The word is Greek, formed of ιχθυς, *fiſh*, and κολλα, *glue*.—The method of making Iſinglaſs was long a ſecret in the hands of the Ruſſians; but hath lately been diſcovered, and the following account of it publiſhed by Humphrey Jackſon, Eſq. in the 63d volume of the Philoſophical Tranſactions.

"All authors who have hitherto delivered proceſſes for making ichthyocolla, fiſh-glue, or iſinglaſs, have greatly miſtaken both its conſtituent matter and preparation.

"To prove this aſſertion, it may not be improper to recite what Pomet ſays upon the ſubject, as he appears to be the principal author whom the reſt have copied. After deſcribing the fiſh, and referring to a cut engraved from an original in his cuſtody, he ſays: 'As to the manner of making the iſinglaſs, the ſinewy parts of the fiſh are boiled in water, till all of them be diſſolved that will diſſolve; then the gluey liquor is ſtrained, and ſet to cool. Being cold, the fat is carefully taken off, and the liquor itſelf boiled to a juſt conſiſtency, then cut to pieces, and made into a twiſt, bent in form of a creſcent, as commonly ſold, then hung upon a ſtring, and carefully dried.'

"From this account, it might be rationally concluded, that every ſpecies of fiſh which contained gelatinous principles would yield iſinglaſs: and this parity of reaſoning ſeems to have given riſe to the haſty concluſions of thoſe, who ſtrenuouſly vouch for the extraction of iſinglaſs from ſturgeon; but as that fiſh is eaſily procurable, the negligence of aſcertaining the fact by experiment ſeems inexcuſable.

"In my firſt attempt to diſcover the conſtituent parts and manufacture of iſinglaſs, relying too much upon the authority of ſome chemical authors whoſe veracity I had experienced in many other inſtances, I found myſelf conſtantly diſappointed. Glue, not iſinglaſs, was the reſult of every proceſs; and although, in the ſame view, a journey to Ruſſia proved fruitleſs, yet a ſteady perſeverance in the reſearch proved not only ſucceſsful as to this object, but, in the purſuit, to diſcover a reſinous matter plentifully procurable in the Britiſh fiſheries, which has been found by ample experience to anſwer ſimilar purpoſes. It is now no longer a ſecret, that our (A) lakes and rivers in North America are ſtocked with immenſe quantities of fiſh, ſaid to be the ſame ſpecies with thoſe in Muſcovy, and yielding the fineſt iſinglaſs, the

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(A) As the lakes of North America lie nearly in the ſame latitude with the Caſpian Sea, particularly lake Superior, which is ſaid to be of greater extent, it was conjectured they might abound with the ſame ſorts of fiſh; and, in conſequence of public advertiſements diſtributed in various parts of North America, offering premiums for the ſounds of ſturgeon and other fiſh, for the purpoſe of making iſinglaſs, ſeveral ſpecimens of fine iſinglaſs, the produce of fiſh taken in theſe parts, have been lately ſent to England, with proper atteſtations as to the unlimited quantity which may be procured.

fiſheries whereof, under due encouragement, would doubtleſs ſupply all Europe with this valuable article.

"No artificial heat is neceſſary to the production of iſinglaſs, neither is the matter diſſolved for this purpoſe; for, as the continuity of its fibres would be deſtroyed by ſolution, the maſs would become brittle in drying, and ſnap ſhort aſunder, which is always the caſe with glue, but never with iſinglaſs. The latter, indeed, may be reſolved into glue with boiling water; but its fibrous recompoſition would be found impracticable afterwards, and a fibrous texture is one of the moſt diſtinguiſhing characteriſtics of genuine iſinglaſs.

"A due conſideration that an imperfect ſolution of iſinglaſs, called *fining* by the brewers, poſſeſſed a peculiar property of clarifying malt-liquors, induced me to attempt its analyſis in cold ſubacid menſtruums. One ounce and an half of good iſinglaſs, ſteeped a few days in a gallon of ſtale beer, was converted into good fining, of a remarkable thick conſiſtence: the ſame quantity of glue, under ſimilar treatment, yielded only a mucilaginous liquor, reſembling diluted gum-water, which, inſtead of clarifying beer, increaſed both its tenacity and turbidneſs, and communicated other properties in no reſpect correſponding with thoſe of genuine fining. On commixing three ſpoonfuls of the ſolution of iſinglaſs with a gallon of malt liquor, in a tall cylindrical glaſs, a vaſt number of curdly maſſes became preſently formed, by the reciprocal attraction of the particles of iſinglaſs, and the feculencies of the beer, which, increaſing in magnitude and ſpecific gravity, arranged themſelves accordingly, and fell in a combined ſtate to the bottom, through the well-known laws of gravitation; for, in this caſe, there is no elective attraction, as ſome have imagined, which bears the leaſt affinity with what frequently occurs in chemical decompoſitions.

"If what is commercially termed *long* or *ſhort ſtapled iſinglaſs* be ſteeped a few hours in fair cold water, the entwiſted membranes will expand, and reaſſume their original beautiful (B) hue, and, by a dexterous addreſs, may be perfectly unfolded. By this ſimple operation, we find that iſinglaſs is nothing more than certain membranous parts of fiſhes, diveſted of their native mucoſity, rolled and twiſted into the forms abovementioned, and dried in the open air.

"The ſounds, or air-bladders, of freſh-water fiſh in general, are preferred for this purpoſe, as being the moſt tranſparent, flexible, delicate ſubſtances. Theſe conſtitute the fineſt ſorts of iſinglaſs; thoſe called *book* and *ordinary ſtaple*, are made of the inteſtines, and probably of the peritonæum of the fiſh. The belluga yields the greateſt quantity, as being the largeſt and moſt plentiful fiſh in the Muſcovy rivers; but the ſounds of all freſh-water fiſh yield, more or leſs, fine iſinglaſs, particularly the ſmaller ſorts, found in prodigious quantities in the Caſpian Sea, and ſeveral hundred miles beyond Aſtracan, in the Wolga, Yaik, Don, and even as far as Siberia, where it is called *kle* or *kla* by the natives, which implies a glutinous matter; it is the baſis of the Ruſſian glue, which is preferred to all other kinds for its ſtrength.

"The ſounds, which yields the finer iſinglaſs, conſiſt of parallel fibres, and are eaſily rent longitudinally; but the ordinary ſorts are found compoſed of double membranes, whoſe fibres croſs each other obliquely, reſembling the coats of a bladder: hence the former are more readily pervaded and divided with ſubacid liquors; but the latter, through a peculiar kind of interwoven texture, are with great difficulty torn aſunder, and long reſiſt the power of the ſame menſtruum; yet, when duly reſolved, are found to act with equal energy in clarifying liquors.

"Iſinglaſs receives its different ſhapes in the following manner:

"The parts of which it is compoſed, particularly the ſounds, are taken from the fiſh while ſweet and freſh, ſlit open, waſhed from their ſlimy *ſordes*, diveſted of every thin membrane which envelopes the ſound, and then expoſed to ſtiffen a little in the air. In this ſtate, they are formed into rolls about the thickneſs of a finger, and in length according to the intended ſize of the ſtaple: a thin membrane is generally ſelected for the centre of the roll, round which the reſt are folded alternately, and about half an inch of each extremity of the roll is turned inwards. The due dimenſions being thus obtained, the two ends of what is called *ſhort-ſtaple* are pinned together with a ſmall wooden peg; the middle of the roll is then preſſed a little downwards, which gives it the reſemblance of a heart-ſhape; and thus it is laid on boards, or hung up in the air to dry. The ſounds, which compoſe the long-ſtaple, are larger than the former; but the operator lengthens this ſort at pleaſure, by interfolding the ends of one or more pieces of the ſound with each other. The extremities are faſtened with a peg, like the former; but the middle part of the roll is bent more conſiderably downwards; and, in order to preſerve the ſhape of the three obtuſe angles thus formed, a piece of round ſtick, about a quarter of an inch diameter, is faſtened in each angle with ſmall wooden pegs, in the ſame manner as the ends. In this ſtate, it is permitted to dry long enough to retain its form, when the pegs and ſticks are taken out, and the drying completed; laſtly, the pieces of iſinglaſs are colligated in rows, by running packthread through the peg-holes, for convenience of package and exportation.

"The membranes of the book ſort, being thick and refractory, will not admit a ſimilar formation with the preceding: the pieces therefore, after their ſides are folded inwardly, are bent in the centre, in ſuch manner that the oppoſite ſides reſemble the cover of a book, from whence its name; a peg being run acroſs the middle, faſtens the ſides together, and thus it is dried like the former. This ſort is interleaved, and the pegs run acroſs the ends, the better to prevent its unfolding.

"That called *cake-iſinglaſs*, is formed of the bits and fragments of the ſtaple ſorts, put into a flat metalline-pan, with a very little water, and heated juſt enough to make the parts cohere like a pancake, when it is dried; but frequently it is overheated, and ſuch pieces, as before obſerved, are uſeleſs in the buſineſs of fining. Experience has taught the conſumers to reject them.

(B) If the tranſparent iſinglaſs be held in certain poſitions to the light, it frequently exhibits beautiful priſmatic colours.

" Iſinglaſs is beſt made in the ſummer, as froſt gives it a diſagreeable colour, deprives it of weight, and impairs its gelatinous principles; its faſhionable forms are unneceſſary, and frequently injurious to its native qualities. It is common to find oily putrid matter, and *exuviæ* of inſects, between the implicated membranes, which, through the inattention of the cellarman, often contaminate wines and malt-liquors in the act of clarification. Theſe peculiar ſhapes might, probably, be introduced originally with a view to conceal and diſguiſe the real ſubſtance of iſinglaſs, and preſerve the monopoly; but, as the maſk is now taken off, it cannot be doubted to anſwer every purpoſe more effectually in its native ſtate, without any ſubſequent manufacture whatever, eſpecially to the principal conſumers, who hence will be enabled to procure ſufficient ſupply from the Britiſh colonies. Until this laudable end can be fully accompliſhed, and as a ſpecies of iſinglaſs, more eaſily produceable from the marine fiſheries, may probably be more immediately encouraged, it may be manufactured as follows:

" The ſounds of cod and ling bear great analogy with thoſe of the *accipenſer* genus of Linnæus and Artedi; and are in general ſo well known, as to require no particular deſcription. The Newfoundland and Iceland fiſhermen ſplit open the fiſh, as ſoon as taken, and throw the back-bones, with the ſounds annexed, in a heap; but previous to incipient putrefaction, the ſounds are cut out, waſhed from their ſlimes, and ſalted for uſe. In cutting out the ſounds, the intercoſtal parts are left behind, which are much the beſt; the Iceland fiſhermen are ſo ſenſible of this, that they beat the bone upon a block with a thick ſtick, till the pockets, as they term them, come out eaſily, and thus preſerve the ſound entire. If the ſounds have been cured with ſalt, that muſt be diſſolved by ſteeping them in water, before they are prepared for iſinglaſs; the freſh ſound muſt then be laid upon a block of wood, whoſe ſurface is a little elliptical, to the end of which a ſmall hair-bruſh is nailed, and with a ſaw-knife the membranes on each ſide of the ſound muſt be ſcraped off. The knife is rubbed upon the bruſh occaſionally, to clear its teeth; the pockets are cut open with ſciſſars, and perfectly cleanſed of the mucous matter with a coarſe cloth; the ſounds are afterwards waſhed a few minutes in lime-water in order to abſorb their oily principle, and laſtly in clear water. They are then laid upon nets, to dry in the air; but if intended to reſemble the foreign iſinglaſs, the ſounds of cod will only admit of that called *book*, but thoſe of ling both ſhapes. The thicker the ſounds are, the better the iſinglaſs, colour excepted; but that is immaterial to the brewer, who is its chief conſumer.

" This iſinglaſs reſolves into fining, like the other ſorts, in ſubacid liquors, as ſtale beer, cyder, old hock, &c. and in equal quantities produces ſimilar effects upon turbid liquors, except that it falls ſpeedier and cloſer to the bottom of the veſſel, as may be demonſtrated in tall cylindrical glaſſes; but foreign iſinglaſs retains the conſiſtency of fining preferably in warm weather, owing to the greater tenacity of its native mucilage.

" Vegetable acids are, in every reſpect, beſt adapted to fining: the mineral acids are too corroſive, and even inſalubrious, in common beverage.

" It is remarkable, that, during the converſion of iſinglaſs into fining, the acidity of the menſtruum ſeems greatly diminiſhed, at leaſt to taſte, not on account of any alkaline property in the iſinglaſs, probably, but by its inveloping the acid particles. It is likewiſe reducible into jelly with alkaline liquors, which indeed are ſolvents of all animal-matters; even cold lime-water diſſolves it into a pulpous *magma*. Notwithſtanding this is inadmiſſible as fining, on account of the menſtruum, it produces admirable effects in other reſpects: for, on commixture with compoſitions of plaſter, lime, &c. for ornamenting walls expoſed to viciſſitudes of weather, it adds firmneſs and permanency to the cement; and if common brick-mortar be worked up with this jelly, it ſoon becomes almoſt as hard as the brick itſelf: but, for this purpoſe, it is more commodiouſly prepared, by diſſolving it in cold water, acidulated with vitriolic acid; in which caſe, the acid quits the jelly, and forms with the lime a *ſelenitic* maſs, while, at the ſame time, the jelly being deprived in ſome meaſure of its moiſture, through the formation of an indiſſoluble concrete amongſt its parts, ſoon dries, and hardens into a firm body; whence its ſuperior ſtrength and durability are eaſily comprehended.

" It has long been a prevalent opinion, that ſturgeon, on account of its cartilaginous nature, would yield great quantities of iſinglaſs; but, on examination, no part of this fiſh, except the inner coat of the ſound, promiſed the leaſt ſucceſs. This being full of *rugæ*, adheres ſo firmly to the external membrane, which is uſeleſs, that the labour of ſeparating them ſuperſedes the advantage. The inteſtines, however, which in the larger fiſh extend ſeveral yards in length, being cleanſed from their mucus, and dried, were found ſurpriſingly ſtrong and elaſtic, reſembling cords made with the inteſtines of other animals, commonly called *cat-gut*, and, from ſome trials, promiſed ſuperior advantages when applied to mechanic operations."

Iſinglaſs is ſometimes uſed in medicine; and may be given in a thin acrimonious ſtate of the juices, after the ſame manner as the vegetable gums and mucilages, regard being had to their different diſpoſition to putreſcence.

ICHTHYOLOGY, the ſcience of fiſhes, or that part of zoology which treats of fiſhes. See Fish, and Zoology, n° 10.

ICHTHYOPHAGI, FISH-EATERS, a name given to a people, or rather to ſeveral different people, who lived wholly on fiſhes. The word is Greek, compounded of ιχθυς, *piſcis*, " fiſh," and φαγειν, *edere*, " to eat."

The Icthyophagi ſpoken of by Ptolemy are placed by Sanſon in the provinces of Nanquin and Xantong. Agatharcides calls all the inhabitants between Carmania and Gedroſia by the name *Ichthyophagi*.

From the accounts given us of the Ichthyophagi by Herodotus, Strabo, Solinus, Plutarch, &c. it appears indeed that they had cattle, but that they made no uſe of them excepting to feed their fiſh withal. They made their houſes of large fiſh-bones, the ribs of whales ſerving them for their beams. The jaws of theſe animals ſerved them for doors; and the mortars wherein they pounded their fiſh, and baked it at the ſun, were nothing elſe but their vertebræ.

ICHTHYPERIA, in natural hiſtory, a name given by Dr Hill to the bony palates and mouths of fiſhes, uſually met with either foſſile, in ſingle pieces, or in fragments. They are of the ſame ſubſtance with the bufonitæ; and are of very various figures, ſome broad and ſhort, others longer and ſlender; ſome very gibboſe, and others plainly arched. They are likewiſe of various ſizes, from the tenth of an inch to two inches in length, and an inch in breadth.

ICONOCLASTES, or ICONOCLASTÆ, breakers of images; a name which the church of Rome gives to all who reject the uſe of images in religious matters.—The word is Greek, formed from εικων, *imago*, and κλαϛειν, *rumpere*, "to break."

In this ſenſe, not only the reformed, but ſome of the eaſtern churches are called *Iconoclaſtes*, and eſteemed by them heretics, as oppoſing the worſhip of the images of God and the ſaints, and breaking their figures and repreſentations in churches.

ICOSAHEDRON, in geometry, a regular ſolid, conſiſting of 20 triangular pyramids, whoſe vertexes meet in the centre of a ſphere ſuppoſed to circumſcribe it; and therefore have their height and baſes equal: wherefore the ſolidity of one of theſe pyramids multiplied by 20, the number of baſes, gives the ſolid contents of the icoſahedron.

ICOSANDRIA, (from εικοσι, "twenty," and ανηρ, "a man, or huſband;" the name of the 12th claſs in Linnæus's ſexual method, conſiſting of plants with hermaphrodite flowers, which are furniſhed with 20 or more ſtamina, that are inſerted into the inner ſide of the calix or petals. See BOTANY, p. 1292.

ICTINUS, a celebrated Greek architect who lived about 430 B. C. built ſeveral magnificent temples, and among others that of Minerva at Athens.

IDA, (anc. geog.) a mountain ſituated in the heart of Crete where broadeſt; the higheſt of all in the iſland; round, and in compaſs 60 ſtadia, (Strabo); the nurſing-place of Jupiter, and where his tomb was viſited in Varro's time.—Another *Ida*, a mountain of Myſia, or rather a chain of mountains (Homer, Virgil), extending from Zeleia on the ſouth of the territory of Cyzicus to Lectum the utmoſt promontory of Troas. The top was called *Gargara*, (Homer, Strabo); and celebrated by the poets for the judgment of Paris on the beauty of the three goddeſſes, Minerva, Juno, and Venus, to the laſt of whom he gave the preference.

IDALIUM, (anc. geog.) a promontory on the eaſt ſide of Cyprus. Now *Capo di Griego*; with a high rugged eminence riſing over it, in the form of a table. It was ſacred to Venus; and hence the epithet *Idalia* given her by the poets. The eminence was covered with a grove; and in the grove was a little town, in Pliny's time extinct. *Idalia*, according to Bochart, denotes the place or ſpot ſacred to the goddeſs.

IDEA, the reflex perception of objects, after the original perception or impreſſion has been felt by the mind. See METAPHYSICS, *paſſim*; and LOGIC, Part I.

IDENTITY, denotes that by which a thing is itſelf, and not any thing elſe; in which ſenſe *identity* differs from *ſimilitude*, as well as *diverſity*. See METAPHYSICS, n° 105,—120.

IDES, in the ancient Roman calendar, were eight days in each month; the firſt of which fell on the 15th of March, May, July, and October; and on the 13th day of the other months.—The origin of the word is conteſted. Some will have it formed from ιδειν, "to ſee;" by reaſon the full moon was commonly ſeen on the day of the ides: others from ειδος, "ſpecies, figure," on account of the image of the full moon then viſible: others from *idulium*, or *ovis idulis*, a name given by the Hetrurians to a victim offered on that day to Jupiter: others from the Hetrurian word *iduo*, i. e. *divido*; by reaſon the ides divided the moon into two nearly equal parts.

The ides came between the KALENDS and the NONES; and were reckoned backwards. Thus they called the 14th day of March, May, July, and October, and the 12th of the other months, the *pridie idus*, or the day before the ides; the next preceding day they called the *tertia idus*; and ſo on, reckoning always backwards, till they came to the NONES. This method of reckoning time is ſtill retained in the chancery of Rome, and in the calendar of the Breviary.—The ides of May were conſecrated to Mercury: the ides of March were ever eſteemed unhappy, after Cæſar's murder on that day: the time after the ides of June was reckoned fortunate for thoſe who entered into matrimony: the ides of Auguſt were conſecrated to Diana, and were obſerved as a feaſt-day by the ſlaves. On the ides of September, auguries were taken for appointing the magiſtrates, who formerly entered into their offices on the ides of May, afterwards on thoſe of March.

IDIOCY, a defect of underſtanding. Both idiocy and LUNACY excuſe from the guilt of crimes; (ſee CRIME, *par. ult.*) For the rule of law as to lunatics, which alſo may be eaſily adapted to idiots, is, that *furioſus furore ſolum punitur.* In criminal caſes, therefore, idiots and lunatics are not chargeable for their own acts, if committed when under theſe incapacities: no, not even for treaſon itſelf. Alſo, if a man in his ſound memory commits a capital offence, and before arraignment for it he becomes mad, he ought not to be arraigned for it; becauſe he is not able to plead to it with that advice and caution that he ought. And if, after he has pleaded, the priſoner becomes mad, he ſhall not be tried: for how can he make his defence? If, after he be tried and found guilty, he loſes his ſenſes before judgment, judgment ſhall not be pronounced; and if, after judgment, he becomes of nonſane memory, execution ſhall be ſtayed: for, peradventure, ſays the humanity of the Engliſh law, had the priſoner been of ſound memory, he might have alleged ſomething in ſtay of judgment or execution. Indeed, in the bloody reign of Henry VIII. a ſtatute was made, which enacted, that if a perſon, being *compos mentis*, ſhould commit high treaſon, and after fall into madneſs, he might be tried in his abſence, and ſhould ſuffer death, as if he were of perfect memory. But this ſavage and inhuman law was repealed by the ſtatute 1. & 2 Ph. & M. c. 10. For, as is obſerved by Sir Edward Coke, "the execution of an offender is for example, *ut pœna ad paucos, metus ad omnes perveniat*: but ſo it is not when a madman is executed; but ſhould be a miſerable ſpectacle, both againſt law, and of extreme inhumanity and cruelty, and can be

Blackſt. Comment.

no example to others." But if there be any doubt whether the party be *compos* or not, this ſhall be tried by a jury. And if he be ſo found, a total idiocy, or abſolute inſanity, excuſes from the guilt, and of courſe from the puniſhment, of any criminal action committed under ſuch deprivation of the ſenſes: but if a lunatic hath lucid intervals of underſtanding, he ſhall anſwer for what he does in thoſe intervals, as if he had no deficiency. Yet, in the caſe of abſolute madmen, as they are not anſwerable for their actions, they ſhould not be permitted the liberty of acting unleſs under proper control; and, in particular, they ought not to be ſuffered to go looſe, to the terror of the king's ſubjects. It was the doctrine of our ancient law, that perſons deprived of their reaſon might be confined till they recovered their ſenſes, without waiting for the forms of a commiſſion or other ſpecial authority from the crown: and now, by the vagrant acts, a method is chalked out for impriſoning, chaining, and ſending them to their proper homes.

The matrimonial contract likewiſe cannot take place in a ſtate of idiocy. It was formerly adjudged, that the iſſue of an idiot was legitimate, and his marriage valid. A ſtrange determination! ſince conſent is abſolutely requiſite to matrimony, and neither idiots nor lunatics are capable of conſenting to any thing. And therefore the civil law judged much more ſenſibly, when it made ſuch deprivations of reaſon a previous impediment, though not a cauſe of divorce if they happened after marriage. And modern reſolutions have adhered to the ſenſe of the civil law, by determining that the marriage of a lunatic, not being in a lucid interval, was abſolutely void. But as it might be difficult to prove the exact ſtate of the party's mind at the actual celebration of the nuptials, upon this account, (concurring with ſome private family-reaſons *) the ſtatute 15 Geo. II. c. 30. has provided, that the marriage of lunatics and perſons under phrenzies (if found lunatics under a commiſſion, or committed to the care of truſtees under any act of parliament) before they are declared of ſound mind by the lord chancellor, or the majority of ſuch truſtees, ſhall be totally void.

Idiots, and perſons of nonſane memory, as well as infants, and perſons under dureſs, are not totally diſabled either to convey or purchaſe, but *ſub modo* only. For their conveyances and purchaſes are voidable, but not actually void. The king, indeed, on behalf of an idiot, may avoid his grants or other acts. But it hath been ſaid, that a *non compos* himſelf, though he be afterwards brought to a right mind, ſhall not be permitted to allege his own inſanity in order to avoid ſuch grant: for that no man ſhall be allowed to ſtupify himſelf, or plead his own diſability. The progreſs of this notion is ſomewhat curious. In the time of Edward I. *non compos* was a ſufficient plea to avoid a man's own bond: and there is a writ in the regiſter for the alienor himſelf to recover lands aliened by him during his inſanity; *dum fuit non compos mentis ſuæ, ut dicit*, &c. But under Edward III. a ſcruple began to ariſe, whether a man ſhould be permitted to *blemiſh* himſelf, by pleading his own inſanity: and, afterwards, a defendant in aſſiſe having pleaded a releaſe by the plaintiff ſince the laſt continuance, to which the plaintiff replied (*ore tenus*, as the manner then was) that he was out of his mind when he gave it, the court adjourned the aſſiſe; doubting, whether as the plaintiff was ſane both then and at the commencement of the ſuit, he ſhould be permitted to plead an intermediate deprivation of reaſon; and the queſtion was aſked, how he came to remember to releaſe, if out of his ſenſes when he gave it? Under Henry VI. this way of reaſoning (that a man ſhall not be allowed to diſable himſelf, by pleading his own incapacity, becauſe he cannot know what he did under ſuch a ſituation) was ſeriouſly adopted by the judges in argument; upon a queſtion, whether the heir was barred of his right of entry by the feoffment of his inſane anceſtor. And from theſe looſe authorities, which Fitzherbert does not ſcruple to reject as being contrary to reaſon, the maxim that a man ſhall not ſtultify himſelf hath been handed down as ſettled law: though later opinions, feeling the inconvenience of the rule, have in many points endeavoured to reſtrain it. And, clearly, the next heir, or other perſon intereſted, may, after the death of the idiot or *non compos*, take advantage of his incapacity and avoid the grant. And ſo too, if he purchaſes under this diſability, and does not afterwards upon recovering his ſenſes agree to the purchaſe, his heir may either waive or accept the eſtate at his option. In like manner, an infant may waive ſuch purchaſe or conveyance, when he comes to full age; or, if he does not then actually agree to it, his heirs may waive it after him. Perſons alſo, who purchaſe or convey under dureſs, may affirm or avoid ſuch tranſaction, whenever the dureſs is ceaſed. For all theſe are under the protection of the law; which will not ſuffer them to be impoſed upon thro' the imbecillity of their preſent condition; ſo that their acts are only binding, in caſe they be afterwards agreed to when ſuch imbecillity ceaſes. Yet the guardians or committees of a lunatic, by the ſtatute 11 Geo. III. c. 20. are empowered to renew in his right, under the directions of the court of chancery, any leaſe for lives or years, and apply the profits of ſuch renewal for the benefit of ſuch lunatic, his heirs, or executors *.

IDIOM, among grammarians, properly ſignifies the peculiar genius of each language, but is often uſed in a ſynonimous ſenſe with dialect.

IDIOPATHY, in phyſic, a diſorder peculiar to a certain part of the body, and not ariſing from any preceding diſeaſe, in which ſenſe it is oppoſed to ſympathy. Thus, an epilepſy is idiopathic when it happens merely through ſome fault in the brain; and ſympathetic when it is the conſequence of ſome other diſorder.

IDIOSYNCRASY, among phyſicians, denotes a peculiar temperament of body, whereby it is rendered more liable to certain diſorders than perſons of a different conſtitution uſually are.

IDLENESS, a reluctancy in people to be employed in any kind of work.

Idleneſs in any perſon whatſoever is a high offence againſt the public œconomy. In China it is a maxim, that if there be a man who does not work, or a woman that is idle, in the empire, ſomebody muſt ſuffer cold or hunger: the produce of the lands not being more than ſufficient, with culture, to maintain the inhabitants; and therefore, though the idle perſon may ſhift off the want from himſelf, yet it muſt in the end fall ſomewhere. The court alſo of Areopagus at A-

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* See Private Acts 23 Geo. II. c. 6.

* See Lunacy.

Athens puniſhed idleſs, and exerted a right of examining every citizen in what manner he ſpent his time; the intention of which was, that the Athenians, knowing they were to give an account of their occupations, ſhould follow only ſuch as were laudable, and that there might be no room left for ſuch as lived by unlawful arts. The civil law expelled all ſturdy vagrants from the city: and, in our own law, all idle perſons or vagabonds, whom our ancient ſtatutes deſcribe to be "ſuch as wake on the night, and ſleep on the day, and haunt cuſtomable taverns, and ale-houſes, and routs about; and no man wot from whence they come, ne whether they go;" or ſuch as are more particularly deſcribed by ſtatute 17 Geo. II. c. 5. and divided into three claſſes, *idle* and *diſorderly* perſons, *rogues* and *vagabonds*, and *incorrigible rogues*;—all theſe are offenders againſt the good order, and blemiſhes in the government, of any kingdom. They are therefore all puniſhed, by the ſtatute laſt mentioned; that is to ſay, idle and diſorderly perſons with one month's impriſonment in the houſe of correction; rogues and vagabonds with whipping, and impriſonment not exceeding ſix months; and incorrigible rogues with the like diſcipline, and confinement not exceeding two years: the breach and eſcape from which confinement in one of an inferior claſs, ranks him among incorrigible rogues; and in a rogue (before incorrigible) makes him a felon, and liable to be tranſported for ſeven years. Perſons harbouring vagrants are liable to a fine of forty ſhillings, and to pay all expences brought upon the pariſh thereby: in the ſame manner as, by our ancient laws, whoever harboured any ſtranger for more than two nights, was anſwerable to the public for any offence that ſuch his inmate might commit.

Blackſt. Comment.

IDOL, in pagan theology, an image, or fancied repreſentation of any of the heathen gods.—This image, of whatever materials it conſiſted, was, by certain ceremonies called *conſecration*, converted into a god. While under the artificer's hands, it was only a mere ſtatue. Three things were neceſſary to turn it into a god; proper ornaments, conſecration, and oration. The ornaments were various, and wholly deſigned to blind the eyes of the ignorant and ſtupid multitude, who are chiefly taken with ſhew and pageantry. Then followed the conſecration and oration, which were performed with great ſolemnity among the Romans.

IDOLATRY, or the worſhip of idols, may be diſtinguiſhed into two ſorts. By the firſt, men adore the works of God, the ſun, the moon, the ſtars, angels, dæmons, men and animals: by the ſecond, men worſhip the work of their own hands, as ſtatues, pictures, and the like: and to theſe may be added a third, that by which men have worſhipped the true God under ſenſible figures and repreſentations. This indeed may have been the caſe with reſpect to each of the above kinds of idolatry; and thus the Iſraelites adored God under the figure of a calf.

The ſtars were the firſt objects of idolatrous worſhip, on account of their beauty, their influence on the productions of the earth, and the regularity of their motions, particularly the ſun and moon, which are conſidered as the moſt glorious and reſplendent images of the Deity: afterwards, as their ſentiments became more corrupted, they began to form images, and to entertain the opinion, that by virtue of conſecration, the gods were called down to inhabit or dwell in their ſtatues. Hence Arnobius takes occaſion to rally the pagans for guarding ſo carefully the ſtatues of their gods, who, if they were really preſent in their images, might ſave their worſhippers the trouble of ſecuring them from thieves and robbers.

As to the adoration which the ancient pagans paid to the ſtatues of their gods, it is certain, that the wiſer and more ſenſible heathens conſidered them only as ſimple repreſentations or figures deſigned to recal to their minds the memory of their gods. This was the opinion of Varro and Seneca: and the ſame ſentiment is clearly laid down in Plato, who maintains, that images are inanimate, and that all the honour paid to them has reſpect to the gods whom they repreſent. But as to the vulgar, they were ſtupid enough to believe the ſtatues themſelves to be gods, and to pay divine worſhip to ſtocks and ſtones.

Soon after the flood, idolatry ſeems to have been the prevailing religion of all the world; for wherever we caſt our eyes at the time of Abraham, we ſcarcely ſee any thing but falſe worſhip and idolatry. And it appears from Scripture, that Abraham's foreſathers, and even Abraham himſelf, were for a time idolaters.

The Hebrews were indeed expreſsly forbidden to make any repreſentation of God; they were not ſo much as to look upon an idol: and from the time of the Maccabees to the deſtruction of Jeruſalem, the Jews extended this precept to the making the figure of any man: by the law of Moſes, they were obliged to deſtroy all the images they found, and were forbidden to apply any of the gold or ſilver to their own uſe, that no one might receive the leaſt profit from any thing belonging to an idol. Of this the Jews, after they had ſmarted for their idolatry, were ſo ſenſible, that they thought it unlawful to uſe any veſſel that had been employed in ſacrificing to a falſe god, to warm themſelves with the wood of a grove after it was cut down, or to ſhelter themſelves under its ſhade.

But the preaching of the Chriſtian religion, wherever it prevailed, entirely rooted out idolatry; as did alſo that of Mahomet, which is built on the worſhip of one God. It muſt not, however, be forgotten, that the Proteſtant Chriſtians charge thoſe of the church of Rome with paying an idolatrous kind of worſhip to the pictures or images of ſaints and martyrs: before theſe, they burn lamps and wax-candles; before theſe, they burn incenſe, and, kneeling, offer up their vows and petitions: they, like the Pagans, believe that the ſaint to whom the image is dedicated, preſides in a particular manner about its ſhrine, and works miracles by the intervention of its image; and that if the image was deſtroyed or taken away, the ſaint would no longer perform any miracle in that place.

IDYLLION, in ancient poetry, is only a diminutive of the word EIDOS, and properly ſignifies any poem of moderate extent, without conſidering the ſubject. But as the collection of Theocritus's poems were called *idyllia*, and the paſtoral pieces being by far the beſt in that collection, the term *idyllion* ſeems to be now appropriated to paſtoral pieces.

JEARS, or GEERS, in the ſea-language, an aſſemblage of tackles, by which the lower yards of a ſhip are hoiſted along the maſt to their uſual ſtation, or lowered from thence as occaſion requires; the former of which operations is called *ſwaying*, and the latter *ſtriking*.

JEBUSÆI, one of the ſeven ancient people of Canaan, deſcendants of Jebuſi, Canaan's ſon; ſo warlike and brave, as to have ſtood their ground, eſpecially in Jebus, afterwards called *Jeruſalem*, down to the time of David. Judges i. 21. 1 Sam. v. 6.

JEDBURGH, a town of Scotland, capital of Tiviotdale or Roxburghſhire. It is well-built and populous, with a handſome church and town-hall, and a good market for corn and cattle. It gives the title of *lord* to the marquis of Lothian's eldeſt ſon, and is the ſeat of the ſheriff's court and preſbytery.

JEDDO, the capital town or city of the iſlands of Japan, where the emperor reſides. It is open on all ſides, having neither walls nor ramparts; and the houſes are built with earth, and boarded on the outſide to prevent the rain from deſtroying the walls. In every ſtreet there is an iron gate, which is ſhut up in the night; and a kind of cuſtom-houſe or magazine, to put merchandizes in. It is a large place, being nine miles in length and ſix in breadth, and contains 1,000,000 of inhabitants. A fire happened in 1658, which, in the ſpace of 48 hours, burnt down 100,000 houſes, and in which a vaſt number of the inhabitants periſhed. The emperor's palace and all the reſt were reduced to aſhes; but they are all rebuilt again. The royal palace is in the middle of the town; and is defended with walls, ditches, towers, and baſtions. Where the emperor reſides, there are three towers nine ſtories high, each covered with plates of gold; and the hall of audience is ſaid to be ſupported by pillars of maſſy gold. Near the palace are ſeveral others, where the relations of the emperor live. The empreſs has a palace of her own, and there are 20 ſmall ones for the concubines. Beſides, all the vaſſal kings have each a palace in the city, with a handſome garden, and ſtables for 2000 horſes. The houſes of the common ſort are nothing but a ground-floor, and the rooms are parted by folding-ſcreens; ſo that they can make the rooms larger or ſmaller at pleaſure. It is ſeated in an agreeable plain, at the bottom of a fine bay; and the river which croſſes it, is divided into ſeveral canals. E. Long. 140. 0. N. Lat. 35. 32.

JEFFERY. See GEOFFREY.

JEFFREYS (lord George), baron Wem, commonly called *Judge Jeffreys*, was the ſixth ſon of John Jeffreys, Eſq; of Acton in Denbighſhire; and was educated at Weſtminſter-ſchool, whence he removed to the Inner Temple, where he applied himſelf to the ſtudy of the law. Alderman Jeffreys, who was probably related to him, introduced him among the citizens of London; and he being a merry bottle-companion, ſoon came into great buſineſs, and was choſen their recorder. He was afterwards choſen ſolicitor to the duke of York; and in 1680 was knighted, and made chief-juſtice of Cheſter. At length, reſigning the recorderſhip, he obtained the poſt of chief-juſtice of the king's-bench, and, ſoon after the acceſſion of James II. the great ſeal. During the reign of king Charles II. he ſhewed himſelf a bitter enemy to thoſe diſſenting miniſters who, in that time of perſecution, were tried by him: he was one of the greateſt adviſers and promoters of all the oppreſſions and arbitrary meaſures carried on in the reign of James II.; and his ſanguinary and inhuman proceedings againſt Monmouth's unhappy adherents in the weſt will ever render his name infamous. Whenever the priſoner was of a different party, or he could pleaſe the court by condemning him, inſtead of appearing according to the duty of his office, as his counſel, he would ſcarce allow him to ſpeak for himſelf; but would load him with the groſſeſt and moſt vulgar abuſe, browbeat, inſult, and turn to ridicule the witneſſes that ſpoke in his behalf; and even threaten the jury with fines and impriſonment, if they made the leaſt heſitation about bringing in the priſoner guilty. Yet it is ſaid, that when he was in temper, and matters perfectly indifferent came before him, no one became a ſeat of juſtice better. Nay, it even appears, that, when he was under no ſtate-influence, he was ſometimes inclined to protect the natural and civil rights of mankind, of which the following inſtance has been given:—The mayor and aldermen of Briſtol had been uſed to tranſport convicted criminals to the American plantations, and ſell them by way of trade. This turning to good account, when any pilferers or petty rogues were brought before them, they threatened them with hanging; and then ſome officers who attended, earneſtly perſuaded the ignorant intimidated creatures to beg for tranſportation, as the only way to ſave them; and in general their advice was followed. Then, without more form, each alderman in courſe took one, and ſold him for his own benefit; and ſometimes warm diſputes aroſe between them about the next turn. This infamous trade, which had been carried on many years, coming to the knowledge of the lord chief juſtice, he made the mayor deſcend from the bench, and ſtand at the bar in his ſcarlet and furr, with his guilty brethren the aldermen, and plead as common criminals. He then obliged them to give ſecurities to anſwer informations; but the proceedings were ſtopped by the Revolution.

However, the brutality Jeffreys commonly ſhewed on the bench, where his voice and viſage were equally terrible, at length expoſed him to a ſevere mortification. A ſcrivener of Wapping having a cauſe before him, one of the opponent's counſel ſaid he was a ſtrange fellow, and ſometimes went to church, and ſometimes to conventicles; and it was thought he was a trimmer. At this the chancellor fired: "A trimmer? (ſaid he); I have heard much of that monſter, but never ſaw one. Come forth, Mr Trimmer, and let me ſee your ſhape." He then treated the poor fellow ſo roughly, that, on his leaving the hall, he declared he would not undergo the terrors of that man's face again to ſave his life, and he ſhould certainly retain the frightful impreſſions of it as long as he lived. Soon after, the prince of Orange coming, the lord-chancellor, dreading the public reſentment, diſguiſed himſelf in a ſeaman's dreſs, in order to leave the kingdom; and was drinking in a cellar, when this ſcrivener coming into the cellar, and ſeeing again the face which had filled him with ſuch horror, ſtarted; on which, Jeffreys, fearing he was known, feigned a cough, and turned to the wall with his pot of beer in his hand.

But Mr Trimmer going out, gave notice that he was there; and the mob ruſhing in, ſeized him, and carried him before the lord-mayor, who ſent him with a ſtrong guard to the lords of the council, by whom he was committed to the Tower, where he died in 1689. —It is remarkable, that the late counteſs of Pomfret met with very rude inſults from the populace on the weſtern road, only becauſe ſhe was grand-daughter of the inhuman Jeffries.

JEHOVAH, one of the ſcripture-names of God, ſignifying the Being who is ſelf-exiſtent and gives exiſtence to others.

So great a veneration had the Jews for this name, that they left off the cuſtom of pronouncing it, whereby its true pronunciation was forgotten. They call it *tetragrammaton*, or "the name with four letters;" and believe, that whoever knows the true pronunciation of it cannot fail to be heard by God.

JEJUNUM, in anatomy, the name of one of the ſmall inteſtines. See Anatomy, n° 354, g.

JELLY. See Gelly; and Chemistry, n° 521.

JEMTERLAND, a province of Sweden, bounded on the north by Angermania, on the eaſt by Medalpadia, on the ſouth by Helſingia, and on the weſt by Norway. It is full of mountains; and the principal towns are Reſſundt, Lich, and Docra.

JENA, a ſtrong town of Germany, in the circle of Upper Saxony, and in Thuringia, with an univerſity. It is ſeated on the the river Sala, in E. Long. 2. 59. N. Lat. 51. 0.

JENCAPORE, a town of Aſia, in Indoſtan, and in the dominions of the Great Mogul, capital of a territory of the ſame name. It is ſeated on the river Chaul, in E. Long. 76. 25. N. Lat. 30. 30.

JENISA, a river of the Ruſſian empire, that runs from north to ſouth through Siberia, and falls into the Frozen Ocean.

JENISKOI, a town of the Ruſſian empire, in Siberia, ſeated on the river Jeniſa. It is large, populous, and pretty ſtrong; and there are villages for ſeveral miles round it. It is ſubject to the Tunguſians, who are pagans, and chiefly live on the above river. They pay a tribute to the emperor for every bow, reckoning a man and a woman for one. The climate is extremely cold; and no other fruits grow there but black and red currants, ſtrawberries, and gooſeberries. Corn, butchers meat, and wild fowls, are very cheap. E. Lon. 86. 25. N. Lat. 58. 40.

JENCOPING, a town of Sweden, in the province of Smaland, ſeated on the ſouth ſide of the lake Werter, with a ſtrong citadel. The houſes are all built with wood. E. Long. 14. 20. N. Lat. 57. 22.

JENKIN (Robert), a learned Engliſh divine in the 18th century, was bred at Cambridge, became maſter of St John's college, and wrote ſeveral books much eſteemed, *viz.* 1. An hiſtorical examination of the authority of General Councils, 4to. 2. The reaſonableneſs and certainty of the Chriſtian religion, 2 vols 8vo. 3. *Defenſio S. Auguſtini.* This book is written againſt M. Le Clerc. 4. Remarks on ſome books lately publiſhed, *viz.* Mr Whiſton's eight ſermons, Locke's paraphraſe, &c. 5. A tranſlation from the French of the life of Apollonius Tyaneus.

JENKINS (Henry). See Longevity.

Jenkins (Sir Leoline), a learned civilian and able ſtateſman of the laſt century, born in Glamorganſhire about the year 1623. Being rendered obnoxious to the parliament during the civil war by adhering to the king's cauſe, he conſulted his ſafety by flight; but returning on the reſtoration, he was admitted an advocate in the court of arches, and ſucceeded Dr Exton as judge. When the queen-mother Henrietta died in 1669 at Paris, her whole eſtate, real and perſonal, was claimed by her nephew Lewis XIV.: upon which Dr Jenkins's opinion being called for and approved, he went to Paris, with three others joined with him in a commiſſion, and recovered her effects; for which he received the honour of knighthood. He officiated as one of the mediators at the treaty of Nimeguen, in which tedious negociation he was engaged about four years and a half; and was afterwards made a privy counſellor and ſecretary of ſtate. He died in 1685; and as he never married, bequeathed his whole eſtate to charitable uſes: he was ſo great a benefactor to Jeſus-college Oxford, that he is generally looked on as the ſecond founder. All his letters and papers were collected and printed in 1724, in 2 vols folio.

JENNY-wren, a name given by writers on ſong-birds to the wren. See Wren.

JEOFAILE, (compounded of three French words, *J'ay faille,* "I have failed"), a term in law, uſed for an overſight in pleading or other proceedings at law.

The ſhewing of theſe defects or overſights was formerly often practiſed by the counſel; and when the jury came into court in order to try the iſſue, they ſaid, This inqueſt you ought not to take; and after verdict they would ſay to the court, To judgment you ought not to go. But ſeveral ſtatutes have been made to avoid the delays occaſioned by ſuch ſuggeſtions; and a judgment is not to be ſtayed after verdict for miſtaking the Chriſtian or ſurname of either of the parties, or in a ſum of money, or in the day, month, year, &c. where the ſame are rightly named in any preceding record.

JEREMIAH (*the Prophecy of*), a canonical book of the Old Teſtament. This divine writer was of the race of the prieſts, the ſon of Hilkia of Anathoth, of the tribe of Benjamin. He was called to the prophetic office when very young, about the 13th year of Joſiah, and continued in the diſcharge of it about 40 years. He was not carried captive to Babylon with the other Jews, but remained in Judea to lament the deſolation of his country. He was afterwards a priſoner in Egypt with his diſciple Baruch, where it is ſuppoſed he died in a very advanced age. Some of the Chriſtian fathers tell us he was ſtoned to death by the Jews, for preaching againſt their idolatry; and ſome ſay he was put to death by Pharaoh Hophrah, becauſe of his prophecy againſt him. Part of the prophecy of Jeremiah relates to the time after the captivity of Iſrael, and before that of Judah, from the firſt chapter to the 44th; and part of it was in the time of the latter captivity, from the 44th chapter to the end. The prophet lays open the ſins of Judah with great freedom and boldneſs, and reminds them of the ſevere judgments which had befallen the ten tribes for the ſame offences. He paſſionately laments their miſfortune, and recommends a ſpeedy reformation to them. Afterwards he predicts the grievous calamities that were approaching, particularly the 70 years captivity in Chaldea. He likewiſe foretells their deliverance and happy return, and the recompence which Babylon, Moab, and other enemies of the Jews, ſhould meet with in due time. There are likewiſe ſeveral intimations in this prophecy concerning the kingdom of the Meſſiah; alſo ſeveral remarkable viſions, and types, and hiſtorical paſſages relating to thoſe times. The 52d chapter does not belong to the prophecy of Jeremiah, which probably was added by Ezra, and contains a narrative of the taking of Jeruſalem, and of what happened during the captivity of the Jews, to the death of Jechonias. St Jerom has obſerved upon this prophet, that his ſtyle is more eaſy than that of Iſaiah and Hoſea; that he retains ſomething of the ruſticity of the village where he was born; but that he is very learned and majeſtic, and equal to thoſe two prophets in the ſenſe of his prophecy.

JERICHO, or HIERICHUS, (anc. geog.) a city of Judea; ſituated between Jordan and Jeruſalem, at the diſtance of 150 ſtadia from the latter, and 60 from the former. Joſephus ſays the whole ſpace from Jeruſalem is deſart and rocky, and equally barren and uncultivated from Jericho to the lake Aſphaltites; yet the places near the town and above it are extremely fertile and delicious, ſo that it may be juſtly called a *divine plain*, ſurpaſſing the reſt of the land of Canaan, no unfruitful country, and ſurrounded by hills in the manner of an amphitheatre. It produces opobalſamum, myrobalans, and dates; from the laſt of which it is called the *city of palm-trees*, by Moſes.

JERIMOTH. See JARIMUTH.

JEROME (St), in Latin *Hieronymus*, a famous doctor of the church, and the moſt learned of all the Latin fathers, was the ſon of Euſebius; and was born at Stridon, a city of the ancient Pannonia, about the year 340. He ſtudied at Rome under Donatus, the learned grammarian. After having received baptiſm, he went into Gaul, and there tranſcribed St Hilary's book *de Synodis*. He then went into Aquileia, where he contracted a friendſhip with Heliodorus, who prevailed on him to travel with him into Thrace, Pontus, Bithynia, Galatia, and Cappadocia. In 372 St Jerome retired into a deſart in Syria, where he was perſecuted by the orthodox of Melitius's party, for being a Sabellian, becauſe he made uſe of the word *Hypoſtaſis*, which had been uſed by the council of Rome in 369. This obliged him to go to Jeruſalem; where he applied himſelf to the ſtudy of the Hebrew language, in order to receive a more perfect knowledge of the Holy Scriptures; and about this time he conſented to be ordained, on condition that he ſhould not be confined to any particular church. In 381, he went to Conſtantinople to hear St Gregory of Nazianzen; and the following year returned to Rome, where he was made ſecretary to pope Damaſus. He then inſtructed many Roman ladies in piety and the knowledge of the ſciences, which expoſed him to the calumnies of thoſe whom he zealouſly reproved for their irregularities; and pope Siricius not having all the eſteem for him which his learning and virtue juſtly entitled him to, this learned doctor left Rome, and returned to the monaſtery of Bethlehem, where he employed himſelf in writing againſt thoſe whom he called *heretics*, eſpecially againſt Vigilantius and Jovinian. He had a quarrel with John of Jeruſalem, and Rufinus, about the Origeniſts. He was the firſt who wrote againſt Pelagius; and died on the 30th of September, 420, at about 80 years of age. There have been ſeveral editions of his works; the laſt, which is that of Verona, is in 11 vols folio. His principal works are, 1. A Latin verſion of the Holy Scriptures, diſtinguiſhed by the name of the *Vulgate*. 2. Commentaries on the Prophets, Eccleſiaſtes, St Matthew's Goſpel, and the Epiſtle to the Galatians, Epheſians, Titus, and Philemon. 3. Polemical treatiſes againſt Montanus, Helvidius, Jovinian, Vigilantius, and Pelagius. 4. Several letters. 5. A treatiſe on the lives and writings of the eccleſiaſtical authors who had flouriſhed before his time.—St Jerome's ſtyle is lively and animated, and ſometimes ſublime.

JEROME *of Prague*, ſo called from the place of his birth, in Bohemia. He was neither a monk nor clergyman, but had a learned education. Having embraced the opinions of John Huſs, he began to propagate them in the year 1480. In the mean time the council of Nice kept a watchful eye over him, and conſidering him as a dangerous perſon, cited him to appear before them and give an account of his faith. In obedience to this citation, he went to Conſtance; but on his arrival, in 1415, finding Huſs in priſon, he ſet out for his own country. Being ſeized however on the way, impriſoned, and examined, he was ſo intimidated, that he retracted, and pretended to approve of the condemnation of Wickliff's and Huſs's opinions; but on the 26th of May, 1416, he condemned that recantation in theſe terms: "I am not aſhamed to confeſs here publicly my weakneſs. Yes, with horror I confeſs my baſe cowardice. It was only the dread of the puniſhment by fire which drew me to conſent, againſt my conſcience, to the condemnation of the doctrine of Wickliff and Huſs." Accordingly ſentence was paſſed on him; in purſuance of which he was delivered to the ſecular arm, and burnt in 1416. He was a perſon of great parts, learning, and elocution.

JERSEY, an iſland in the Engliſh channel, believed to be the iſland called in the Itinerary *Cæſarea*, in ſucceeding times *Augia*, by us *Gerſey*, more frequently *Jerſey*. It is ſituated 25 leagues ſouth from the continent of Britain; five leagues weſt from Cape Carteret in Normandy; three leagues ſouth from Sarke; ſeven leagues, according to the common computation, ſouth-eaſt from Guernſey, but in reality not ſo much; and nine leagues ſouth from Alderney. It is of an oblong figure, meaſuring 12 miles from weſt to eaſt, and ſix from north to ſouth; in circumference between 35 and 36; and, in point of extent, nearly equal to, or rather ſomewhat larger than, Guernſey: elevated like that; but on the oppoſite ſide declining from ſouth to north, the cliffs on that ſide which looks towards Guernſey being 40 or 50 fathom in height, whereas on the ſouth it is in a manner level with the ſea. Hence the diſtance between St Peter's and St Hellier's is really ſeven leagues, though the iſlands have not above four leagues of ſea between them. The people of Jerſey think, that from this elevation, they have a great advantage in point of climate; that their ſummers are warmer, and that their corn and fruits ripen better. The country is beautifully diverſified with little hills, warm valleys, and, towards the ſea, with pleaſant plains. The ſoil alſo varies very much; in ſome places gravelly, in others ſandy: but the greateſt part is a deep, rich, fertile mould; and there is hardly any part of the iſland that can be ſtyled barren. It is alſo thought to be better watered than Guernſey, abounding every where with rills, rivulets, and living ſprings; ſo that there are between 30 and 40 corn-mills driven by water, excluſive of ſeven fulling, and ſeveral windmills. The produce of this iſland is much the ſame with that of Guernſey; their paſture is ſo ſweet, that no country in Europe can boaſt of richer milk or finer butter; and they have grain of all kinds, and particularly a ſort of wheat called *froment-tremais*, from its being ſown in the latter end of May, and reaped in the beginning of Auguſt. But what chiefly diſtinguiſhes this iſland at preſent, is its orchards; which are very well fenced, regularly planted, and yield commonly immenſe quantities of fruit.

On the ſouth of the iſland the ſea ſeems to have encroached upon the land, (which, as we have before obſerved, declines on that ſide), and to have ſwallowed upwards of ſix ſquare miles, making a very beautiful bay of between two and three miles broad, and near the ſame in depth. In the eaſt corner of this bay ſtands the town of St Hellier, very happily ſituated, having a proſpect open to the ſea and Mount Eliſabeth Caſtle (which, ſince it was repaired and the works augmented in the reign of Charles II. entirely occupies a rocky iſle, which the ſea, when it devoured the ſoil, could not digeſt), covered with hills to the north, with meadows between them and the town, through which runs a copious and delightful ſtream that waters the place as well as can be wiſhed. The ſtreets are open and well-built, with a handſome ſquare in the centre, and well accommodated in point of markets, and every thing that can contribute to the convenience of the inhabitants, of whom there may be about 2000. There has been of late years a pier raiſed; which is a great advantage to the port, and of courſe not a little to the benefit of the town. But the principal haven is on the other ſide, in the weſtern corner of the bay, which receives its name from it, being called *St Aubin's*. It is about half the ſize of St Hellier, chiefly occupied by merchants and maſters of ſhips; and moſt of the buildings being new, make a very neat and elegant figure. A little to the eaſtward of the town a rock riſes up in the ſea, upon which the fort of St Aubin is erected; to which the inhabitants having joined a ſtrong, well-built pier, their haven is now equally ſecured againſt the fury of the winds, and the inſults of an enemy. Within the pier, a ſixth-rate juſt floats at a dead neap, and a veſſel of 200 tons at all times; but ſhips of ſuperior ſize muſt lie without, in the road, where there is good anchoring; and the whole bay being a fine, clean, hard ſand, renders the intercourſe between the two towns, which are about three miles diſtant, perfectly eaſy. There are, beſides theſe, ſeveral other havens of leſs note; as, St Brelade's Bay, at the back of St Aubin's; the great bay of St Ouen, which takes in the greateſt part of the weſt ſide of the iſland, where the largeſt ſhips may ride in 12 and 15 fathom, ſafe from all but eaſt winds. La Crevaſſe is a port only for boats; Greve de Lecq and port St John are alſo ſmall havens on the north ſide, where is likewiſe Bonnenuit. On the eaſt there is the bay of St Catherine, and the harbour of Roſel; to the ſouth of which lies the famous Mount Orgueil Caſtle, formerly Caſtle Gourray, upon a ſolid rock, which was entirely covered with its out-works; once the glory of this iſle, and ſtill majeſtic though in decay. To the ſouth-weſt lies the haven de la Chauſſée. The laſt we ſhall mention is the port de Pas, a very little to the eaſtward of St Aubin's bay. All theſe are covered with breaſt-works, well defended by cannon.

The ſtate of things and the occupations of the people are very much changed from what they were a century paſt, or a very little more. The country then was in a manner altogether arable or paſture, and the people in general applied themſelves to agriculture: whereas now every houſe has its orchards; and theſe orchards are ſo fenced with ſtrong and thick mounds of earth and ſtone, frequently ſurmounted by hedges, and ſometimes by trees, that it has been thought, not by tranſient ſpectators, but even on reflection affirmed by the moſt competent judges, theſe incloſures, together with larger or leſſer roads, take up not leſs than a third part of the ſurface of the iſland; and they have ſuch an abundance of fruit, that it is believed in a good year they make between 20,000 and 30,000 hogſheads of cyder; and if we conſider that this is the common drink of the inhabitants, we may eaſily acquieſce in the account. Their great manufacture is the ſame with that of Guernſey, the working up of their own wool, and that which by two acts of parliament they are allowed to import from England, which is 4000 tods; and ſome ſay that 10,000 pair of ſtockings, of all ſorts and ſizes, are brought weekly to the market of St Hellier. In ancient times they depended greatly upon their fiſhery, in which they are much inferior at preſent to Guernſey: but whereas they had formerly larger ſhips, and a greater ſhare of commerce, that is now in the hands of the people of Jerſey, who ſend annually 30 ſtout ſhips to the Newfoundland fiſhery; and in time of peace, great quantities of tobacco are ſmuggled from thence into France. For the defence of the iſland they have two troops of horſe, five regiments of infantry, and a fine train of artillery, excluſive of what is in their ſeveral caſtles, and on the redoubts and breaſt-works upon their coaſts, amounting in the whole to 115 18-pounders, given by King William to the iſland in 1692. There are always regular troops in Elizabeth Caſtle and in Fort St Aubin; and in time of war, they have commonly a body of forces from England. The whole number of inhabitants is computed at about 25,000, all of whom are (except a very few) natives of the place.

The iſland of Jerſey, with thoſe of Guernſey, Sark, Alderney, and their appendages, were parcel of the duchy of Normandy, and were united to the crown of England by the firſt princes of the Norman line. They are governed by their own laws, which are for the moſt part the ducal cuſtoms of Normandy, being collected in an ancient book of cuſtoms intitled *Le grand couſtumier*. The king's writ, or proceſs from the courts of Weſtminſter, is here of no force; but his commiſſion is. They are not bound by any common acts of our parliaments, unleſs particularly named. All cauſes are originally determined by their own officers, the bailiffs and jurats of the iſlands. But an appeal lies from them to the king and counſel in the laſt reſort.

New JERSEY, or, as it is commonly called, *the Jerſeys* (being two provinces united into one government), Jerſey, Jeruſalem.

ment), one of the Britiſh colonies in North America. They lie from 39 to 41 degrees of north latitude, and from 74 to 75 degrees 30 minutes longitude weſt from London. In length 150 miles, in breadth in ſome places about 100. Bounded on the north by New York, on the eaſt by the Atlantic, on the ſouth by Delawar Bay, on the weſt by Penſylvania. This ſituation, and their having on all ſides either the ſea or cultivated countries, accounts for the mildneſs of the climate, which is equally ſerene and pleaſant. The ſoil is almoſt every-where deep and fertile, producing vaſt quantities of excellent wheat and all other kinds of grain in abundance, a variety of rich fruits, fine timber-trees fit for building, and prodigious quantities of cattle of all ſorts. Abounding alſo in copper and iron ores, which are very rich. The inhabitants live here much at their eaſe, and with little labour, enjoying not only all the neceſſaries but moſt of the conveniencies of life, from whence this country hath not been improperly ſtyled the *Garden of America*. It is a royal government, the governor being aſſiſted by a council of 12 which compoſe the upper houſe, as the repreſentatives of the people do the lower houſe of aſſembly, and are in number 24. In Eaſt Jerſey, the capital is Perth Amboy, which hath a fine port, notwithſtanding which Elizabeth-Town is much larger. In Weſt Jerſey they have two ports, Burlington and Salem. The commodities of the Jerſeys are the ſame with thoſe of New York, and the number of inhabitants is ſaid to be 60,000.

The duke of York, as proprietor of the province laſt mentioned, by a deed, dated the 24th of June 1664, granted the ſouthern part of it to Sir George Carteret and Lord Berkeley of Stratton, which part was called *New Jerſey*. Ten years after this the two lords proprietors, with the conſent of the duke, divided this country into Eaſt Jerſey under Sir George Carteret, and Weſt Jerſey under Lord Berkeley. The duke of York, notwithſtanding this, reſumed for a ſhort ſpace the government of Weſt Jerſey; but by a new deed, in the year 1680, revived and confirmed the former diviſion, by which Weſt Jerſey was reſtored to lord Berkeley. Theſe proprietors afterwards aſſigned their rights to others; and the inhabitants frequently falling out with the governors they ſent over, and the aſſignees of the original proprietors diſagreeing amongſt themſelves, the latter, by a ſolemn act, April 17th, 1702, reſigned both provinces to the queen, reſerving however the property in the ſoil, &c. Since this period it hath been a royal government, though ſometimes the ſame perſon hath been governor of New York and the Jerſeys. The exports, 1769, amounted to no more than 2531 l. all for the Britiſh or foreign Weſt Indies. In 1770, there were entered inwards two ſhips and 41 ſloops; cleared outwards two ſhips and 47 ſloops.

JERUSALEM, a very famous and ancient city, capital of Judea or Paleſtine, now a province of Turky in Aſia. According to Manetho, an Egyptian hiſtorian, it was founded by the ſhepherds who invaded Egypt in an unknown period of antiquity †. According to Joſephus, it was the capital of Melchiſedek's kingdom, called *Salem* in the book of Geneſis: and the Arabians aſſert, that it was built in honour of Melchiſedek by 12 neighbouring kings; which when they had done, he called it *Jeruſalem*. We know nothing of it with certainty, however, till the time of king David, who took it from the Jebuſites, and made it the capital of his kingdom, which it ever after continued to be. It was firſt taken in the days of Jehoaſh, by Hazael the king of Syria, who ſlew all the nobility, but did not deſtroy their city. It was afterwards taken by Nebuchadnezzar king of Babylon, who deſtroyed it, and carried away the inhabitants. Seventy years after, permiſſion was granted by Cyrus king of Perſia to the Jews to rebuild their city, which was done; and it continued the capital of Judæa, (though frequently ſuffering much from the Grecian monarchs of Syria and Egypt,) till the time of Veſpaſian emperor of Rome, by whoſe ſon Titus it was totally deſtroyed *. It was, however, rebuilt by Adrian; and ſeemed likely to have recovered its former grandeur, being ſurrounded with walls, and adorned with ſeveral noble buildings; the Chriſtians alſo being permitted to ſettle in it. But this was a ſhort-lived change; ſo that when the empreſs Helena, mother of Conſtantine the Great, came to viſit this city, ſhe found it in the moſt forlorn and ruinous ſituation. Having formed a deſign of reſtoring it to its ancient luſtre, ſhe cauſed, with a great deal of coſt and labour, all the rubbiſh that had been thrown upon thoſe places where our Saviour had ſuffered, been buried, &c. to be removed. In doing this, they found the croſs on which he died, as well as thoſe of the two malefactors who ſuffered with him; and, as the writers of thoſe times relate, diſcovered by a miracle that which had borne the Saviour of mankind. She then cauſed a magnificent church to be built, which incloſed as many of the ſcenes of our Saviour's ſufferings as could conveniently be done, and adorned the city with ſeveral other buildings. The emperor Julian is ſaid to have formed a deſign of rebuilding the temple of Jeruſalem, and of reſtoring the Jewiſh worſhip. This ſcheme was contrived on purpoſe to give the lie to our Saviour's prophecy concerning the temple and city of Jeruſalem, namely, that the firſt ſhould be totally deſtroyed, without one ſtone being left upon another; and that Jeruſalem ſhould be trodden down of the Gentiles till the times of the Gentiles were fulfilled. In this attempt, however, according to the accounts of the Chriſtian writers of that age, the emperor was fruſtrated by an earthquake and fiery eruption from the earth, which totally deſtroyed the work, conſumed the materials which had been collected, and killed a great number of the workmen.

This event hath been the ſubject of much diſpute. Mr Warburton, who hath publiſhed a treatiſe expreſsly on the truth of this fact, hath collected the following teſtimonies in favour of it. The firſt is that of Ammianus Marcellinus, who tells us, "Julian (having been already thrice conſul) taking Salluſt, prefect of the ſeveral Gauls, for his colleague, entered a fourth time on this high magiſtracy; and although his ſenſibility of the many and great events which this year was likely to produce made him very anxious for the future, yet he both puſhed on the various and complicated preparatives for this expedition with the utmoſt application, and, having an eye in every quarter, and being deſirous to eternize his reign by the greatneſs of his atchievements, he projected to rebuild

Jeruſalem.

† See Egypt, n° 2.

* See Jew

Jeruſalem.

rebuild at an immenſe expence the proud and magnificent temple of Jeruſalem; which, (after many combats, attended with much bloodſhed on both ſides, during the ſiege by Veſpaſian) was with great difficulty taken and deſtroyed by Titus. He committed the conduct of this affair to Alypius of Antioch, who had formerly been lieutenant in Britain. When therefore this Alypius had ſet himſelf to the vigorous execution of his charge, in which he had all the aſſiſtance that the governor of the province could afford him, horrible balls of fire breaking out near the foundations, with frequent and reiterated attacks, rendered the place from time to time inacceſſible to the ſcorched and blaſted workmen; and the victorious element continuing, in this manner, obſtinately and reſolutely bent, as it were, to drive them to a diſtance, Alypius thought beſt to give over the enterprize."

The next teſtimony is that of Gregory Nazianzen. Speaking of the emperor Julian, he ſays, "After having run through a courſe of every other tyrannical experiment againſt the faith, and upon trial deſpiſing all of them as trifling and contemptible, he at laſt brought down the whole body of the Jews upon us; whom, for their ancient turn to ſeditious novelties, and an inveterate hatred of the Chriſtian name, he choſe as the fitteſt inſtrument for his machinations. Theſe, under a ſhow of great good-will, which hid his ſecret purpoſe, he endeavoured to convince from their ſacred books and traditions, which he took upon him to interpret, that now was come the time foretold, when they ſhould return to their own land, rebuild their temple, and reſtore the law to its ancient force and ſplendor. When theſe things had been thoroughly inſinuated, and heartily entertained, (for deceit finds eaſy admittance when it flatters our paſſions), the Jews ſet upon the work of rebuilding with great attention, and puſhed on the project with the utmoſt labour and application. But when, now driven from their work by a violent whirlwind and a ſudden earthquake, they fled together for refuge to a certain neighbouring church, (ſome to deprecate the impending miſchief; others, as is natural in ſuch caſes, to catch at any help that preſents itſelf; and others again, inveloped in the crowd, were carried along with the body of thoſe who fled), there are who ſay, the church refuſed them entrance; and that when they came to the doors which were wide open but a moment before, they found them on a ſudden cloſed by a ſecret and inviſible hand; a hand accuſtomed to work theſe wonders by the terror and confuſion of the impious, and for the ſecurity and comfort of godly men. This, however, is now invariably affirmed and believed by all, that as they ſtrove to force their way in by violence, the fire which burſt from the foundations of the temple, met and ſtopped them. One part it burnt and deſtroyed, and another it deſperately maimed, leaving them a living monument of God's commination and wrath againſt ſinners. Thus the affair paſſed; and, let no man continue incredulous concerning this or the other miraculous works of God. But ſtill the thing moſt wonderful and illuſtrious was, a light which appeared in the heavens, of a croſs within a circle. That name and figure which impious men before eſteemed ſo diſhonourable upon earth, was now raiſed on high, and equally objected to the common view of all men; advanced by God himſelf as the trophy of his victory over unbelievers; of all trophies the moſt exalted and ſublime. Nay further, they who were preſent, and partakers of the miracle we are now about to ſpeak of, ſhew to this very day the ſign or figure of the croſs which was then marked or impreſſed upon their garments. For at that time, as theſe men, (whether ſuch as were of us, or ſtrangers) were ſhewing theſe marks, or attending to others who ſhewed them, each preſently obſerved the wonder, either on himſelf or his neighbour; having a radiant mark on his body or on his garment, in which there is ſomething that, in art and elegance, exceeded all painting or embroidery."

Jeruſalem.

Notwithſtanding theſe teſtimonies, however, this fact hath been ſtrenuouſly conteſted by others; and indeed it muſt be owned that the teſtimonies above mentioned are by no means unexceptionable. In the laſt particularly, the propenſity to the marvellous is ſo exceedingly great, that every one muſt at firſt ſight be ſtruck with it. It is true indeed, the moſt miraculous part of it, as it ſeemed to be to Gregory, namely, the appearance of croſſes upon the garments and bodies of ſome of the people who were ſtruck, may be explained upon a natural principle; ſince we are aſſured that lightning will ſometimes produce effects of this kind *: but even this is no deciſive proof of the authenticity of the relation; though it cannot by any means diſcredit it, as ſome think. On the whole, however, it is not a matter of any conſequence whether this event happened with the circumſtances abovementioned or not. If Julian did make any attempt to rebuild the temple, it is certain that *ſomething* obſtructed the attempt, becauſe the temple was never actually rebuilt. If he made no ſuch attempt, the prophecy of our Saviour ſtill holds good; and it ſurely cannot be thought to detract from the merit of a prophecy, that no body ever attempted to elude it, or prove it to be a falſehood.

* See *Lightning*.

Jeruſalem continued in the hands of the eaſtern emperors till the reign of the Caliph Omar, who reduced it under his ſubjection. The Saracens continued in poſſeſſion of it till the year 1099, when it was taken by the cruſaders. They founded a new kingdom, of which Jeruſalem was the capital, which laſted 88 years under nine kings. At laſt this kingdom was utterly ruined by Saladin; and though the Chriſtians once more got poſſeſſion of the city, they were again obliged to relinquiſh it. In 1217, the Saracens were expelled by the Turks, who have ever ſince continued in poſſeſſion of it.

The city of Jeruſalem, in its moſt flouriſhing ſtate, was divided into four parts, each incloſed with its own walls; viz. 1. The old city of Jebus, which ſtood on mount Zion, where the prophets dwelt, and where David built a magnificent caſtle and palace, which became the reſidence both of himſelf and ſucceſſors; on which account it was emphatically called, *the city of David*. 2. The lower city, called alſo *the daughter of Zion*, being built after it; on which ſtood the two magnificent palaces which Solomon built for himſelf and his queen; that of the Maccabean princes; and the ſtately amphitheatre built by Herod, capable of containing 80,000 ſpectators; the ſtrong citadel, built

Jeruſalem. built by Antiochus, to command and overtop the temple, but afterwards razed by Simon the Maccabee, who recovered the city from the Syrians; and laſtly, a ſecond citadel, built by Herod, upon a high and craggy rock, and called by him *Antonia*. 3. The new city, moſtly inhabited by tradeſmen, artificers, and merchants; and, 4. Mount Moriah, on which was built the ſo famed temple of Solomon, deſcribed in the ſixth and ſeventh chapters of the ſecond book of Kings; and, ſince then, that rebuilt by the Jews on their return from Babylon, and afterwards built almoſt anew and greatly adorned and enriched by Herod.

Some idea of the magnificence of this temple may be had from the following conſiderations. 1. That there were no leſs than 163,300 men employed in the work. 2. That notwithſtanding that prodigious number of hands, it took up ſeven whole years in building. 3. That the height of this building was 120 cubits, or 82 yards, rather more than leſs; and the courts round it about half as high. 4. That the front, on the eaſt ſide, was ſuſtained by ramparts of ſquare ſtone, of vaſt bulk, and built up from the valley below, which laſt was 300 cubits high, and being added to that of the edifice amounted to 420 cubits; to which, if we add, 5. The height of the principal tower above all the reſt, viz. 60, will bring it to 480 cubits, which, reckoning at two feet to a cubit will amount to 960 feet; but, according to the length of that meaſure, as others reckon it, viz. at two feet and an half, it will amount to 1200 feet; a prodigious height this from the ground, and ſuch as might well make Joſephus ſay, that the very deſign of it was ſufficient to have turned the brain of any but Solomon. 6. Theſe ramparts, which were raiſed in this manner, to fill up the prodigious chaſm made by the deep valley below, and to make the area of a ſufficient breadth and length for the edifice, were 1000 cubits in length at the bottom, and 800 at the top, and the breadth of them 100 more. 7. The huge buttreſſes which ſupported the ramparts were of the ſame height, ſquare at the top, and 50 cubits broad, and jutted out 150 cubits at the bottom. 8. The ſtones, of which they were built, were, according to Joſephus, 40 cubits long, 12 thick, and 8 high, all of marble, and ſo exquiſitely joined, that they ſeemed one continued piece, or rather poliſhed rock. 9. According to the ſame Jewiſh hiſtorian, there were 1453 columns of Parian marble, and twice that number of pilaſters; and of ſuch thickneſs, that three men could hardly embrace them, and their height and capitals proportionable, and of the Corinthian order. But it is likely Joſephus hath given us theſe two laſt articles from the temple of Herod, there being nothing like them mentioned by the ſacred hiſtorians, but a great deal about the prodigious cedars of Lebanon uſed in that noble edifice, the excellent workmanſhip of them adapted to their ſeveral ends and deſigns, together with their gildings and other curious ornaments. The only thing more we ſhall venture to add is, what is affirmed in Scripture, that all the materials of this ſtupendous fabric were finiſhed and adapted to their ſeveral ends before they were brought to Jeruſalem, that is, the ſtones in their quarries, and the cedars in Lebanon; ſo that their was no noiſe of ax, hammer, or any tool, heard in the rearing of it.

Jeruſalem. At preſent Jeruſalem is called by the Turks *Cudſembaric*, and *Coudſheriff*; and is reduced to a poor thinly-inhabited town, about three miles in circumference, ſituated on a rocky mountain, ſurrounded on all ſides, except the north, with ſteep aſcents and deep valleys; and theſe again environed with other hills, at ſome diſtance from them. In the neighbourhood of the city there grow ſome corn, vines, olives, &c. The ſtately church erected by the empreſs Helena, on mount Cavalry, is ſtill ſtanding. It is called the *church of the ſepulchre*; and is kept in good repair by the generous offerings of a conſtant concourſe of pilgrims, who annually reſort to it, as well as by the contributions of ſeveral Chriſtian princes. The walls of this church are of ſtone, and the roof of cedar; the eaſt end incloſes Mount Calvary, and the weſt the holy ſepulchre: the former is covered with a noble cupola, open at top, and ſupported by 16 maſſive columns. Over the high altar, at the eaſt end, is another ſtately dome. The nave of the church conſtitutes the choir; and in the inſide-iſles are ſhewn the places where the moſt remarkable circumſtances of our Saviour's paſſion was tranſacted, together with the tombs of Godfrey and Baldwin, the two firſt Chriſtian kings of Jeruſalem. In the chapel of the crucifixion, is ſhewn the very hole in the rock in which the croſs is ſaid to have been fixed. The altar in this chapel hath three croſſes on it; and is richly adorned, particularly with four lamps of immenſe value that hang before it, and are kept conſtantly burning. At the weſt end is that of the ſepulchre, which is hewn in that form out of the ſolid rock, and hath a ſmall dome ſupported by pillars of porphyry. The cloiſter round the ſepulchre is divided into ſundry chapels, appropriated to the ſeveral ſorts of Chriſtians who reſide there; as Greeks, Armenians, Maronites, Jacobites, Copts, Abyſſines, Georgians, &c. and on the north-weſt ſide of it are the apartments of the Latins, who have the care of the church, and are forced to reſide conſtantly in it; the Turks keeping the keys of it, and not ſuffering any of them to go out, but obliging them to receive their proviſions in at a wicket. At Eaſter there are ſome grand ceremonies performed in the church, repreſenting our Lord's paſſion, crucifixion, death, and reſurrection, at which a vaſt concourſe of pilgrims commonly aſſiſt. For a particular account of them, we refer the reader to doctors Shaw and Pococke.

On Mount Moriah, on the ſouth-eaſt part of the city, is an edifice called *Solomon's Temple*, ſtanding on or near the ſame ſpot as the ancient; but when or by whom erected is uncertain. In the midſt of it is a Turkiſh moſque, where the Jewiſh ſanctum ſanctorum is ſuppoſed to have ſtood. The building, which Dr Pococke thinks muſt have been formerly a Chriſtian church, is held in the utmoſt veneration by the Turks.

The city is now under the government of a ſangiac, who reſides in a houſe ſaid to have been that of Pontius Pilate, over-againſt the caſtle of Antonia built by Herod the Great. Many of the churches erected in memory of ſome remarkable goſpel-tranſaction, have been ſince converted into moſques; into ſome of which money will procure admittance, but not into others. Both the friars and other Chriſtians are kept ſo poor by the tyranny of the government, that the chief ſupport and trade of the place conſiſts in providing ſtrangers with food and other accommodations, and ſelling them beads, relics, and other trinkets, for which they are obliged to pay conſiderable ſums to the ſangiac, as well as to his officers; and thoſe are ſeldom ſo well contented with their uſual duties, but they frequently extort ſome freſh ones, eſpecially from the Franciſcans, whoſe convent is the common receptacle for all pilgrims, and for which they have conſiderable allowances from the pope, and other crowned heads, beſides the preſents which ſtrangers generally make them at their departure. The moſt remarkable antiquities in the neighbourhood of Jeruſalem are, 1. The pools of Betheſda and Gihon; the former 120 paces long, 40 broad, and at leaſt eight deep, but now without water; and the old arches, which it ſtill diſcovers at the weſt end, are quite dammed up: the other, which is about a quarter of a mile without Bethlehem-gate, is a very ſtately relic, 106 paces long, and 60 broad, lined with a wall and plaſter, and ſtill well ſtored with water. 2. The tomb of the Virgin Mary, in the valley of Jehoſhaphat, into which one deſcends by a magnificent flight of 47 ſteps. On the right hand as one goes down, is alſo the ſepulchre of St Ann the mother, and on the left that of Joſeph the huſband, of that virgin-mother: ſome add likewiſe that of Jehoiakim her father. In all theſe are erected altars for prieſts of all ſorts to ſay maſs, and the whole is cut into the ſolid rock. 3. The tomb of king Jehoſhaphat, cut likewiſe into the rock, and divided into ſeveral apartments; in one of which is his tomb, which is adorned with a ſtately portico and entablature over it. 4. That commonly called *Abſalom's pillar* or *place*, as being generally ſuppoſed to be that which he is ſaid to have erected in his life-time to perpetuate his memory, as he had no male-iſſue. The place, however, both within and without, hath more the reſemblance of a ſepulchre than any thing elſe: though we do not read that he was buried there, neither do the people here affirm that he was. There is a great heap of ſtones about it, which is continually increaſing; the ſuperſtitious Jews and Turks always throwing ſome as they paſs, in token of their abhorrence of Abſalom's unnatural rebellion againſt ſo good and holy a parent. The ſtructure itſelf is about 20 cubits ſquare, and 60 high, riſing in a lofty ſquare, adorned below with four columns of the Ionic order, with their capitals, entablatures, &c. to each front. From the height of 20 to 40 cubits, it is ſomewhat leſs, and quite plain, excepting a ſmall fillet at the upper end; and from 40 to the top it changes into a round, which grows gradually into a point, the whole cut out of the ſolid rock. There is a room within, conſiderably higher than the level of the ground without, on the ſides of which are niches, probably to receive coffins. 5. A little eaſtward of this is that called the *tomb of Zechariah*, the ſon of Barachiah, whom the Jews ſlew between the temple and the altar, as is commonly ſuppoſed. This fabric is all cut out of the natural rock, 18 feet high, and as many ſquare; and adorned with Ionic columns on each front, cut out likewiſe of the ſame rock, and ſupporting a cornice. The whole ends in a pointed top, like a diamond. But the moſt curious, grand, and elaborate pieces, in this kind, are the grotts without the walls of Jeruſalem, ſtyled the *royal ſepulchres*; but of what kings is not agreed on. They conſiſt of a great number of apartments, ſome of them ſpacious, all cut out of the ſolid marble rock; and may juſtly be pronounced a royal work, and one of the moſt noble, ſurpriſing, and magnificent. For a particular account of them we muſt refer the reader, for want of room, to Pococke's Travels. In the neighbourhood of Jeruſalem is a ſpot of ground, about 30 yards long and 15 broad, now the burying-place of the Armenians, which is ſhewn as the Aceldama, or Field of Blood, formerly the Potter's Field, and ſince ſtyled *Campo Sancto*, or the *Holy Field*, purchaſed with the price of Judas's treaſon, for the burial of ſtrangers. It is walled round, to prevent the Turks abuſing the bones of Chriſtians; and one half of it is taken up by a building in the nature of a charnel-houſe. Beſides the above, a great many other antiquities in the city and its environs are ſhewn to ſtrangers; there being ſcarce any place or tranſaction mentioned either in the Old or New Teſtament, but they ſhew the very ſpot of ground where the one ſtood, and the other was done; not only here, but all over Judæa.

JESI, an ancient town of Italy, in the territory of the church, and in the marca or march of Ancona, with a biſhop's ſee. It is ſeated on a mountain, near a river of the ſame name, in E. Long. 12. 20. N. Lat. 43. 50.

JESSO, Jedso, or *Yadſo*, a large iſland of Aſia to the north of Niphon, and ſaid to be governed by a prince tributary to the empire of Japan; but is very little known to the Europeans, ſo that nothing can be ſaid with certainty concerning it.

JESSES, ribbons that hang down from garlands or crowns in falconry; alſo ſhort ſtraps of leather faſtened to the hawk's legs, and ſo to the vervels.

1
Foundation of the order.

JESUITS, or *the Society of* Jesus; a famous religious order of the Romiſh church, founded by Ignatius Loyola. See Ignatius.—The plan which this fanatic formed of its conſtitution and laws was ſuggeſted, as he gave out, and as his followers ſtill teach, by the immediate inſpiration of heaven. But notwithſtanding this high pretenſion, his deſign met at firſt with violent oppoſition. The pope, to whom Loyola had applied for the ſanction of his authority to confirm the inſtitution, referred his petition to a committee of cardinals. They repreſented the eſtabliſhment to be unneceſſary as well as dangerous, and Paul refuſed to grant his approbation of it. At laſt, Loyola removed all his ſcruples by an offer which it was impoſſible for any pope to reſiſt. He propoſed, that beſides the three vows of poverty, of chaſtity, and of monaſtic obedience, which are common to all the orders of regulars, the members of his ſociety ſhould take a fourth vow of obedience to the pope, binding themſelves to go whitherſoever he ſhould command for the ſervice of religion, and without requiring any thing from the holy ſee for their ſupport. At a time when the papal authority had received ſuch a ſhock by the revolt of ſo many nations from the Romiſh church; at a time when every part of the popiſh ſyſtem was attacked with ſo much violence and ſucceſs, the acquiſition of a body of men, thus peculiarly devoted to the ſee of Rome, and whom it might ſet in oppoſition to all its enemies, was an object of the higheſt conſequence. Paul inſtantly perceiving this, confirmed the inſtitution of the Jeſuits

2
Confirmed by the pope, and from what motives.

ſuits by his bull, granted the moſt ample privileges to the members of the ſociety, and appointed Loyola to be the firſt general of the order. The event hath fully juſtified Paul's diſcernment, in expecting ſuch beneficial conſequences to the ſee of Rome from this inſtitution. In leſs than half a century, the ſociety obtained eſtabliſhments in every country that adhered to the Roman-catholic church: its power and wealth increaſed amazingly; the number of its members became great; their character as well as accompliſhments were ſtill greater; and the Jeſuits were celebrated by the friends and dreaded by the enemies of the Romiſh faith as the moſt able and enterpriſing order in the church.

The conſtitution and laws of the ſociety were perfected by Laynez and Aquaviva, the two generals who ſucceeded Loyola, men far ſuperior to their maſter in abilities and in the ſcience of government. They framed that ſyſtem of profound and artful policy which diſtinguiſhes the order. The large infuſion of fanaticiſm mingled with its regulation ſhould be imputed to Loyola its founder. Many circumſtances concurred in giving a peculiarity of character to the order of Jeſuits, and in forming the members of it not only to take greater part in the affairs of the world than any other body of monks, but to acquire ſuperior influence in the conduct of them.

3
The object of the order ſingular.

The primary object of almoſt all the monaſtic orders is to ſeparate men from the world, and from any concern in its affairs. In the ſolitude and ſilence of the cloiſter, the monk is called to work out his own ſalvation by extraordinary acts of mortification and piety. He is dead to the world, and ought not to mingle in its tranſactions. He can be of no benefit to mankind but by his example and by his prayers. On the contrary, the Jeſuits are taught to conſider themſelves as formed for action. They are choſen ſoldiers, bound to exert themſelves continually in the ſervice of God, and of the pope his vicar on earth. Whatever tends to inſtruct the ignorant, whatever can be of uſe to reclaim or to oppoſe the enemies of the holy ſee, is their proper object. That they may have full leiſure for this active ſervice, they are totally exempted from thoſe functions the performance of which is the chief buſineſs of other monks. They appear in no proceſſions; they practiſe no rigorous auſterities; they do not conſume one half of their time in the repetition of tedious offices: but they are required to attend to all the tranſactions of the world, on account of the influence which theſe may have upon religion; they are directed to ſtudy the diſpoſitions of perſons in high rank, and to cultivate their friendſhip; and by the very conſtitution as well as genius of the order, a ſpirit of action and intrigue is infuſed into all its members.

4
Peculiarities in its policy.

As the object of the ſociety of Jeſuits differed from that of the other monaſtic orders, the diverſity was no leſs in the form of its government. The other orders are to be conſidered as voluntary aſſociations, in which whatever affects the whole body is regulated by the common ſuffrage of all its members. The executive power is veſted in the perſons placed at the head of each convent or of the whole ſociety; the legiſlative authority reſides in the community. Affairs of moment, relating to particular convents, are determined in conventual chapters; ſuch as reſpect the whole order are conſidered in general congregations. But Loyola, full of the ideas of implicit obedience, which he had derived from his military profeſſion, appointed that the government of his order ſhould be purely monarchical. A general, choſen for life by deputies from the ſeveral provinces, poſſeſſed power that was ſupreme and independent, extending to every perſon and to every caſe. He, by his ſole authority, nominated provincials, rectors, and every other officer employed in the government of the ſociety, and could remove them at pleaſure. In him was veſted the ſovereign adminiſtration of the revenues and funds of the order. Every member belonging to it was at his diſpoſal; and by his uncontrolable mandate he could impoſe on them any taſk, or employ them in what ſervice ſoever he pleaſed.

5
Power of the general.

To his commands they were required to yield not only outward obedience, but to reſign up to him the inclinations of their own wills and the ſentiments of their own underſtandings. They were to liſten to his injunctions as if they had been uttered by Chriſt himſelf. Under his direction they were to be mere paſſive inſtruments, like clay in the hands of the potter, or like dead carcaſes incapable of reſiſtance. Such a ſingular form of policy could not fail to impreſs its character on all the members of the order, and to give a peculiar force to all its operations. There is not, in the annals of mankind, any example of ſuch a perfect deſpotiſm, exerciſed not over monks ſhut up in the cells of a convent, but over men diſperſed among all the nations of the earth.

As the conſtitutions of the order veſt in the general ſuch abſolute dominion over all its members, they carefully provide for his being perfectly informed with reſpect to the character and abilities of his ſubjects. Every novice who offers himſelf as a candidate for entering into the order, is obliged to manifeſt his conſcience to the ſuperior, or a perſon appointed by him; and is required to confeſs not only his ſins and defects, but to diſcover the inclinations, the paſſions, and the bent of his ſoul. This manifeſtation muſt be renewed every ſix months. The ſociety, not ſatisfied with penetrating in this manner into the innermoſt receſſes of the heart, directs each member to obſerve the words and actions of the novices: they are conſtituted ſpies upon their conduct, and are bound to diſcloſe every thing of importance concerning them to the ſuperior. In order that this ſcrutiny into their character may be as complete as poſſible, a long noviciate muſt expire, during which they paſs through the ſeveral gradations of ranks in the ſociety; and they muſt have attained the full age of thirty-three years, before they can be admitted to take the final vows, by which they become profeſſed members. By theſe various methods, the ſuperiors, under whoſe immediate inſpection the novices are placed, acquire a thorough knowledge of their diſpoſitions and talents. In order that the general, who is the ſoul that animates and moves the whole ſociety, may have under his eye every thing neceſſary to inform or direct him, the provincials and heads of the ſeveral houſes are obliged to tranſmit to him regular and frequent reports concerning the members under their inſpection. In theſe they deſcend into minute details with reſpect to the character of each perſon, his abilities natural or acquired, his temper, his experience

Jeſuits.

rience in affairs, and the particular department for which he is beſt fitted. Theſe reports, when digeſted and arranged, are entered into regiſters kept of purpoſe, that the general may, at one comprehenſive view, ſurvey the ſtate of the ſociety in every corner of the earth; obſerve the qualifications and talents of its members; and thus chooſe, with perfect information, the inſtruments which his abſolute power can employ in any ſervice for which he thinks meet to deſtine them.

6
Progreſs of the power and influence of the order.

As it was the profeſſed intention of the order of Jeſuits to labour with unwearied zeal in promoting the ſalvation of men, this engaged them of courſe in many active functions. From their firſt inſtitution, they conſidered the education of youth as their peculiar province; they aimed at being ſpiritual guides and confeſſors; they preached frequently in order to inſtruct the people; they ſet out as miſſionaries to convert unbelieving nations. The novelty of the inſtitution, as well as the ſingularity of its objects, procured the order many admirers and patrons. The governors of the ſociety had the addreſs to avail themſelves of every circumſtance in its favour, and in a ſhort time the number as well as influence of its members increaſed wonderfully. Before the expiration of the ſixteenth century, the Jeſuits had obtained the chief direction of the education of youth in every catholic country in Europe. They had become the confeſſors of almoſt all its monarchs; a function of no ſmall importance in any reign, but, under a weak prince, ſuperior even to that of miniſter. They were the ſpiritual guides of almoſt every perſon eminent for rank or power. They poſſeſſed the higheſt degree of confidence and intereſt with the papal court, as the moſt zealous and able champions for its authority. The advantages which an active and enterpriſing body of men might derive from all theſe circumſtances are obvious. They formed the minds of men in their youth. They retained an aſcendant over them in their advanced years. They poſſeſſed, at different periods, the direction of the moſt conſiderable courts in Europe. They mingled in all affairs. They took part in every intrigue and revolution. The general, by means of the extenſive intelligence which he received, could regulate the operations of the order with the moſt perfect diſcernment; and, by means of his abſolute power, could carry them on with the utmoſt vigour and effect.

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Together with the power of the order, its wealth continued to increaſe. Various expedients were deviſed for eluding the obligation of the vow of poverty. The order acquired ample poſſeſſions in every catholic country; and by the number as well as magnificence of its public buildings, together with the value of its property, moveable or real, it vied with the moſt opulent of the monaſtic fraternities. Beſides the ſources of wealth common to all the regular clergy, the Jeſuits poſſeſſed one which was peculiar to themſelves. Under pretext of promoting the ſucceſs of their miſſions, and of facilitating the ſupport of their miſſionaries, they obtained a ſpecial licence from the court of Rome to trade with the nations which they laboured to convert. In conſequence of this, they engaged in an extenſive and lucrative commerce both in the Eaſt and Weſt Indies. They opened warehouſes in different parts of Europe, in which they vended their commodities. Not ſatisfied with trade alone, they imitated the example of other commercial ſocieties, and aimed at obtaining ſettlements. They acquired poſſeſſion accordingly of a large and fertile province in the ſouthern continent of America, and reigned as ſovereigns over ſome hundred thouſand ſubjects.

8
Pernicious effects of theſe on civil ſociety.

Unhappily for mankind, the vaſt influence which the order of Jeſuits acquired by all theſe different means, has been often exerted with the moſt pernicious effect. Such was the tendency of that diſcipline obſerved by the ſociety in forming its members, and ſuch the fundamental maxims in its conſtitution, that every Jeſuit was taught to regard the intereſt of the order as the capital object to which every conſideration was to be ſacrificed. This ſpirit of attachment to their order, the moſt ardent perhaps that ever influenced any body of men, is the characteriſtic principle of the Jeſuits, and ſerves as a key to the genius of their policy as well as the peculiarities in their ſentiments and conduct.

As it was for the honour and advantage of the ſociety that its members ſhould poſſeſs an aſcendant over perſons in high rank or of great power; the deſire of acquiring and preſerving ſuch a direction of their conduct with greater facility, has led the Jeſuits to propagate a ſyſtem of relaxed and pliant morality, which accommodates itſelf to the paſſions of men, which juſtifies their vices, which tolerates their imperfections, which authoriſes almoſt every action that the moſt audacious or crafty politician would wiſh to perpetrate.

As the proſperity of the order was intimately connected with the preſervation of the papal authority, the Jeſuits, influenced by the ſame principle of attachment to the intereſts of their ſociety, have been the moſt zealous patrons of thoſe doctrines which tend to exalt eccleſiaſtical power on the ruins of civil government. They have attributed to the court of Rome a juriſdiction as extenſive and abſolute as was claimed by the moſt preſumptuous pontiffs in the dark ages. They have contended for the entire independence of eccleſiaſtics on the civil magiſtrates. They have publiſhed ſuch tenets concerning the duty of oppoſing princes who were enemies of the catholic faith as countenanced the moſt atrocious crimes, and tended to diſſolve all the ties which connect ſubjects with their rulers.

As the order derived both reputation and authority from the zeal with which it ſtood forth in defence of the Romiſh church againſt the attacks of the reformers, its members, proud of this diſtinction, have conſidered it as their peculiar function to combat the opinions and to check the progreſs of the Proteſtants. They have made uſe of every art, and have employed every weapon againſt them. They have ſet themſelves in oppoſition to every gentle or tolerating meaſure in their favour. They have inceſſantly ſtirred up againſt them all the rage of eccleſiaſtical and civil perſecution.

Monks of other denominations have indeed ventured to teach the ſame pernicious doctrines, and have held opinions equally inconſiſtent with the order and happineſs of civil ſociety. But they, from reaſons which are obvious, have either delivered ſuch opinions with greater reſerve, or have propagated them with leſs ſucceſs. Whoever recollects the events which have happened in Europe during two centuries, will find that the Jeſuits may juſtly be conſidered as reſponſible for moſt of the pernicious effects ariſing from that corrupt and dangerous caſuiſtry, from thoſe extravagant tenets concerning eccleſiaſtical power, and from that intolerant ſpirit, which have been the diſgrace of the church of Rome throughout that period, and which have brought ſo many calamities upon civil ſociety.

9 Some advantages reſulting from the inſtitution of this order.

But, amidſt many bad conſequences flowing from the inſtitution of this order, mankind, it muſt be acknowledged, have derived from it ſome conſiderable advantages. As the Jeſuits made the education of youth one of their capital objects, and as their firſt attempts to eſtabliſh colleges for the reception of ſtudents were violently oppoſed by the univerſities in different countries, it became neceſſary for them, as the moſt effectual method of acquiring the public favour, to ſurpaſs their rivals in ſcience and induſtry. This prompted them to cultivate the ſtudy of ancient literature with extraordinary ardour. This put them upon various methods for facilitating the inſtruction of youth; and, by the improvements which they made in it, they have contributed ſo much towards the progreſs of polite learning, that on this account they have merited well of ſociety. Nor has the order of Jeſuits been ſucceſsful only in teaching the elements of literature; it has produced likewiſe eminent maſters in many branches of ſcience, and can alone boaſt of a greater number of ingenious authors than all the other religious fraternities taken together.

10 Settlement in Paraguay

But it is in the new world that the Jeſuits have exhibited the moſt wonderful diſplay of their abilities, and have contributed moſt effectually to the benefit of the human ſpecies. The conquerors of that unfortunate quarter of the globe had nothing in view but to plunder, to enſlave, and to exterminate its inhabitants. The Jeſuits alone have made humanity the object of their ſettling there. About the beginning of the laſt century, they obtained admiſſion into the fertile province of Paraguay, which ſtretches acroſs the ſouthern continent of America, from the bottom of the mountains of Potoſi to the confines of the Spaniſh and Portugueſe ſettlements on the banks of the river de la Plata. They found the inhabitants in a ſtate little different from that which takes place among men when they firſt begin to unite together; ſtrangers to the arts, ſubſiſting precariouſly by hunting or fiſhing, and hardly acquainted with the firſt principles of ſubordination and government. The Jeſuits ſet themſelves to inſtruct and to civilize theſe ſavages. They taught them to cultivate the ground, to rear tame animals, and to build houſes. They brought them to live together in villages. They trained them to arts and manufactures. They made them taſte the ſweets of ſociety, and accuſtomed them to the bleſſings of ſecurity and order. Theſe people became the ſubjects of their benefactors, who have governed them with a tender attention, reſembling that with which a father directs his children. Reſpected and beloved almoſt to adoration, a few Jeſuits preſided over ſome hundred thouſand Indians. They maintained a perfect equality among all the members of the community. Each of them was obliged to labour, not for himſelf alone, but for the public. The produce of their fields, together with the fruits of their induſtry of every ſpecies, were depoſited in common ſtorehouſes, from which each individual received every thing neceſſary for the ſupply of his wants. By this inſtitution, almoſt all the paſſions which diſturb the peace of ſociety, and render the members of it unhappy, were extinguiſhed. A few magiſtrates, choſen by the Indians themſelves, watched over the public tranquillity, and ſecured obedience to the laws. The ſanguinary puniſhments frequent under other governments were unknown. An admonition from a Jeſuit, a ſlight mark of infamy, or, on ſome ſingular occaſion, a few laſhes with a whip, were ſufficient to maintain good order among theſe innocent and happy people.

But, even in this meritorious effort of the Jeſuits for the good of mankind, the genius and ſpirit of their order have mingled and are diſcernible. They plainly aimed at eſtabliſhing in Paraguay an independent empire, ſubject to the ſociety alone, and which, by the ſuperior excellence of its conſtitution and police, could ſcarcely have failed to extend its dominion over all the ſouthern continent of America. With this view, in order to prevent the Spaniards or Portugueſe in the adjacent ſettlements from acquiring any dangerous influence over the people within the limits of the province ſubject to the ſociety, the Jeſuits endeavoured to inſpire the Indians with hatred and contempt of theſe nations. They cut off all intercourſe between their ſubjects and the Spaniſh or Portugueſe ſettlements. They prohibited any private trader of either nation from entering their territories. When they were obliged to admit any perſon in a public character from the neighbouring governments, they did not permit him to have any converſation with their ſubjects; and no Indian was allowed even to enter the houſe where theſe ſtrangers reſided, unleſs in the preſence of a Jeſuit. In order to render any communication between them as difficult as poſſible, they induſtriouſly avoided giving the Indians any knowledge of the Spaniſh or of any other European language; but encouraged the different tribes which they had civilized to acquire a certain dialect of the Indian tongue, and laboured to make that the univerſal language throughout their dominions. As all theſe precautions, without military force, would have been inſufficient to have rendered their empire ſecure and permanent, they inſtructed their ſubjects in the European arts of war. They formed them into bodies of cavalry and infantry, completely armed and regularly diſciplined. They provided a great train of artillery, as well as magazines ſtored with all the implements of war. Thus they eſtabliſhed an army ſo numerous and well-appointed, as to be formidable in a country where a few ſickly and ill-diſciplined battalions compoſed all the military force kept on foot by the Spaniards or Portugueſe.

11 Downfall of the ord in Europ

Such were the laws, the policy, and the genius of this formidable order; of which, however, a perfect knowledge has only been attainable of late. Europe had obſerved, for two centuries, the ambition and power of the order. But while it felt many fatal effects of theſe, it could not fully diſcern the cauſes to which they were to be imputed. It was unacquainted with many of the ſingular regulations in the political conſtitution or government of the Jeſuits, which formed the enterpriſing ſpirit of intrigue that diſtinguiſhed its members, and elevated the body itſelf to ſuch a height of power. It was a fundamental maxim with the Jeſuits, from their firſt inſtitution, not to publiſh the rules of their order. Theſe they kept concealed as an impenetrable myſtery. They never communicated them to ſtrangers, nor even to the greater part of their own members. They refuſed to produce them when required by courts of juſtice; and, by a ſtrange ſolecíſm in policy, the civil power in different countries authoriſed or connived at the eſtabliſhment of an order of men, whoſe conſtitution and laws were concealed with a ſolicitude which alone was a good reaſon for having excluded them. During the proſecutions lately carried on againſt them in Portugal and France, the Jeſuits have been ſo inconſiderate as to produce the myſterious volumes of their inſtitute. By the aid of theſe authentic records, the principles of their government may be delineated, and the ſources of their power inveſtigated with a degree of certainty and preciſion which, previous to that event, it was impoſſible to attain.

The pernicious effects, however, of the ſpirit and conſtitution of this order, rendered it early obnoxious to ſome of the principal powers in Europe, and gradually brought on its downfal. The emperor Charles V. ſaw it expedient to check its progreſs in his dominions; it was expelled England, by proclamation 2 James I. in 1604; Venice, in 1606; Portugal, in 1759; France, in 1764; Spain and Sicily, in 1767; and totally ſuppreſſed and aboliſhed by the late Pope Clement XIV. in 1773.

JESUS *the Son of Sirach*, a native of Jeruſalem, compoſed, about 200 B. C. the book of Eccleſiaſticus, called by the Greeks Παναρετος, "repleniſhed with virtue;" who alſo quote it under the title of *the Wiſdom of Solomon the Son of Sirach*. His grandſon, who was alſo of the ſame name, and a native of Jeruſalem, tranſlated it from the Hebrew into Greek about 121 B. C. We have this Greek verſion, but the Hebrew text is loſt.

Jesus Christ, the Son of God, and Saviour of mankind, deſcended from heaven, and took upon him the human nature in Judæa, towards the concluſion of the reign of Herod the Great, king of that country. The place of his birth was Bethlehem, a flouriſhing city of Judah; but the year in which he was born is not preciſely aſcertained. The moſt general opinion is, that it happened about the year of Rome 748 or 749, and about 18 months before the death of Herod. Four inſpired writers have tranſmitted to us an account of the life of Jeſus Chriſt. They mention particularly his birth, lineage, family, and parents; but ſay very little concerning his infancy and earlier youth. Herod being informed that the Meſſiah, or king of the Jews, ſo much ſpoken of by the prophets, was now born, being afraid that his kingdom ſhould now be taken away, contrived how to deſtroy his ſuppoſed rival: but Chriſt, being carried, while very young, into Egypt, eſcaped the cruelty of the tyrant; who, being determined to make ſure work, made a general maſſacre of the infants about Bethlehem, from the age of two years and under.

After the death of Herod, our Saviour was brought back to Judæa; but we are totally ignorant of what his employment was during the interval between his return thither, and the time of his entering upon the miniſtry. We know only, that when he was but 12 years of age, he diſputed in the temple with the moſt learned of the Jewiſh doctors; whom he ſurpriſed with his knowledge, and the anſwers he gave to their queſtions. After this, as the ſcripture tells us, he continued with his parents, and was ſubject to them, till he entered upon his miniſtry. It is ſaid, indeed, though upon no ſure foundation, that during this period he followed the trade of his father, who was a carpenter. In the 30th year of his age, he began his public miniſtry; to which the attention of the people was drawn by the preaching of John, a prophet miraculouſly inſpired of God to proclaim the exiſtence of the Saviour, as now deſcended upon earth, and viſible to the eyes of all; and by this prophet Chriſt himſelf was baptized in the waters of Jordan, that he might not, in any point, neglect to anſwer the demands of the Jewiſh law.

It is not neceſſary here to enter into a particular detail of the life and actions of Jeſus Chriſt. Every one knows, that his life was one continued ſcene of the moſt perfect ſanctity, and the pureſt and moſt active virtue; not only without ſpot, but alſo beyond the reach of ſuſpicion. And it is alſo well known, that by miracles of the moſt ſtupendous kind, and not more ſtupendous than ſalutary and beneficent, he diſplayed to the univerſe the truth of that religion which he brought with him from above, and demonſtrated the reality of his divine commiſſion in the moſt illuſtrious manner. For the propagation of his religion through the country of Judæa, our Saviour choſe 12 apoſtles; whom, however, he ſent out only once, and after their return kept them conſtantly about his perſon. But, beſides theſe, he choſe other 70, whom he diſperſed throughout the country.

There have been many conjectures concerning the reaſon why the number of apoſtles was fixed at 12, and that of the other teachers at 70. The firſt, however, was, according to our Saviour's own words (Matt. xix. 28.), an alluſion to the 12 tribes of Iſrael, thereby intimating that he was the king of theſe 12 tribes; and as the number of his other meſſengers anſwers evidently to that of the ſenators who compoſed the Sanhedrim, there is a high degree of probability in the conjecture of thoſe who think that Chriſt by this number deſigned to admoniſh the Jews, that the authority of their Sanhedrim was now at an end, and that all power with reſpect to religious matters was veſted in him alone. His miniſtry, however, was confined to the Jews; nor, while he remained upon earth, did he permit his apoſtles or diſciples to extend their labours beyond this favoured nation. At the ſame time, if we conſider the illuſtrious acts of mercy and benevolence that were performed by Chriſt, it will be natural to conclude, that his fame muſt ſoon have ſpread abroad in other countries. Indeed this ſeems probable from a paſſage in ſcripture, where we are told that ſome Greeks applied to the apoſtle Philip in order to ſee Jeſus. We learn alſo from authors of no ſmall note, that Abgarus† king of Edeſſa, being ſeized with a ſevere and dangerous illneſs, wrote to our Lord, imploring his aſſiſtance; and that Jeſus not only ſent him a gracious anſwer, but alſo accompanied it with his picture, as a mark of his eſteem for that pious prince. Theſe letters are ſtill extant; but by the judicious part of mankind are univerſally looked upon as

† See *Abgarus*.

as ſpurious; and indeed the late Mr Jones, in his treatiſe entitled *A new and full method of ſettling the canonical authority of the New Teſtament*, hath offered reaſons which ſeem almoſt unanſwerable againſt the authenticity of the whole tranſaction.

The preaching of our Saviour, and the numberleſs miracles he performed, made ſuch an impreſſion on the body of the Jewiſh nation, that the chief prieſts and leading men, jealous of his authority, and provoked at his reproaching them with their wicked lives, formed a conſpiracy againſt him. For a conſiderable time their deſigns proved abortive; but at laſt, Jeſus, knowing that he had fulfilled every purpoſe for which he came into the world, ſuffered himſelf to be taken through the treachery of one of his diſciples, named *Judas Iſcariot*, and was brought before the Sanhedrim. In this aſſembly he was accuſed of blaſphemy; and being afterwards brought before Pilate the Roman governor, where he was accuſed of ſedition, Pilate was no ſooner ſat down to judge in this cauſe, than he received a meſſage from his wife, deſiring him to have nothing to do with the affair, having that very day had a frightful dream on account of our Saviour, whom ſhe called *that juſt man*. The governor, intimidated by this meſſage, and ſtill more by the majeſty of our Saviour himſelf, and the evident falſehood of the accuſations brought againſt him, was determined if poſſible to ſave him. But the clamours of an enraged populace, who at laſt threatened to accuſe Pilate himſelf as a traitor to the Roman emperor, got the better of his love of juſtice, which indeed on other occaſions was not very fervent.

Our Saviour was now condemned by his judge, though contrary to the plaineſt dictates of reaſon and juſtice; was executed on a croſs between two thieves, and very ſoon expired. Having continued three days in a ſtate of death, he roſe from the dead, and made himſelf viſible to his diſciples as formerly. He converſed with them 40 days after his reſurrection, and employed himſelf during that time in inſtructing them more fully concerning the nature of his kingdom; and having manifeſted the certainty of his reſurrection to as many witneſſes as he thought proper, he was, in the preſence of many of his diſciples, taken up into heaven, there to remain till the end of the world. See CHRISTIANITY.

JET, in natural hiſtory, a kind of foſſile ſubſtance, the characters of which are theſe.—It is a ſolid, dry, opaque, inflammable body, found in large detached maſſes of a fine and regular ſtructure, having a grain like that of wood, ſplitting more eaſily in an horizontal than in any other direction; very light, and moderately hard; not fuſible, but readily inflammable, and burning a long time with a fine greeniſh white flame.

Jet is a ſubſtance concerning which many erroneous opinions have been entertained, and which hath been very little underſtood, even in Britain, where the fineſt in the world is produced; having been uſually confounded with a thing greatly inferior to it in value, the common cannel-coal; ſo that many believe there is no other jet than that ſubſtance: they are, however, eaſily diſtinguiſhed from each other by the following characters.—Jet is always found in detached maſſes lodged in other ſtrata; but cannel-coal conſtitutes whole ſtrata of itſelf. Jet has the grain of wood, and ſplits horizontally with much greater eaſe than in any other direction; cannel-coal has no particular direction, and ſplits any way with equal eaſe. Jet is but moderately hard; cannel-coal not leſs ſo than many ſtones: jet, when ſet on fire, flames a long time; cannel-coal but a little while.——Jet is found in Italy, Germany, and the Eaſt-Indies; but nowhere in ſuch plenty as in England. It is very common in Yorkſhire and the other northern counties, and is found in many of the clay-pits about London. By the ancients it was uſed in medicine, and celebrated as an emollient and diſcutient; but the modern practice takes no notice of it.

JET-*d'Eau*, a French term, frequently alſo uſed with us, for a fountain that caſts up water to a conſiderable height in the air. See HYDROSTATICS, n° 22.; and ICELAND, n° 7, 8.

JETTY-HEAD, a name uſually given, in the royal dock-yards, to that part of a wharf which projects beyond the reſt; but more particularly the front of a wharf, whoſe ſide forms one of the cheeks of a dry or wet dock.

JEWEL, any precious ſtone, or ornament beſet with them. See DIAMOND, RUBY, &c.

JEWEL (John), a learned Engliſh writer and biſhop, was born in 1522, and educated at Oxford. In 1540 he proceeded A. B. became a noted tutor, and was ſoon after choſen rhetoric lecturer in his college. In February 1544, he commenced A. M. He had early imbibed Proteſtant principles, and inculcated the ſame to his pupils; but this was carried on privately till the acceſſion of king Edward VI. in 1546, when he made a public declaration of his faith, and entered into a cloſe friendſhip with Peter Martyr, who was made profeſſor of divinity at Oxford. In 1550, he took the degree of B. D. and frequently preached before the univerſity with great applauſe. At the ſame time he preached and catechiſed every other Sunday at Sunningwell in Berkſhire, of which church he was rector. Upon the acceſſion of queen Mary to the crown in 1553, he was one of the firſt who felt the rage of the ſtorm then raiſed againſt the reformation; for before any law was made, or order given by the queen, he was expelled Corpus Chriſti college by the fellows, by their own private authority; but he continued in Oxford, till he was called upon to ſubſcribe to ſome of the Popiſh doctrines under the ſevereſt penalties, which he ſubmitted to. However, this did not procure his ſafety; for he was obliged to fly, and, after encountering many difficulties, arrived at Franckfort, in the 2d year of queen Mary's reign, where he made a public recantation of his ſubſcription to the Popiſh doctrines. Thence he went to Straſburg, and afterwards to Zurich, where he attended Peter Martyr, in whoſe houſe he reſided. He returned to England in 1558, after queen Mary's death; and, in 1559, was conſecrated biſhop of Saliſbury. This promotion was given him as a reward for his great merit and learning; and another atteſtation of theſe was given him by the univerſity of Oxford, who, in 1565, conferred on him in his abſence the degree of D. D. In this character he attended the queen to Oxford the following year, and preſided at the divinity-diſputations held before her majeſty on that occaſion. He had before greatly diſtinguiſhed himſelf by a ſermon preached at St Paul's-croſs, preſently after he was made a biſhop, wherein he gave a public challenge to all the Roman-catholics in the world, to produce but one clear and evident teſtimony out of any father or famous writer, who flouriſhed within 600 years after Chriſt, for any one of the articles which the Romaniſts maintain againſt the church of England; and, two years afterwards, he publiſhed his famous apology for this church. In the mean time, he gave a particular attention to his dioceſe; where he began in his firſt viſitation, and perfected in his laſt, ſuch a reformation, not only in his cathedral and parochial churches, but in all the churches of his juriſdiction, as procured him and the whole order of biſhops due reverence and eſteem. For he was a careful overlooker and ſtrict obſerver, not only of all the flocks, but alſo of the paſtors, in his dioceſe: and he watched ſo narrowly upon the proceedings of his chancellor and archdeacons, and of his ſtewards and receivers, that they had no opportunities of being guilty of oppreſſion, injuſtice, or extortion, nor of being a burthen to the people, or a ſcandal to himſelf. To prevent theſe and the like abuſes, for which the eccleſiaſtical courts are often too juſtly cenſured, he ſat often in his conſiſtory-court, and ſaw that all things were carried rightly there: he alſo ſat often as aſſiſtant on the bench of civil juſtice, being himſelf a juſtice of the peace. Amidſt theſe employments, however, the care of his health was too much neglected; to which, indeed, his general courſe of life was totally unfavourable. He roſe at four o'clock in the morning; and, after prayers with his family at five, and in the cathedral about ſix, he was ſo fixed to his ſtudies all the morning, that he could not without great violence be drawn from them. After dinner, his doors and ears were open to all ſuitors; and it was obſerved of him as of Titus, that he never ſent any ſad from him. Suitors being thus diſmiſſed, he heard, with great impartiality and patience, ſuch cauſes debated before him, as either devolved to him as a judge, or were referred to him as an arbitrator; and if he could ſpare any time from theſe, he reckoned it as clear gain to his ſtudy. About nine at night he called all his ſervants to an account how they had ſpent the day, and then went to prayers with them. From the chapel he withdrew again to his ſtudy till near midnight, and from thence to his bed; in which when he was laid, the gentleman of his bed-chamber read to him till he fell aſleep. This watchful and laborious life, without any recreation at all, except what his neceſſary refreſhment at meals and a very few hours of reſt afforded him, waſted his life too faſt. He died at Monkton-Farley, in 1571, in the 50th year of his age. He wrote, 1. A view of a ſeditious bull ſent into England by pope Pius V. in 1569. 2. A treatiſe on the Holy Scriptures. 3. An expoſition of St Paul's two epiſtles to the Theſſalonians. 4. A treatiſe on the ſacrament. 5. An apology for the national church. 6. Several ſermons, controverſial treatiſes, and other works.

"This excellent prelate (ſays the rev. Mr Granger) was one of the greateſt champions of the reformed religion, as he was to the church of England what Bellarmine was to that of Rome. His admirable Apology was tranſlated from the Latin by Anne, the ſecond of the four learned daughters of Sir Anthony Coke, and mother of Sir Francis Bacon. It was publiſhed, as it came from her pen, in 1564, with the approbation of the queen and the prelates. The ſame Apology was printed in Greek at Conſtantinople, under the direction of St Cyril the patriarch. His Defence of his Apology, againſt Harding and other Popiſh divines, was in ſuch eſteem, that queen Elizabeth, king James I. king Charles I. and four ſucceſſive archbiſhops, ordered it to be kept chained in all pariſh-churches for public uſe.

JEWEL-*Blocks*, in the ſea-language, a name given to two ſmall blocks which are ſuſpended at the extremity of the main and fore-top-ſail yards, by means of an eye-bolt driven from without into the middle of the yard-arm, parallel to its axis. The uſe of theſe blocks is, to retain the upper-part of the top-maſt ſtudding-ſails beyond the ſkirts of the top-ſails, ſo that each of thoſe ſails may have its full force of action, which would be diminiſhed by the encroachment of the other over its ſurface. The *haliards*, by which thoſe ſtudding-ſails are hoiſted, are accordingly paſſed through the jewel-blocks; whence, communicating with a block on the top-maſt head, they lead downwards to the top or decks, where they may be conveniently hoiſted. See SAIL.

JEWS, a name derived from the patriarch Judah, and given to the deſcendants of Abraham by his eldeſt ſon Iſaac, who for a long time poſſeſſed the land of Paleſtine in Aſia, and are now diſperſed through all nations in the world.

The hiſtory of this people, as it is the moſt ſingular, ſo is it alſo the moſt ancient in the world; and the greateſt part being before the beginning of profane hiſtory, depends entirely on the authenticity of the Old Teſtament, where it is only to be found.—To repeat here what is ſaid in the ſacred writings would both be ſuperfluous and tedious, as thoſe writings are in every perſons hands, and may be conſulted at pleaſure. It ſeems moſt proper therefore to commence the hiſtory of the Jews from their return to Jeruſalem from Babylon, and the rebuilding of their city and temple under Ezra and Nehemiah, when the ſcripture leaves off any farther accounts, and profane hiſtorians begin to take notice of them.

1
Cyrus publiſhes a decree for rebuilding Jeruſalem.

Cyrus the Great, king of Perſia, having conquered Babylon and almoſt all the weſtern parts of Aſia, perceiving the deſolate and ruinous condition in which the province of Paleſtine lay, formed a deſign of reſtoring the Jews to their native country, and permitting them to rebuild Jeruſalem and re-eſtabliſh their worſhip. For this purpoſe he iſſued out a decree in the firſt year of his reign, about 536 B. C. by which they were allowed not only to return and rebuild their city, but to carry along with them all the ſacred veſſels which Nebuchadnezzar had carried off, and engaged to defray the expence of building the temple himſelf. This offer was gladly embraced by the more zealous Jews of the tribes of Judah, Benjamin, and Levi; but many more, being no doubt leſs ſanguine about their religion, choſe to ſtay where they were.

In 534 B. C. the foundations of the temple were laid, and matters ſeemed to go on proſperouſly, when the undertaking was ſuddenly obſtructed by the Samaritans. Theſe came at firſt expreſſing an earneſt deſire to aſſiſt in the work, as they worſhipped the ſame God with the Jews; but the latter refuſed their aſſiſtance, as they knew they were not true Iſraelites, but the deſcendants of thoſe heathens who had been tranſplanted into the country of the ten tribes after their captivity by Shalmanezer. This refuſal proved the ſource of all that bitter enmity which afterwards took place between the Jews and Samaritans; and the immediate conſequence was, that the latter made all the oppoſition in their power to the going on of the work. At laſt, however, all obſtacles were ſurmounted, and the temple finiſhed as related in the books of Ezra and Nehemiah. The laſt of theſe chiefs died about 409 B. C. after having reſtored the Jewiſh worſhip to its original purity, and reformed a number of abuſes which took place immediately on its commencement.

2
The temple &c. finiſhed

3
Adminiſtration of affairs conferred on the high-prieſts.

But though the Jews were now reſtored to the free exerciſe of religion, they were neither a free nor a powerful people as they had formerly been. They were few in number, and their country only a province of Syria, ſubject to the kings of Perſia. The Syrian governors conferred the adminiſtration of affairs upon the high-prieſts; and their accepting this office, and thus deviating from the law of Moſes, muſt be conſidered as one of the chief cauſes of the miſfortunes which immediately befel the people, becauſe it made room for a ſet of men who aſpired at this high office merely through ambition or avarice, without either zeal for religion, or love for their country. It beſides made the high-prieſthood capable of being diſpoſed of at the pleaſure of the governors, whereas the Moſaic inſtitution had fixed it unalienably in the family of Aaron.—Of the bad effects of this practice a fatal inſtance happened in 373 B. C. Bagoſes, governor of Syria, having contracted an intimate friendſhip with Jeſhua the brother of Johanan the high-prieſt, promiſed to raiſe him to the pontifical office a few years after his brother had been inveſted with it. Jeſhua came immediately to Jeruſalem, and acquainted his brother with it. Their interview happened in the inner court of the temple; and a ſcuffle enſuing, Jeſhua was killed by his brother, and the temple thus polluted in the moſt ſcandalous manner. The conſequence to the Jews was, that a heavy fine was laid on the temple, which was not taken off till ſeven years after.

The firſt public calamity which befel the Jews nation after their reſtoration from Babylon, happened in the year 351 B. C.; for having ſome how or other diſobliged Darius Ochus king of Perſia, he beſieged and took Jericho, and carried off all the inhabitants captives. From this time they continued faithful to the Perſians, inſomuch that they had almoſt drawn upon themſelves the diſpleaſure of Alexander the Great. That monarch having reſolved upon the ſiege of Tyre, and being informed that the city was wholly ſupplied with proviſions from Judea, Samaria, and Galilee, ſent to Jaddua, then high-prieſt, to demand of him that ſupply which he had been accuſtomed to pay to the Perſians. The Jewiſh pontiff excuſed himſelf on account of his oath of fidelity to Darius; which ſo provoked Alexander, that he had no ſooner completed the reduction of Tyre than he marched againſt Jeruſalem. The inhabitants then, being with good reaſon thrown into the utmoſt conſternation, had recourſe to prayers; and Jaddua is ſaid, by a divine revelation to have been commanded to go and meet Alexander. He obeyed accordingly, and ſet out on his journey, dreſſed in his pontifical robes, at the head of all his prieſts in their proper habits, and attended by the reſt of the people dreſſed in white garments. Alexander is ſaid to have been ſeized with ſuch awful reſpect on ſeeing this venerable proceſſion, that he embraced the high-prieſt, and paid a kind of religious adoration to the name of God engraven on the front of his mitre. His followers being ſurpriſed at this unexpected behaviour, the Macedonian monarch informed them, that he paid that reſpect not to the prieſt, but to his God, as an acknowledgment for a viſion which he had been favoured with at Dia; where he had been promiſed the conqueſt of Perſia, and encouraged in his expedition by a perſon of much the ſame aſpect and dreſſed in the ſame habit with the pontiff before him. He afterwards accompanied Jaddua into Jeruſalem, where he offered ſacrifices in the temple. The high-prieſt ſhewed him alſo the prophecies of Daniel, wherein the deſtruction of the Perſian empire by himſelf is plainly ſet forth; in conſequence of which the king went away highly ſatisfied, and at his departure aſked the high-prieſt if there was nothing in which he could gratify himſelf or his people. Jaddua then told him, that, according to the Moſaic law, they neither ſowed nor ploughed on the ſeventh year; therefore would eſteem it an high favour if the king would be pleaſed to remit their tribute in that year. To this requeſt the king readily yielded; and having confirmed them in the enjoyment of all their privileges, particularly that of living under their own laws, he departed.

4
Interview of the high-prieſt with Alexander the Great.

5
Miſerable ſtate of the Jews after Alexander's death.

Whether this ſtory deſerves credit or not (for the whole tranſaction is not without reaſon called in queſtion by ſome), it is certain that the Jews were much favoured by Alexander; but with him their good fortune ſeemed alſo to expire. The country of Judea being ſituated between Syria and Egypt, became ſubject to all the revolutions and wars which the ambitious ſucceſſors of Alexander waged againſt each other. At firſt it was given, together with Syria and Phenicia, to Leomedon the Mitylenian one of Alexander's generals; but he being ſoon after ſtripped of the other two by Ptolemy, Judea was next ſummoned to yield to the conqueror. The Jews ſcrupled to break their oath of fidelity to Leomedon; and were of conſequence invaded by Ptolemy at the head of a powerful army. The open country was eaſily reduced; but the city being ſtrongly fortified both by art and nature, threatened a ſtrong reſiſtance. A ſuperſtitious fear of breaking the ſabbath, however, prevented the beſieged from making any defence on that day; of which Ptolemy being informed, he cauſed an aſſault to be made on the ſabbath, and eaſily carried the place. At firſt he treated them with great ſeverity, and carried 100,000 men of them into captivity; but reflecting ſoon after on their known fidelity to their conquerors, he reſtored them to all the privileges they had enjoyed under the Macedonians. Of the captives he put ſome into garriſons, and others he ſettled in the countries of Libya and Cyrene. From thoſe who ſettled in the latter of theſe countries deſcended the Cyrenean Jews mentioned by the writers of the New Teſtament.

Five years after Ptolemy had ſubdued Judea, he was forced to yield it to Antigonus, reſerving to himſelf only the cities of Ace, Samaria, Joppa, and Gaza; and carrying off an immenſe booty, together with a great number of captives, whom he ſettled at Alexandria and endowed with conſiderable privileges and immunities.—Antigonus behaved in ſuch a tyrannical manner, that great numbers of his Jewiſh ſubjects fled into Egypt, and others put themſelves under the protection of Seleucus, who alſo granted them conſiderable privileges. Hence this nation came gradually to be ſpread over Syria, and Aſia Minor; while Judea ſeemed to be in danger of being depopulated, till it was recovered by Ptolemy in 292. The affairs of the Jews then took a more proſperous turn, and continued in a thriving way till the reign of Ptolemy Philopator, when they were grievouſly oppreſſed by the incurſions of the Samaritans, at the ſame time that Antiochus Theos, king of Syria, invaded Galilee. Ptolemy, however, marched againſt Antiochus, and defeated him; after which, having gone to Jeruſalem to offer ſacrifices, he ventured to profane the temple itſelf by going into it. He penetrated thro' the two outer courts; but as he was about to enter the ſanctuary, he was ſtruck with ſuch dread and terror that he fell down half-dead. A dreadful perſecution was then raiſed againſt the Jews, who had attempted to hinder him in his impious attempt; but this perſecution was ſtopped by a ſtill more extraordinary accident related under the article EGYPT, n° 30. and the Jews again received into favour.

6
ubdued by
ntiochus
Great.

About the year 204 B. C. the country of Judea was ſubdued by Antiochus the Great; and on this occaſion the loyalty of the Jews to the Egyptians failed them, the whole nation readily ſubmitting to the king of Syria. This attachment ſo pleaſed the Syrian monarch, that he ſent a letter to his general, wherein he acquainted him that he deſigned to reſtore Jeruſalem to its ancient ſplendor, and to recal all the Jews that had been driven out of it: that out of his ſingular reſpect to the temple of God, he granted them 20,000 pieces of ſilver, towards the charges of the victims, frankincenſe, wine, and oil; 1400 meaſures of fine wheat, and 375 meaſures of ſalt, towards their uſual oblations: that the temple ſhould be thoroughly repaired at his coſt; that they ſhould enjoy the free exerciſe of their religion; and reſtore the public ſervice of the temple, and the prieſts, Levites, ſingers, &c. to their uſual functions: that no ſtranger, or Jew that was unpurified, ſhould enter farther into the temple than was allowed by their law; and that no fleſh of unclean beaſts ſhould be brought into Jeruſalem, not even their ſkins: and all theſe under the penalty of paying 3000 pieces of ſilver into the treaſury of the temple. He further granted an exemption of taxes for three years to all the diſperſed Jews that ſhould come within a limited time to ſettle in the metropolis; and that all who had been ſold for ſlaves within his dominions ſhould be immediately ſet free.

7
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This ſudden proſperity proved of no long duration. About the year 176, a quarrel happened between Onias at that time high prieſt, and one Simon, governor of the temple, which was attended with the moſt fatal conſequences. The cauſes of this quarrel are unknown. The event, however, was, that Simon finding he could not get the better of Onias, informed Apollonius governor of Cœloſyria and Paleſtine, that there was at that time in the temple an immenſe treaſure, which at his pleaſure might be ſeized upon for the uſe of the king of Syria. Of this the governor inſtantly ſent intelligence to the king, who diſpatched one Heliodorus to take poſſeſſion of the ſuppoſed treaſure. This perſon, through a miraculous interpoſition, as the Jews pretend, failed in his attempt of entering the temple; upon which Simon accuſed the high-prieſt to the people, as the perſon who had invited Heliodorus to Jeruſalem. This produced a kind of civil war, in which many fell on both ſides. At laſt Onias having complained to the king, Simon was baniſhed; but ſoon after, Antiochus Epiphanes having aſcended the throne of Syria, Jaſon, the high-prieſt's brother, taking advantage of the neceſſities of Antiochus, purchaſed from him the high-prieſthood at the price of 350 talents, and obtained an order that his brother ſhould be ſent to Antioch, there to be confined for life.

Jaſon's next ſtep was to purchaſe liberty, at the price of 150 talents more, to build a gymnaſium at Jeruſalem ſimilar to thoſe which were uſed in the Grecian cities; and to make as many Jews as he pleaſed free citizens of Antioch. By means of theſe powers he became very ſoon able to form a ſtrong party in Judea; for his countrymen were exceedingly fond of the Grecian cuſtoms, and the freedom of the city of Antioch was a very valuable privilege. From this time therefore a general apoſtacy took place; the ſervice of the temple was neglected, and Jaſon abandoned himſelf without remorſe to all the impieties and abſurdities of paganiſm.

8
A general apoſtacy takes place.

He did not, however, long enjoy his ill-acquired dignity. Having ſent his brother Menelaus with the uſual tribute to Antiochus, the former took the opportunity of ſupplanting Jaſon in the ſame manner that he had ſupplanted Onias. Having offered for the high-prieſthood 300 talents more than his brother had given, he eaſily obtained it, and returned with his new commiſſion to Jeruſalem. He ſoon got himſelf a ſtrong party; but Jaſon proving too powerful, forced Menelaus and his adherents to retire to Antioch. Here, the better to gain their point, they acquainted Antiochus that they were determined to renounce their old religion, and wholly conform themſelves to that of the Greeks: which ſo pleaſed the tyrant, that he immediately gave them a force ſufficient to drive Jaſon out of Jeruſalem; who thereupon took refuge among the Ammonites.

Menelaus being thus freed from his rival, took care to fulfil his promiſe to the king with regard to the apoſtacy, but forgot to pay the money he had promiſed. At laſt he was ſummoned to Antioch; and finding nothing but the payment of the promiſed ſum would do, ſent orders to his brother Lyſimachus to convey to him as many of the ſacred utenſils belonging to the temple as could be ſpared. As theſe were all of gold, the apoſtate ſoon raiſed a ſufficient ſum from them, not only to ſatisfy the king, but alſo to bribe the courtiers in his favour. But his brother Onias, who had been all this time confined at Antioch, getting intelligence of the ſacrilege, made ſuch bitter complaints, that an inſurrection was ready to take place among the Jews at Antioch. Menelaus, in order to avoid the impending danger, bribed Andronicus, governor of the city, to murder Onias. This produced the moſt vehement complaints as ſoon as Antiochus returned to the capital, (he having been abſent for ſome time in order to quell an inſurrection in Cilicia); which at laſt ended in the death of Andronicus, who was executed by the king's order. By dint of money, however, Menelaus ſtill found means to keep up his credit; but was obliged to draw ſuch large ſums from Jeruſalem, that the inhabitants at laſt maſſacred his brother Lyſimachus, whom he had left governor of the city in his abſence. Antiochus ſoon after took a journey to Tyre; upon which the Jews ſent deputies to him, both to juſtify the death of Lyſimachus, and to accuſe Menelaus of being the author of all the troubles which had happened. The apoſtate, however, was never at a loſs while he could procure money. By means of this powerful argument he pleaded his cauſe ſo effectually, that the deputies were not only caſt, but put to death; and this unjuſt ſentence gave the traitor ſuch a complete victory over all his enemies, that from thenceforth he commenced a downright tyrant. Jeruſalem was deſtitute of protectors; and the ſanhedrim, if there were any zealous men left among them, were ſo much terrified, that they durſt not oppoſe him, though they evidently ſaw that his deſign was finally to eradicate the religion and liberties of his country.

In the mean time, Antiochus was taken up with the conqueſt of Egypt, and a report was ſome how or other ſpread that he had been killed at the ſiege of Alexandria. At this news the Jews imprudently ſhewed ſome ſigns of joy; and Jaſon thinking this a proper opportunity to regain his loſt dignity, appeared before Jeruſalem at the head of about 1000 reſolute men. The gates were quickly opened to him by ſome of his friends in the city; upon which Menelaus retired into the citadel, and Jaſon, minding nothing but his reſentment, committed the moſt horrid butcheries. At laſt he was obliged to leave both the city and country, on the news that Antiochus was coming with a powerful army againſt him; for that prince, highly provoked at this rebellion, and eſpecially at the rejoicings the Jews had made on the report of his death, had actually reſolved to puniſh the city in the ſevereſt manner.

9
Jeruſalem taken by Antiochus Epiphanes.

Accordingly, about 170 B. C. having made himſelf maſter of the city, he behaved with ſuch cruelty, that within three days they reckoned no fewer than 40,000 killed, and as many ſold for ſlaves. In the midſt of this dreadful calamity, the apoſtate Menelaus found means not only to preſerve himſelf from the general ſlaughter, but even to regain the good graces of the king, who, having by his means plundered the temple of every thing valuable, returned to Antioch in a kind of triumph. Before he departed, however, he put Judea under the government of one Philip, a barbarous Phrygian; Samaria under that of Andronicus, a perſon of a ſimilar diſpoſition; and left Menelaus, the moſt hateful of all the three, in poſſeſſion of the high-prieſthood.

10
His monſtrous cruelty.

Though the Jews ſuffered exceedingly under theſe tyrannical governors, they were ſtill reſerved for greater calamities. About 168 B. C. Antiochus having been moſt ſeverely mortified by the Romans, took it into his head to wreck his vengeance on the unhappy Jews. For this purpoſe he diſpatched Apollonius at the head of 22,000 men, with orders to plunder all the cities of Judea, to murder all the men, and ſell the women and children for ſlaves. Apollonius accordingly came with his army, and to outward appearance with a peaceable intention; neither was he ſuſpected by the Jews, as he was ſuperintendant of the tribute in Paleſtine. He kept himſelf inactive till the next ſabbath, when they were all in a profound quiet; and then, on a ſudden, commanded his men to arms. Some of them he ſent to the temple and ſynagogues, with orders to cut in pieces all whom they found there; whilſt the reſt going through the ſtreets of the city maſſacred all that came in their way; the ſuperſtitious Jews not attempting to make the leaſt reſiſtance for fear of breaking the Sabbath. He next ordered the city to be plundered and ſet on fire, pulled down all their ſtately buildings, cauſed the walls to be demoliſhed, and carried away captive about 10,000 of thoſe who had eſcaped the ſlaughter.

11
The temple profaned, and the Jewiſh religion aboliſhed.

From that time the ſervice of the temple was totally abandoned; that place having been quite polluted, both with the blood of multitudes who had been killed, and in various other ways. The Syrian troops built a large fortreſs on an eminence in the city of David; fortified it with a ſtrong wall and ſtately towers, and put a garriſon in it to command the temple over-againſt which it was built, ſo that the ſoldiers could eaſily ſee and ſally out upon all thoſe who attempted to come into the temple; ſo many of whom were continually plundered and murdered by them, that the reſt, not daring to ſtay any longer in Jeruſalem, fled for refuge to the neighbouring nations.

Antiochus, not yet ſatiated with the blood of the Jews, reſolved either totally to aboliſh their religion, or deſtroy their whole race. He therefore iſſued out a decree that all nations within his dominions ſhould forſake their old religion and gods, and worſhip thoſe of the king under the moſt ſevere penalties. To make his orders more effectual, he ſent overſeers into every province to ſee them ſtrictly put in execution; and as he knew the Jews were the only people who would diſobey them, ſpecial directions were given to have them treated with the utmoſt ſeverity. Atheneas, an old and cruel miniſter, well verſed in all the pagan rites, was ſent into Judea. He began by dedicating the temple to Jupiter Olympius, and ſetting up his ſtatue on the altar of burnt-offerings. Another leſſer altar was raiſed before it, on which they offered ſacrifices to that falſe deity. All who refuſed to come and worſhip this idol were either maſſacred, or put to ſome cruel tortures till they either complied or expired under the hands of the executioners. At the ſame time, altars, groves, and ſtatues, were raiſed every where through the country, and the inhabitants compelled to worſhip them under the ſame ſevere penalties; while it was inſtant death to obſerve the ſabbath, circumciſion, or any other inſtitution of Moſes.

11
Reſtored
Mattat

At laſt, when vaſt numbers had been put to cruel deaths, and many more had ſaved their lives by their apoſtacy, an eminent prieſt, named *Mattathias*, began to ſignalize himſelf by his bravery and zeal for religion. He had for ſome time been obliged to retire to Modin his native place, in order to avoid the perſecution which raged at Jeruſalem. During his receſs there, Apelles, one of the king's officers, came to oblige the inhabitants to comply with the abovementioned orders. By him Mattathias and his ſons were addreſſed in the moſt earneſt manner, and had the moſt ample promiſes made them of the king's favour and protection if they would renounce their religion. But Mattathias anſwered, that though the whole Jewiſh nation, and the whole world, were to conform to the king's edict, yet both he and his ſons would continue faithful to their God to the laſt minute of their lives. At the ſame time perceiving one of his countrymen juſt going to offer ſacrifices to an idol, he fell upon him and inſtantly killed him, agreeable to the law of Moſes in ſuch caſes. Upon this his ſons, fired with the ſame zeal, killed the officer and his men; overthrew the altar and idol; and, running about the city, cried out, that thoſe who were zealous for the law of God ſhould follow them; by which means they quickly ſaw themſelves at the head of a numerous troop, with whom they ſoon after withdrew into ſome of the deſarts of Judea. They were followed by many others, ſo that in a ſhort time they found themſelves in a condition to reſiſt their enemies; and having conſidered the danger to which they were expoſed by their ſcrupulous obſervance of the Sabbath, they reſolved to defend themſelves, in caſe of an attack, upon that day as well as upon any other.

In the year 167 B. C. Mattathias finding that his followers daily increaſed in number, began to try his ſtrength by attacking the Syrians and apoſtate Jews. As many of theſe as he took he put to death, but forced a much greater number to fly for refuge into foreign countries; and having ſoon ſtruck his enemies with terror, he marched from city to city, overturned the idolatrous altars, opened the Jewiſh ſynagogues, made a diligent ſearch after all the ſacred books, and cauſed freſh copies of them to be written; he alſo cauſed the reading of the Scriptures to be reſumed, and all the males born ſince the perſecution to be circumciſed. In all this he was attended with ſuch ſucceſs, that he had extended his reformation through a conſiderable part of Judea within the ſpace of one year; and would probably have completed it, had he not been prevented by death.

3 oits of Mac- s.

Mattathias was ſucceeded by his ſon Judas, ſurnamed *Maccabeus*, the greateſt uninſpired hero of whom the Jews can boaſt. His troops amounted to no more than 6000 men; yet with theſe he quickly made himſelf maſter of ſome of the ſtrongeſt fortreſſes of Judea, and became terrible to the Syrians, Samaritans, and apoſtate Jews. In one year he defeated the Syrians in five pitched battles, and drove them quite out of the country; after which he purified the temple, and reſtored the true worſhip, which had been interrupted for three years and a half. Only one obſtacle now remained, viz. the Syrian garriſon abovementioned, which had been placed over-againſt the temple, and which Judas could not at preſent reduce. In order to prevent them from interrupting the worſhip, however, he fortified the mountain on which the temple ſtood, with an high wall and ſtrong towers round about, leaving a garriſon to defend it; making ſome additional fortifications at the ſame time to Bethzura, a fortreſs at about 20 miles diſtance.

In the mean time Antiochus being on his return from an unſucceſsful expedition into Perſia, received the diſagreeable news that the Jews had all to a man revolted, defeated his generals, driven their armies out of Judea, and reſtored their ancient worſhip. This threw him into ſuch a fury, that he commanded his charioteer to drive with the utmoſt ſpeed, threatening utterly to extirpate the Jewiſh race, without leaving a ſingle perſon alive. Theſe words were ſcarce uttered, when he was ſeized with a violent pain in his bowels, which no remedy could cure or abate. But notwithſtanding this violent ſhock, ſuffering himſelf to be hurried away by the tranſports of his fury, he gave orders for proceeding with the ſame precipitation in his journey. But while he was thus haſtening forward, he fell from his chariot, and was ſo bruiſed by the fall, that his attendants were forced to put him into a litter. Not being able to bear even the motion of the litter, he was forced to halt at a town called *Tabæ* on the confines of Perſia and Babylonia. Here he kept his bed, ſuffering inexpreſſible torments, occaſioned chiefly by the vermin which bred in his body, and the ſtench, which made him inſupportable even to himſelf. But the torments of his mind, cauſed by his reflecting on the former actions of his life, ſurpaſſed by many degrees thoſe of his body. Polybius, who in his account of this prince's death agrees with the Jewiſh hiſtorians, tells us, that the uneaſineſs of his mind grew at laſt to a conſtant delirium or ſtate of madneſs, by reaſon of ſeveral ſpectres and apparitions of evil genii or ſpirits, which he imagined were continually reproaching him with the many wicked actions of which he had been guilty. At laſt, having languiſhed for ſome time in this miſerable condition, he expired, and by his death freed the Jews from the moſt inveterate enemy they had ever known.

14 Dreadful death of Antiochus Epiphanes.

Notwithſtanding the death of Antiochus, however, the war was ſtill carried on againſt the Jews; but through the valour and good conduct of Judas, the Syrians were conſtantly defeated, and in 163 B. C. a peace was concluded upon terms very advantageous to the Jewiſh nation. This tranquillity, however, was of no long continuance; the Syrian generals renewed their hoſtilities, and were attended with the ſame ill ſucceſs as before. Judas defeated them in five engagements; but in the ſixth was abandoned by all his men except 800, who, together with their chief, were ſlain in the year 161 B. C.

15 Exploits of Jonathan, Simon, and Hyrcan.

The news of the death of Judas threw his countrymen into the utmoſt conſternation, and ſeemed to give new life to all their enemies. He was ſucceeded, however, by his brother Jonathan; who conducted matters with no leſs prudence and ſucceſs than Judas had done, till he was treacherouſly ſeized and put to death by Tryphon, a Syrian uſurper, who ſhortly after murdered his own ſovereign. The traitor immediately prepared to invade Judea; but found all his projects fruſtrated by Simon, Jonathan's brother. This pontiff repaired all the fortreſſes of Judea, and furniſhed them with freſh garriſons, took Joppa and Gaza, and drove out the Syrian garriſon from the fortreſs of Jeruſalem; but was at laſt treacherouſly murdered by a ſon-in-law named Ptolemy, about 135 B. C.

Simon was ſucceeded by ſon Hyrcan; who not only ſhook off the yoke of Syria, but conquered the Samaritans, demoliſhed their capital city, and became maſter of all Paleſtine, to which he added the provinces of Samaria and Galilee; all which he enjoyed till within a year of his death, without the leaſt diſturbance from without, or any internal diſcord. His reign was no leſs remarkable on the account of his great wiſdom and piety at home, than his conqueſts abroad. He was the firſt ſince the captivity who had aſſumed the royal title; and he raiſed the Jewiſh nation to a greater degree of ſplendor than it had ever enjoyed ſince that time. The author of the fourth book of the Maccabees alſo informs us, that in him three dignities were centered which never met in any other perſon, namely, the royal dignity, the high-prieſthood, and the gift of prophecy. But the inſtances given of this laſt are very equivocal and ſuſpicious. The laſt year of his reign, however, was imbittered by a quarrel with the phariſees; and which proceeded ſuch a length as was thought to have ſhortened his days. Hyrcan had always been a great friend to that ſect, and they had hitherto enjoyed the moſt honourable employments in the ſtate; but at length one of them, named *Eleazar*, took it into his head to queſtion Hyrcan's legitimacy, alleging, that his mother had formerly been a ſlave, and conſequently that he was incapable of enjoying the high-prieſthood. This report was credited, or pretended to be ſo, by the whole ſect; which irritated the high-prieſt to ſuch a degree, that he joined the ſadducees, and could never afterwards be reconciled to the phariſees, who therefore raiſed all the troubles and ſeditions they could during the ſhort time he lived.

Hyrcan died in 107 B. C. and was ſucceeded by his eldeſt ſon Ariſtobulus, who conquered Iturea, but proved a moſt cruel and barbarous tyrant, polluting his hands with the blood even of his mother and one of his brothers, keeping the reſt cloſely confined during his reign, which, however, was but ſhort. He was ſucceeded in 105 by Alexander Jannæus, the greateſt conqueror, next to king David, that ever ſat on the Jewiſh throne. He was hated, however, by the phariſees, and once in danger of being killed in a tumult excited by them; but having cauſed his guards to fall upon the mutinous mob, they killed 6000 of them, and diſperſed the reſt. After this, finding it impoſſible to remain in quiet in his own kingdom, he left Jeruſalem, with a deſign to apply himſelf wholly to the extending of his conqueſts; but while he was buſied in ſubduing his foreign enemies, the phariſees raiſed a rebellion at home. This was quaſhed in the year 86 B. C. and the rebels were treated in the moſt inhuman manner. The faction, however, was by this means ſo thoroughly quelled, that they never dared to lift up their heads as long as he lived; and Alexander having made ſeveral conqueſts in Syria, died about 79 B. C.

16 Alexander Jannæus, a great conqueror.

17 Conteſts between his ſons Hyrcanus and Ariſtobulus.

The king left two ſons, Hyrcanus and Ariſtobulus; but bequeathed the government to his wife Alexandra as long as ſhe lived: but as he ſaw her greatly afraid, and not without reaſon, of the reſentment of the phariſees, he deſired his queen, juſt before his death, to ſend for the principal leaders of that party, and pretend to be entirely devoted to them; in which caſe, he aſſured her, that they would ſupport her and her ſons after her in the peaceable poſſeſſion of the government. With this advice the queen complied; but found herſelf much embarraſſed by the turbulent phariſees, who, after ſeveral exorbitant demands, would at laſt be contented with nothing leſs than the total extermination of their adverſaries the ſadducees. As the queen was unable to reſiſt the ſtrength of the phariſaic faction, a moſt cruel perſecution immediately took place againſt the ſadducees, which continued for four years; until at laſt, upon their earneſt petition, they were diſperſed among the ſeveral garriſons of the kingdom, in order to ſecure them from the violence of their enemies. A few years after this, being ſeized with a dangerous ſickneſs, her youngeſt ſon Ariſtobulus collected a ſtrong party in order to ſecure the crown to himſelf; but the queen, being diſpleaſed with his conduct, appointed her other ſon Hyrcanus, whom ſhe had before made high-prieſt, to ſucceed her alſo in the royal dignity. Soon after this ſhe expired, and left her two ſons competitors for the crown. The phariſees raiſed an army againſt Ariſtobulus, which almoſt inſtantly deſerted to him, ſo that Hyrcanus found himſelf obliged to accept of peace upon any terms; which, however, was not granted, till the latter had abandoned all title both to the royal and pontifical dignity, and contented himſelf with the enjoyment of his peculiar patrimony as a private perſon.

But this depoſition did not extinguiſh the party of Hyrcanus. A new cabal was raiſed by Antipater an Idumæan proſelyte, and father of Herod the Great; who carried off Hyrcanus into Arabia, under pretence that his life was in danger if he remained in Judea. Here he applied to Aretas king of that country, who undertook to reſtore the depoſed monarch; and for that purpoſe invaded Judea, defeated Ariſtobulus, and kept him cloſely beſieged in Jeruſalem. The latter had recourſe to the Romans; and having bribed Scaurus, one of their generals, he defeated Aretas with the loſs of 7000 of his men, and drove him quite out of the country. The two brothers next ſent preſents to Pompey, at that time commander in chief of all the Roman forces in the eaſt, and whom they made the arbitrator of their differences. But he, fearing that Ariſtobulus, againſt whom he intended to declare, might obſtruct his intended expedition againſt the Nabatheans, diſmiſſed them with a promiſe, that as ſoon as he had ſubdued Aretas, he would come into Judea and decide their controverſy.

18 The Romans called in by Ariſtobulus.

This delay gave ſuch offence to Ariſtobulus, that he ſuddenly departed for Judea without even taking leave of the Roman general, who on his part was no leſs offended at this want of reſpect. The conſequence was, that Pompey entered Judea with thoſe troops with which he had deſigned to act againſt the Nabathæans, and ſummoned Ariſtobulus to appear before him. The Jewiſh prince would gladly have been excuſed; but was forced by his own people to comply with Pompey's ſummons, to avoid a war with that general. He came accordingly more than once or twice to him, and was diſmiſſed with great promiſes and marks of friendſhip. But at laſt Pompey inſiſted, that he ſhould deliver into his hands all the fortified places he poſſeſſed; which let Ariſtobulus plainly ſee that he was in the intereſt of his brother, and upon this he fled to Jeruſalem with a deſign to oppoſe the Romans to the utmoſt of his power. He was quickly followed by Pompey; and to prevent hoſtilities was at laſt forced to go and throw himſelf at the feet of the haughty Roman, and to promiſe him a conſiderable ſum of money as the reward of his forbearance. This ſubmiſſion was accepted; but Gabinius, being ſent with ſome troops to receive the ſtipulated ſum, was repulſed by the garriſon of Jeruſalem, who ſhut the gates againſt him, and refuſed to fulfil the agreement. This diſappointment ſo exaſperated Pompey, that he immediately marched with his whole army againſt the city.

19
Jeruſalem taken by Pompey.

The Roman general firſt ſent propoſals of peace; but finding the Jews reſolved to ſtand out to the laſt, he began the ſiege in form. As the place was ſtrongly fortified both by nature and art, he might have found it very difficult to accompliſh his deſign, had not the Jews been ſuddenly ſeized with a qualm of conſcience reſpecting the obſervance of the ſabbath-day. From the time of the Maccabees they had made no ſcruple of taking up arms againſt an offending enemy on the ſabbath; but now they diſcovered, that tho' it was lawful on that day to ſtand on their defence in caſe they were actually attacked, yet it was unlawful to do any thing towards the preventing of thoſe preparatives which the enemy made towards ſuch future aſſaults. As therefore they never moved an hand to hinder the erection of mounds and batteries, or the making of breaches in their walls on the ſabbath, the beſiegers at laſt made ſuch a conſiderable breach on that day, that the garriſon could no longer reſiſt them. The city was therefore taken in the year 63 B. C. 12,000 of the inhabitants were ſlaughtered, and many more died by their own hands; while the prieſts, who were offering up the uſual prayers and ſacrifices in the temple, choſe rather to be butchered along with their brethren, than ſuffer divine ſervice to be one moment interrupted. At laſt, after the Romans had ſatiated their cruelty with the death of a vaſt number of the inhabitants, Hyrcanus was reſtored to the pontifical dignity with the title of *prince;* but forbid to aſſume the title of *king*, to wear a diadem, or to extend his territories beyond the limits of Judea. To prevent future revolts, the walls were pulled down; and Scaurus was left governor with a ſufficient force. But before he departed, the Roman general gave the Jews a ſtill greater offence than almoſt any thing he had hitherto done; and that was by entering into the moſt ſacred receſſes of the temple, where he took a view of the golden table, candleſtick, cenſers, lamps, and all the other ſacred veſſels; but, out of reſpect to the Deity, forbore to touch any of them, and when he came out commanded the prieſts immediately to purify the temple according to cuſtom.

Pompey having thus ſubdued the Jewiſh nation, ſet out for Rome, carrying along with him Ariſtobulus and his two ſons Alexander and Antigonus, as captives to adorn his future triumph. Ariſtobulus himſelf and his ſon Antigonus were led in triumph; but Alexander found means to eſcape into Judea, where he raiſed an army of 10,000 foot and 1500 horſe, and began to fortify ſeveral ſtrong holds, from whence he made incurſions into the neighbouring country. As for Hyrcanus, he had no ſooner found himſelf freed from his rival brother, than he relapſed into his former indolence, leaving the care of all his affairs to Antipater, who, like a true politician, failed not to turn the weakneſs of the prince to his own advantage and the aggrandizing of his family. He foreſaw, however, that he could not eaſily compaſs his ends, unleſs he ingratiated himſelf with the Romans; and therefore ſpared neither pains nor coſt to gain their favour. Scaurus ſoon after received from him a ſupply of corn and other proviſions, without which his army, which he had led againſt the metropolis of Arabia, would have been in danger of periſhing; and after this, he prevailed on the king to pay 300 talents to the Romans, to prevent them from ravaging his country. Hyrcanus was now in no condition to face his enemy Alexander; and therefore had again recourſe to the Romans, Antipater at the ſame time ſending as many troops as he could ſpare to join them. Alexander ventured a battle; but was defeated with conſiderable loſs, and beſieged in a ſtrong fortreſs named *Alexandrion.* Here he would have been forced to ſurrender; but his mother, partly by her addreſs, and partly by the ſervices ſhe found means to do the Roman general, prevailed upon him to grant her ſon a pardon for what was paſt. The fortreſſes were then demoliſhed, that they might not give occaſion to freſh revolts; Hyrcanus was again reſtored to the pontifical dignity; and the province was divided into five ſeveral diſtricts, in each of which a ſeparate court of judicature was erected. The firſt of theſe was at Jeruſalem, the ſecond at Gadara, the third at Amath, the fourth at Jericho, and the fifth at Sephoris in Galilee. Thus was the government changed from a monarchy to an ariſtocracy, and the Jews now fell under a ſet of domineering lords.

20
Jewiſh government changed into an ariſtocracy.

Soon after this, Ariſtobulus found means to eſcape from his confinement at Rome, and raiſed new troubles in Judea, but was again defeated and taken priſoner: his ſon alſo renewed his attempts; but was in like manner defeated, with the loſs of near 10,000 of his followers; after which Gabinius, having ſettled the affairs of Judea to Antipater's mind, reſigned the government of his province to Craſſus. The only tranſaction during his government was his plundering the temple of all its money and ſacred utenſils, amounting in the whole to 10,000 Attic talents, *i. e.* above two millions of our money. After this ſacrilege, Craſſus ſet out on his expedition againſt Parthia, where he periſhed; and his death was by the Jews interpreted as a divine judgment for his impiety.

21
Jews favoured by Cæſar.

The war between Cæſar and Pompey afforded the Jews ſome reſpite, and likewiſe an opportunity of ingratiating themſelves with the former, which the politic Antipater readily embraced. His ſervices were rewarded by the emperor. He confirmed Hyrcanus in his prieſthood, added to it the principality of Judea to be entailed on his poſterity for ever, and reſtored the Jewiſh nation to their ancient rights and privileges; ordering at the ſame time a pillar to be erected, whereon all theſe grants, and his own decree, ſhould be engraved, which was accordingly done; and ſoon after, when Cæſar himſelf came into Judea, he granted liberty alſo to fortify the city, and rebuild the wall which had been demoliſhed by Pompey.

22
Herod raiſed to the Jewiſh throne.

During the lifetime of Cæſar, the Jews were ſo highly favoured, that they could ſcarcely be ſaid to feel the Roman yoke. After his death, however, the nation fell into great diſorders; which were not finally quelled, till Herod, who was created king of Judea by Marc Anthony in 40 B. C. was fully eſtabliſhed on the throne by the taking of Jeruſalem by his allies the Romans in 37 B. C. The immediate conſequence of this was another cruel pillage and maſſacre: then followed the death of Antigonus the ſon of Ariſtobulus, who had for three years maintained his ground againſt Herod, put to death his brother Phaſael, and cut off Hyrcanus's ears, in order the more effectually to incapacitate him for the high-prieſthood.

23
His tyranny and cruelty.

The Jews gained but little by this change of maſters. The new king proved one of the greateſt tyrants mentioned in hiſtory. He began his reign with a cruel perſecution of thoſe who had ſided with his rival Antigonus; great numbers of whom he put to death, ſeizing and confiſcating their effects for his own uſe. Nay, ſuch was his jealouſy in this laſt reſpect, that he cauſed guards to be placed at the city-gates, in order to watch the bodies of thoſe of the Antigonian faction who were carried out to be buried, leſt ſome of their riches ſhould be carried along with them. His jealouſy next prompted him to decoy Hyrcanus, the baniſhed pontiff, from Parthia, where he had taken refuge, that he might put him to death, tho' contrary to his moſt ſolemn promiſes. His cruelty then fell upon his own family. He had married Mariamne, the daughter of Hyrcanus; whoſe brother, Ariſtobulus, a young prince of great hopes, was made high-prieſt at the interceſſion of his mother Alexandra. But the tyrant, conſcious that Ariſtobulus had a better right to the kingdom than himſelf, cauſed him ſoon after to be drowned in a bath. The next victim was his beloved queen Mariamne herſelf. Herod had been ſummoned to appear firſt before Marc Anthony, and then before Auguſtus, in order to clear himſelf from ſome crimes laid to his charge. As he was, however, doubtful of the event, he left orders, that in caſe he was condemned, Mariamne ſhould be put to death. This, together with the death of her father and brother, gave her ſuch an averſion for him, that ſhe ſhewed it on all occaſions. By this conduct the tyrant's reſentment was at laſt ſo much inflamed, that having got her falſely accuſed of infidelity, ſhe was condemned to die, and executed accordingly. She ſuffered with great reſolution; but with her ended all the happineſs of her huſband. His love for Mariamne increaſed ſo much after her death, that for ſome time he appeared like one quite diſtracted. His remorſe, however, did not get the better of his cruelty. The death of Mariamne was ſoon followed by that of her mother Alexandra, and this by the execution of ſeveral other perſons who had joined with her in an attempt to ſecure the kingdom to the ſons of the deceaſed queen.

Herod, having now freed himſelf from the greateſt part of his ſuppoſed enemies, began to ſhew a greater contempt for the Jewiſh ceremonies than formerly; and introduced a number of heatheniſh games, which made him odious to his ſubjects. Ten bold fellows at laſt took it into their heads to enter the theatre where the tyrant was celebrating ſome games, with daggers concealed under their clothes, in order to ſtab him or ſome of his retinue. In caſe they ſhould miſcarry in the attempt, they had the deſperate ſatisfaction to think, that, if they periſhed, the tyrant would be rendered ſtill more odious by the puniſhment inflicted on them. They were not miſtaken: for Herod being informed of their deſign by one of his ſpies, and cauſing the aſſaſſins to be put to a moſt excruciating death, the people were ſo much exaſperated againſt the informer, that they cut and tore him to pieces, and caſt his fleſh to the dogs. Herod tried in vain to diſcover the authors of this affront; but at laſt having cauſed ſome women to be put to the rack, he extorted from them the names of the principal perſons concerned, whom he cauſed immediately to be put to death with their families. This produced ſuch diſturbances, that, apprehending nothing leſs than a general revolt, he ſet about fortifying Jeruſalem with ſeveral additional works, rebuilding Samaria, and putting garriſons into ſeveral fortreſſes in Judea. Notwithſtanding this, however, Herod had ſhortly after an opportunity of regaining the affections of his ſubjects in ſome meaſure, by his generoſity to them during a famine; but as he ſoon relapſed into his former cruelty, their love was again turned into hatred, which continued till his death.

24
Rebuilds the temple.

Herod now, about 23 B. C. began to adorn his cities with many ſtately buildings. The moſt remarkable and magnificent of them all, however, was the temple at Jeruſalem, which he is ſaid to have raiſed to a higher pitch of grandeur than even Solomon himſelf had done. Ten thouſand artificers were immediately ſet to work, under the direction of 1000 prieſts, the beſt ſkilled in carving, maſonry, &c. all of whom were kept in conſtant pay. A thouſand carts were employed in fetching materials; and ſuch a number of other hands were employed, that every thing was got ready within the ſpace of two years. After this they ſet about pulling down the old building, and rearing up the new one with the ſame expedition: ſo that the *holy place*, or temple properly ſo called, was finiſhed in a year and an half; during which we are told that it never rained in the day-time, but only in the night. The remainder was finiſhed in ſomewhat more than eight years. The *temple*, properly ſo called, or holy place, was but 60 cubits high, and as many in breadth; but in the front he added two wings or ſhoulders which projected 20 cubits more on each ſide, and which in all made a front of 120 cubits in length, and as many in height; with a gate 70 cubits high and 20 in breadth, but open and without any doors. The ſtones were white marble, 25 cubits in length, 12 in height, and nine in breadth, all wrought and poliſhed with exquiſite beauty; the whole reſembling a ſtately palace, whoſe middle being conſiderably raiſed above the extremities of each face, made it afford a beautiful viſta at a great diſtance, to thoſe who came to the metropolis. Inſtead of doors, the gates cloſed with very coſtly veils, enriched with a variety of flowering of gold, ſilver, purple, and every thing that was rich and curious; and on each ſide of the gates were planted two ſtately columns, from whoſe cornices hung golden feſtoons and vines, with their cluſters of grapes, leaves, &c. curiouſly wrought. The ſuperſtructure, however, which was probably reared on the old foundation without ſufficient additions, proved too heavy, and ſunk down about 20 cubits; ſo that its height was reduced to 100. This foundation was of an aſtoniſhing ſtrength and height, of which an account is given under the article JERUSALEM. The platform was a regular ſquare of a ſtade or furlong on each ſide. Each front of the ſquare had a ſpacious gate or entrance, enriched with ſuitable ornaments; but that on the weſt had four gates, one of which led to the palace, another to the city, and the two others to the ſuburbs and fields. This incloſure was ſurrounded on the outſide with a ſtrong and high wall of large ſtones, well cemented; and on the inſide, had on each front a ſtately piazza or gallery, ſupported by columns of ſuch a bigneſs, that three men could but juſt embrace them, their circumference being about 27 feet. There were in all 162 of them, which ſupported a cedar cieling of excellent workmanſhip, and formed three galleries, the middlemoſt of which was the largeſt and higheſt, it being 45 feet in breadth and 100 in height, whereas thoſe on each ſide were but 30 feet wide and 50 in height.

The piazzas and court were paved with marble of various colours; and, at a ſmall diſtance from the galleries, was a ſecond incloſure, ſurrounded with a flight of beautiful marble rails, with ſtately columns at proper diſtances, on which were engraven certain admonitions in Greek and Latin, to forbid ſtrangers, and thoſe Jews that were not purified, to proceed farther under pain of death. This incloſure had but one gate on the eaſt ſide; none on the weſt; but on the north and ſouth it had three, placed at equal diſtances from each other.

A third incloſure ſurrounded the *temple* properly ſo called, and the altar of burnt-offerings; and made what they called *the court of the Hebrews*, or *Iſraelites*. It was ſquare like the reſt: but the wall on the outſide was ſurrounded by a flight of 14 ſteps, which hid a conſiderable part of it; and on the top was a terrace, of about 12 cubits in breadth, which went quite round the whole cincture. The eaſt ſide had but one gate; the weſt none; and the north and ſouth four, at equal diſtances. Each gate was aſcended by five ſteps more, before one could reach the level of the inward court; ſo that the wall which incloſed it appeared within to be but 25 cubits high, though conſiderably higher on the outſide. On the inſide of each of thoſe gates were raiſed a couple of ſpacious ſquare chambers, in form of a pavilion, 30 cubits wide and 40 in height, each ſupported by columns of 12 cubits in circumference.

This incloſure had likewiſe a double flight of galleries on the inſide, ſupported by a double row of columns; but the weſtern ſide was only one continued wall, without gates or galleries. The women had likewiſe their particular courts ſeparate from that of the men, and one of the gates on the north and ſouth leading to it.

The altar of burnt-offerings was likewiſe high and ſpacious, being 40 cubits in breadth, and 15 in height. The aſcent to it was, according to the Moſaic law, ſmooth, and without ſteps; and the altar of unhewn ſtones. It was ſurrounded, at a convenient diſtance, with a low wall or rail, which divided the court of the prieſts from that of the lay Iſraelites; ſo that theſe laſt were allowed to come thus far to bring their offerings and ſacrifices; though none but the prieſts were allowed to come within that incloſure.

Herod cauſed a new dedication of this temple to be performed with the utmoſt magnificence; and preſented to it many rich trophies of his former victories, after the cuſtom of the Jewiſh monarchs.

This, and many other magnificent works, however, did not divert the king's attention from his uſual jealouſies and cruelty. His ſiſter Salome, and one of his ſons named *Antipater*, taking advantage of this diſpoſition, prompted him to murder his two ſons by Mariamne, named *Alexander* and *Ariſtobulus*, who had been educated at the court of Auguſtus in Italy, and were juſtly admired by all who ſaw them. His cruelty ſoon after broke out in an impotent attempt to deſtroy the Saviour of the world, but which was attended with no other conſequence than the deſtruction of 2000 innocent children of his own ſubjects. His miſery was almoſt brought to its ſummit by the diſcovery of Antipater's deſigns againſt himſelf; who was accordingly tried and condemned for treaſon. Something ſtill more dreadful, however, yet awaited him; he was ſeized with a moſt loathſome and incurable diſeaſe, in in which he was tormented with intolerable pains, ſo that his life became a burden. At laſt he died, to the great joy of the Jews, five days after he had put Antipater to death, and after having divided his kingdom among his ſons in the following manner.—Archelaus had Judea; Antipas, or Herod, was tetrarch of Galilee and Perea; and Philip had the regions of Trachonitis, Gaulon, Batanea, and Panias, which he erected likewiſe into a tetrarchy. To his ſiſter Salome he gave 50,000 pieces of money, together with the cities of Jamnia, Azotus, and Phaſaelis; beſides ſome conſiderable legacies to his other relations.

25
His death.

The cruelty of this monſter accompanied him to his grave; nay, he in a manner carried it beyond the grave. Being well appriſed that the Jews would rejoice at being freed from ſuch a tyrant, he bethought himſelf of the following infernal ſtratagem to damp their mirth. A few days before his death, he ſummoned all the heads of the Jews to repair to Jericho under pain of death; and, on their arrival, ordered them all to be ſhut up in the circus, giving at the ſame time ſtrict orders to his ſiſter Salome and her huſband to have all the priſoners butchered as ſoon as his breath was gone out. "By this means, (ſaid he,) I ſhall not only damp the people's joy, but ſecure a real mourning at my death." Theſe cruel orders, however, were not put in execution. Immediately after the king's death, Salome went to the Hippodrome, where the heads of the Jews were detained, cauſed the gates to be flung open, and declared to them, that now the king had no farther occaſion for their attendance, and that they might depart to their reſpective homes; after which, and not till then, the news of the king's death was publiſhed. Tumults, ſeditions, and inſurrections, quickly followed. Archelaus was oppoſed by his brethren, and obliged to appear at Rome before Auguſtus, to whom many complaints were brought againſt him. After hearing both parties, the emperor made the following diviſion of the kingdom: Archelaus had one-half, under the title of *ethnarch*, or governor of a nation; together with a promiſe that he ſhould have the title of *king*, as ſoon as he ſhewed himſelf worthy of it. This ethnarchy contained Judæa Propria, Idumea, and Samaria: but this laſt was exempted from one-fourth of the taxes paid by the reſt, on account of the peaceable behaviour of the inhabitants during the late tumults. The remainder

26
New diviſion of the kingdom by Auguſtus.

remainder was divided between Philip and Herod; the former of whom had Trachonitis, Batanea, and Auranitis, together with a ſmall part of Galilee; the latter had the reſt of Galilee, and the countries beyond the Jordan. Salome had half a million of ſilver, together with the cities of Jamnia, Azotus, Phaſaelis, and Aſcalon.

27
Archelaus baniſhed, and a Roman governor appointed over Judæa.

For ſome years Archelaus enjoyed his government in peace; but at laſt, both Jews and Samaritans, tired out with his tyrannical behaviour, joined in a petition to Auguſtus againſt him. The emperor immediately ſummoned him to Rome, where, having heard his accuſation and defence, he baniſhed him to the city of Vienne in Dauphiny, and confiſcated all his effects. Judæa being by this ſentence reduced to a Roman province, was ordered to be taxed; and Cyrenius the governor of Syria, a man of conſular dignity, was ſent thither to ſee it put in execution: which having done, and ſold the palaces of Archelaus, and ſeized upon all his treaſure, he returned to Antioch, leaving the Jews in no ſmall ferment on account of this new tax.

28
Agrippa made king.

Thus were the ſeeds of diſſenſion ſown between the Jews and Romans, which ended in the moſt lamentable cataſtrophe of the former. The Jews, always impatient of a foreign yoke, knew from their prophecies, that the time was now come when the Meſſiah ſhould appear. Of conſequence, as they expected him to be a great and powerful warrior, their rebellious and ſeditious ſpirit was heightened to the greateſt degree; and they imagined they had nothing to do but take up arms, and victory would immediately declare on their ſide. From this time, therefore, the country was never quiet; and the infatuated people, while they rejected the true Meſſiah, gave themſelves up to the direction of every impoſtor who choſe to lead them to their own deſtruction. The governors appointed by the Romans were alſo frequently changed, but ſeldom for the better. About the 16th year of Chriſt, Pontius Pilate was appointed governor; the whole of whoſe adminiſtration, according to Joſephus, was one continued ſcene of venality, rapine, tyranny, and every wicked action; of racking and putting innocent men to death, untried and uncondemned; and of every kind of ſavage cruelty. Such a governor was but ill calculated to appeaſe the ferments occaſioned by the late tax. Indeed Pilate was ſo far from attempting this, that he greatly inflamed them by taking every occaſion of introducing his ſtandards with images and pictures, conſecrated ſhields, &c. into their city; and at laſt attempting to drain the treaſury of the temple, under pretence of bringing an aqueduct into Jeruſalem. The moſt remarkable tranſaction of his government, however, was his condemnation of JESUS CHRIST: ſeven years after which he was removed from Judæa; and in a ſhort time Agrippa the grandſon of Herod the Great, was promoted by Caius to the regal dignity. He did not, however, long enjoy this honour; for, on his coming into Judæa, having raiſed a perſecution againſt the Chriſtians, and blaſphemouſly ſuffering himſelf to be ſtyled a *God* by ſome deputies from Tyre and Sidon, he was miraculouſly ſtruck with a diſeaſe, which ſoon put an end to his life. The ſacred hiſtorian tells us, that he was eaten of worms; and Joſephus, that he was ſeized with moſt violent pains in his heart and bowels; ſo that he could not but reflect on the baſeneſs of thoſe flatterers, who had but lately complimented him with a kind of divine immortality, that was now about to expire in all the torments and agonies of a miſerable mortal.

29
The kingdom again reduced to a Roman province.

On the death of Agrippa, Judæa was once more reduced to a province of the Roman empire, and had new governors appointed over it. Theſe were Ventidius, Felix, Feſtus, Albinus, and Geſſius Florus. Under their government the Jewiſh affairs went on from bad to worſe; the country ſwarmed with robbers and aſſaſſins; the latter committing every-where the moſt unheard-of cruelties under the pretence of religion; and about 64 A. C. were joined by 18,000 workmen, who had been employed in further repairing and beautifying the temple. About this time alſo, Geſſius Florus, the laſt and worſt governor the Jews ever had, was ſent into the country. Joſephus ſeems at a loſs for words to deſcribe him by, or a monſter to compare him to. His rapines, cruelties, conniving for large ſums with the banditti, and, in a word, his whole behaviour, were ſo open and barefaced, that he was looked upon by the Jews more like a bloody executioner ſent to butcher, than a magiſtrate to govern them. In this diſtracted ſtate of the country, many of the inhabitants forſook it to ſeek for an aſylum ſomewhere elſe; while thoſe who remained, applied themſelves to Ceſtius Gallus, governor of Syria, who was at Jeruſalem at the paſſover; beſeeching him to pity their unhappy ſtate, and free them from the tyranny of a man who had totally ruined their country. Florus, who was preſent when theſe complaints were brought againſt him, made a mere jeſt of them; and Ceſtius, inſtead of making a ſtrict inquiry into his conduct, diſmiſſed the Jews with a general promiſe that the governor ſhould behave better for the future; and ſet himſelf about computing the number of Jews at that time in Jeruſalem, by the number of lambs offered at that feſtival, that he might ſend an account of the whole to Nero. By his computation, there were at that time in Jeruſalem 2,556,000; tho' Joſephus thinks they rather amounted to 3,000,000.

30
Cauſe of the laſt war with the Romans.

In the year 67 began the fatal war with the Romans, which was ended only by the deſtruction of Jeruſalem. The immediate cauſe was the deciſion of a conteſt with the Syrians concerning the city of Cæſarea. The Jews maintained that this city belonged to them, becauſe it had been built by Herod; and the Syrians pretended that it had always been reckoned a Greek city, ſince even that monarch had reared temples and ſtatues in it. The conteſt at laſt came to ſuch an height, that both parties took up arms againſt each other. Felix put an end to it for a time, by ſending ſome of the chiefs of each nation to Rome, to plead their cauſe before the emperor, where it hung in ſuſpenſe till this time, when Nero decided it againſt the Jews. No ſooner was this deciſion made public, than the Jews in all parts of the country flew to arms; and, tho' they were every-where the ſufferers, yet, from this fatal period, their rage never abated. Nothing was now to be heard of but robberies, murders, and

31
he Jews
rribly
aſſacred.

and every kind of cruelty. Cities and villages were filled with dead bodies of all ages, even ſucking babes. The Jews, on their part, ſpared neither Syrians nor Romans, where they got the better of them; and this proved the deſtruction of great numbers of their peaceful brethren: 20,000 were maſſacred at Cæſarea, 50,000 at Alexandria, 2000 at Ptolemais, and 3,500 at Jeruſalem.

A great number of aſſaſſins, in the mean time, having joined the factious Jews in Jeruſalem, they beat the Romans out of Antonia, a fortreſs adjoining to the temple, and another called *Maſſada;* and likewiſe out of the towers called *Phaſael* and *Mariamne*, killing all who oppoſed them. The Romans were at laſt reduced to ſuch ſtraits, that they capitulated on the ſingle condition that their lives ſhould be ſpared; notwithſtanding which, they were all maſſacred by the furious zealots: and this treachery was ſoon revenged on the faithful Jews of Scythopolis. Theſe had offered to aſſiſt in reducing their factious brethren; but, their ſincerity being ſuſpected by the townſmen, they obliged them to retire into a neighbouring wood, where, on the third night, they were maſſacred to the number of 13,000, and all their wealth carried off. The rebels, in the mean time, croſſed the Jordan, and took the fortreſſes of Machæron and Cyprus; which laſt they razed to the ground, after having put all the Romans to the ſword.—This brought Ceſtius Gallus, the Syrian governor, into Judæa with all his forces; but the Jews, partly by treachery and partly by force, got the better of him, and drove him out of the country with the loſs of 5000 men.

32
ey de-
Ceſtius
llus.

All this time ſuch dreadful diſſenſions reigned among the Jews, that great numbers of the better ſort, foreſeeing the ſad effects of the reſentment of the Romans, left the city as men do a ſinking veſſel; and the Chriſtians, mindful of their Saviour's prediction, retired to Pella, a city on the other ſide of Jordan, whither the war did not reach. Miſerable was the fate of ſuch as either could not, or would not, leave that devoted city. Veſpaſian was now ordered to leave Greece where he was at that time, and to march with all ſpeed into Judea. He did ſo accordingly at the head of a powerful army, ordering his ſon Titus in the mean time to bring two more legions from Alexandria; but before he could reach that country, the Jews had twice attempted to take the city of Aſcalon, and were each time repulſed with the loſs of 10,000 of their number. In the beginning of the year 68, Veſpaſian entered Galilee at the head of an army of 60,000 men all completely armed and excellently diſciplined. He firſt took and burnt Gadara: then he laid ſiege to Jotapa, and took it after a ſtout reſiſtance; at which he was ſo provoked, that he cauſed every one of the Jews to be maſſacred or carried into captivity, not one being left to carry the dreadful news to their brethren. Forty thouſand periſhed on this occaſion; only 1200 were made priſoners, among whom was Joſephus the Jewiſh hiſtorian. Japha next ſhared the ſame fate, after an obſtinate ſiege; all the men being maſſacred, and the women and children carried into captivity. A week after this the Samaritans, who had aſſembled on Mount Gerizzim, were almoſt all put to the ſword, or periſhed. Joppa fell the next victim to the Roman vengeance. It had been formerly laid waſte by Ceſtius; but was now repeopled and fortified by the ſeditious Jews who infeſted the country. It was taken by ſtorm, and ſhared the ſame fate with the reſt. Four thouſand Jews attempted to eſcape, by taking to their ſhips; but were driven back by a ſudden tempeſt, and all of them were drowned or put to the ſword. Tarichea and Tiberias were next taken, but part of their inhabitants were ſpared on account of their peaceable diſpoſitions. Then followed the ſieges of Gamala, Giſchala, and Itabyr. The firſt was taken by ſtorm, with a dreadful ſlaughter of the Jews; the laſt by ſtratagem. The inhabitants of Giſchala were inclineable to ſurrender: but a ſeditious Jew of that town, named *John*, the ſon of Levi, head of the faction, and a vile fellow, oppoſed it; and, having the mob at his beck, overawed the whole city. On the ſabbath he begged of Titus to forbear hoſtilities till to-morrow, and then he would accept his offer; but inſtead of that, he fled to Jeruſalem with as many as would follow him. The Romans, as ſoon as they were informed of his flight, purſued, and killed 6000 of his followers on the road, and brought back near 3000 women and children priſoners. The inhabitants then ſurrendered to Titus, and only the factious were puniſhed; and this completed the reduction of Galilee.

33
paſian
againſt
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34
Different
factions
among the
Jews.

The Jewiſh nation by this time was divided into two very oppoſite parties: the one foreſeeing that this war, if continued, muſt end in the total ruin of their country, were for putting an end to it by ſubmitting to the Romans; the other, which was the remains of the faction of Judas Gaulonites, breathed nothing but war and confuſion, and oppoſed all peaceable meaſures with invincible obſtinacy. This laſt, which was by far the moſt numerous and powerful, conſiſted of men of the vileſt and moſt profligate characters that can be paralleled in hiſtory. They were proud, ambitious, cruel, rapacious, and committed the moſt horrid and unnatural crimes under the maſk of religion. They affirmed every where, that it was offering the greateſt diſhonour to God to ſubmit to any earthly potentate; much leſs to Romans and to heathens. This, they ſaid, was the only motive that induced them to take up arms, and to bind themſelves under the ſtricteſt obligations not to lay them down till they had either totally extirpated all foreign authority, or periſhed in the attempt.—This dreadful diſſenſion was not confined to Jeruſalem, but had infected all the cities, towns, and villages, of Paleſtine. Even houſes and families were ſo divided againſt each other, that, as our Saviour had expreſly foretold, a man's greateſt enemies were often thoſe of his own family and houſehold. In ſhort, if we may believe Joſephus, the zealots acted more like incarnate devils than like men who had any ſenſe of humanity left them.—This obliged the contrary party likewiſe to riſe up in arms in their own defence againſt thoſe miſcreants; from whom, however, they ſuffered much more than they did even from the exaſperated Romans.—The zealots began their outrages by murdering all that oppoſed them in the countries round about. Then they entered Jeruſalem; but met with a ſtout oppoſition from the other party headed by Ananus, who had lately been high-prieſt. A fierce engagement

35
Cruelty of
the zealots.

ment enſued between them; and the zealots were driven into the inner cincture of the temple, where they were cloſely beſieged. John of Giſchala above mentioned, who had pretended to ſide with the peaceable party, was then ſent with terms of accommodation; but, inſtead of adviſing the beſieged to accept of them, he perſuaded them ſtill to hold out, and call the Idumeans to their aſſiſtance. They did ſo, and procured 20,000 of them to come to their relief; but theſe new allies were refuſed admittance into the city. On that night, however, there happened ſuch a violent ſtorm, accompanied with thunder, lightning, and an earthquake, that the zealots from within the inner court ſawed the bolts and hinges of the temple-gates without being heard, forced the guards of the beſiegers, ſallied into the city, and let in the Idumeans. The city was inſtantly filled with butcheries of the moſt horrid kind. Barely to put any of the oppoſite party to death, was thought too mild a puniſhment; they they muſt have the pleaſure of murdering them by inches: ſo that they made it now their diverſion to put them to the moſt exquiſite tortures that could be invented; nor could they be prevailed upon to diſpatch them till the violence of their torments had rendered them quite incapable of feeling them. In this manner periſhed 12,000 perſons of noble extraction, and in the flower of their age; till at laſt the Idumeans complained ſo much againſt the putting ſuch numbers to death, that the zealots thought proper to erect a kind of tribunal, which, however, was intended not for judgment, but condemnation; for the judges having once acquitted a perſon who was manifeſtly innocent, the zealots not only murdered him in the temple, but depoſed the new-created judges as perſons unfit for their office.

The zealots, after having exterminated all thoſe of any character or diſtinction, began next to wreak their vengeance on the common people. This obliged many of the Jews to forſake Jeruſalem, and take refuge with the Romans, though the attempt was very hazardous; for the zealots had all the avenues well guarded, and failed not to put to death ſuch as fell into their hands. Veſpaſian in the mean time ſtaid at Cæſarea an idle ſpectator of their outrages; well knowing that the zealots were fighting for him, and that the ſtrength of the Jewiſh nation was gradually waſting away. Every thing ſucceeded to his wiſh. The zealots, after having maſſacred or driven away the oppoſite party, turned their arms againſt each other. A party was formed againſt John, under one Simon who had his head-quarters at the fortreſs of Maſſada. This new miſcreant plundered, burned, and maſſacred, wherever he came, carrying the ſpoil into the fortreſs above-mentioned. To increaſe his party, he cauſed a proclamation to be publiſhed, by which he promiſed liberty to the ſlaves, and proportionable encouragement to the freemen who joined him. This ſtratagem had the deſired effect, and he ſoon ſaw himſelf at the head of a conſiderable army. Not thinking himſelf, however, as yet maſter of force ſufficient to beſiege Jeruſalem, he invaded Idumea with 20,000 men. The Idumeans oppoſed him with 25,000; and a ſharp engagement enſued, in which neither party was victorious. But Simon, ſoon after, having corrupted the Idumean general, got their army delivered up to him. By this means he eaſily became maſter of the country; where he committed ſuch cruelties, that the miſerable inhabitants abandoned it to ſeek for ſhelter in Jeruſalem.

35
They turn their arms againſt each other.

In the city, matters went in the ſame way. John tyrannized in ſuch a manner, that the Idumeans revolted, killed a great number of his men, plundered his palace, and forced him to retire into the temple. In the mean time the people, having taken a notion that he would ſally out in the night and ſet fire to the city, called a council, in which it was reſolved to admit Simon with his troops, in order to oppoſe John and his zealots. Simon's firſt attempt againſt his rival, however, was ineffectual, and he was obliged to content himſelf with beſieging the zealots in the temple. In the mean time the miſeries of the city were increaſed by the ſtarting up of a third party headed by one Eleazar, who ſeized on the court of the prieſts, and kept John confined within that of the Iſraelites. Eleazar kept the avenues ſo well guarded, that none were admitted to come into that part of the temple but thoſe who came thither to offer ſacrifices; and it was by theſe offerings chiefly that he maintained himſelf and his men. John by this means found himſelf hemmed in between two powerful enemies, Simon below, and Eleazar above. He defended himſelf, however, againſt them both with great reſolution; and when the city was inveſted by the Romans, having pretended to come to an agreement with his rivals, he found means totally to cut off or force Eleazar's men to ſubmit to him, ſo that the factions were again reduced to two.

36
The Romans advance to Jeruſalem.

The Romans, in the year 72, began to advance towards the capital. In their way they deſtroyed many thouſands, waſting the country as they went along; and in the year 73 arrived before the walls of Jeruſalem, under Titus afterwards emperor. As he was a man of an exceedingly merciful diſpoſition, and greatly deſired to ſpare the city, he immediately ſent offers of peace; but theſe were rejected with contempt, and he himſelf put in great danger of his life, ſo that he reſolved to begin the ſiege in form. In the mean time, Simon and John renewed their hoſtilities with greater fury than ever. John now held the whole temple, ſome of the out-parts of it, and the valley of Cedron. Simon had the whole city to range in; in ſome parts of which John had made ſuch devaſtations, that they ſerved them for a field of battle, from which they ſallied unanimouſly againſt the common enemy whenever occaſion ſerved; after which they returned to their uſual hoſtilities, turning their arms againſt each other, as if they had ſworn to make their ruin more eaſy to the Romans. Theſe drew ſtill nearer to the walls, having with great labour and pains levelled all the ground between Scopas and them, by pulling down all the houſes and hedges, cutting down the trees, and even cleaving the rocks that ſtood in their way, from Scopas to the tomb of Herod, and Bethara or the pool of ſerpents; in which work ſo many hands were employed, that they finiſhed it in four days.

37
Offers of peace rejected.

Whilſt this was doing, Titus ſent the beſieged ſome offers of peace; and Joſephus was pitched upon to be the meſſenger of them: but they were rejected with indignation. He ſent a ſecond time Nicanor and Joſephus with freſh offers, and the former received a wound in his ſhoulder; upon which Titus reſolved to begin the aſſault in good earneſt, and ordered his men to raſe the ſuburbs, cut down all the trees, and uſe the materials to raiſe platforms againſt the wall. Every thing was now carried on with invincible ardour; the Romans began to play their engines againſt the city with all their might. The Jews had likewiſe their machines upon the walls, which they plied with uncommon fury: they had taken them lately from Ceſtius; but were ſo ignorant in their uſe, that they did little execution with them, till they were better inſtructed by ſome Roman deſerters: till then, their chief ſucceſs was rather owing to their frequent ſallies; but the Roman legions, who had all their towers and machines before them, made terrible havock. The leaſt ſtones they threw were near 100 weight; and theſe they could throw the length of a quarter of a mile againſt the city, and with ſuch a force, that they could do miſchief on thoſe that ſtood at ſome diſtance behind them. Titus had reared three towers 50 cubits high; one of which happening to fall in the middle of the night, greatly alarmed the Roman camp, who immediately ran to arms at the noiſe of it; but Titus, upon knowing the cauſe, diſmiſſed them, and cauſed it to be ſet up again. Theſe towers, being plaited with iron, the Jews tried in vain to ſet fire to them, but were at length forced to retire out of the reach of their ſhot; by which the battering-rams were now at full liberty to play againſt the wall. A breach was ſoon made in it, at which the Romans entered; and the Jews, abandoning this laſt incloſure, retired behind the next. This happened about the 28th of April, a fortnight after the beginning of the ſiege.

38 The ſiege carried on with vigour.

John defended the temple and the caſtle of Antonia, and Simon the reſt of the city. Titus marched cloſe to the ſecond wall, and plied his battering-rams ſo furiouſly, that one of the towers, which looked towards the north, gave a prodigious ſhake. The men who were in it, made a ſignal to the Romans, as if they would ſurrender; and, at the ſame time, ſent Simon word to be ready to give them a warm reception. Titus, having diſcovered their ſtratagem, plied his work more furiouſly, whilſt the Jews that were in the tower ſet it on fire, and flung themſelves into the flames. The tower being fallen, gave them an entrance into the ſecond incloſure, five days after gaining the firſt; and Titus, who was bent on ſaving the city, would not ſuffer any part of the wall or ſtreets to be demoliſhed; which left the breach and lanes ſo narrow, that when his men were furiouſly repulſed by Simon, they had not room enough to make a quick retreat, ſo that there was a number of them killed in it. This overſight was quickly rectified; and the attack renewed with ſuch vigour, that the place was carried four days after their firſt repulſe.

39 ine and ence in ity.

The famine, raging in a terrible manner in the city, was ſoon followed by a peſtilence; and as theſe two dreadful judgments increaſed, ſo did the rage of the factious, who, by their inteſtine feuds, had deſtroyed ſuch quantities of proviſion, that they were forced to prey upon the people with the moſt unheard-of cruelty. They forced their houſes; and, if they found any victuals in them, they butchered them for not appriſing them of it; and, if they found nothing but bare walls, which was almoſt every where the caſe, they put them to the moſt ſevere tortures, under pretence that they had ſome proviſion concealed. "I ſhould (ſays Joſephus) undertake an impoſſible taſk, were I to enter into a detail of all the cruelties of thoſe impious wretches; it will be ſufficient to ſay, that I do not think, that ſince the creation any city ever ſuffered ſuch dreadful calamities, or abounded with men ſo fertile in all kind of wickedneſs."

Titus, who knew their miſerable condition, and was ſtill willing to ſpare them, gave them four days to cool; during which he cauſed his army to be muſtered, and proviſions to be diſtributed to them in ſight of the Jews, who flocked upon the walls to ſee it. Joſephus was ſent to ſpeak to them afreſh, and to exhort them not to run themſelves into an inevitable ruin by obſtinately perſiſting in the defence of a place which could hold out but a very little while, and which the Romans looked upon already as their own. But this ſtubborn people, after many bitter invectives, began to dart their arrows at him; at which, not at all diſcouraged, he went on with greater vehemence: but all the effect it wrought on them was, that it prevailed on great numbers to ſteal away privately to the Romans, whilſt the reſt became only the more deſperate and reſolute to hold out to the laſt, in ſpite of Titus's merciful offers.

40 Offers of peace rejected.

To haſten therefore their deſtined ruin, he cauſed the city to be ſurrounded with a ſtrong wall, to prevent either their receiving any ſuccours or proviſion from abroad, or their eſcaping his reſentment by flight. This wall, which was near 40 ſtades or five miles in circuit, was yet carried on with ſuch ſpeed, and by ſo many hands, that it was finiſhed in three days; by which one may gueſs at the ardour of the beſiegers to make themſelves maſters of the city.

There was now nothing to be ſeen thro' the ſtreets of Jeruſalem, but heaps of dead bodies rotting above ground, walking ſkeletons, and dying wretches. As many as were caught by the Romans in their ſallies, Titus cauſed to be crucified in ſight of the town, to inject a terror among the reſt: but the zealots gave it out, that they were thoſe who fled to him for protection; which when Titus underſtood, he ſent a priſoner with his hands cut off to undeceive, and aſſure them, that he ſpared all that voluntarily came over to him; which encouraged great numbers to accept his offers, tho' the avenues were cloſely guarded by the factious, who put all to death who were caught going on that errand. A greater miſchief than that was, that even thoſe who eſcaped ſafe to the Roman camp were miſerably butchered by the ſoldiers, from a notion which theſe had taken that they had ſwallowed great quantities of gold; inſomuch that, two thouſand of them were ripped up in one night, to come at their ſuppoſed treaſure. When Titus was appriſed of this barbarity, he would have condemned all thoſe butchering wretches to death; but they proved ſo numerous, that he was forced to ſpare them, and contented himſelf with ſending a proclamation thro' his camp, that as many as ſhould be ſuſpected thenceforward of that horrid villany, ſhould be put to immediate death: yet did not this deter many of them from it, only they did it more privately than before; ſo greedy were they of that bewitching metal. All this while the defection increaſed ſtill more thro' the inhumanity of the faction within, who made the miſeries and dying groans of their ſtarving brethren the ſubject of their cruel mirth, and carried their barbarity even to the ſheathing of their ſwords in ſport in thoſe poor wretches, under pretence of trying their ſharpneſs.

When they found therefore, that neither their guards nor ſeverities could prevent the people's flight, they had recourſe to another ſtratagem equally impious and cruel; which was, to hire a pack of vile pretenders to prophecy, to go about and encourage the deſpairing remains of the people to expect a ſpeedy and miraculous deliverance; and this impoſture proved a greater expedient with that infatuated nation, than their other precautions.

41
Miſerable condition of the Jews.

Nothing could be more dreadful than the famiſhed condition to which they were now reduced. The poor, having nothing to truſt to but the Romans mercy or a ſpeedy death, ran all hazards to get out of the city; and if in their flight, and wandering out for herbs or any other ſuſtenance, they fell into the hands of any of Titus's parties ſent about to guard the avenues, they were unmercifully ſcourged and crucified if they made the leaſt reſiſtance. The rich within the walls were now forced, tho' in the moſt private manner, to give half, or all they were worth, for a meaſure of wheat, and the middling ſort for one of barley. This they were forced to convey into ſome private place in their houſes, and to feed upon it as it was, without daring to pound or grind it, much leſs to boil or bake it, leſt the noiſe or ſmell ſhould draw the rapacious zealots to come and tear it from them. Not that theſe were reduced to any real want of proviſions, but they had a double end in this barbarous plunder; to wit, the ſtarving what they cruelly ſtyled all uſeleſs perſons, and the keeping their own ſtores in reſerve. It was upon this ſad and pinching juncture, that an unhappy mother was reduced to the extremity of butchering and eating her own child.

42
A mother eats her own child.

When this news was ſpread thro' the city, the horror and conſternation were as univerſal as they were inexpreſſible. It was then that they began to think themſelves forſaken by the Divine Providence, and to expect the moſt terrible effects of his anger againſt the poor remains of their nation; inſomuch that they began to envy thoſe that had periſhed before them, and to wiſh their turn might come before the ſad expected cataſtrophe. Their fears were but too juſt; ſince Titus, at the very firſt hearing of this inhuman deed, ſwore the total extirpation of city and people. "Since, (ſaid he,) they have ſo often refuſed my proffers of pardon, and have preferred war to peace, rebellion to obedience, and famine, ſuch a dreadful one eſpecially, to plenty, I am determined to bury that curſed metropolis under its ruins, that the ſun may never ſhoot his beams on a city where the mothers feed on the fleſh of their children, and the fathers, no leſs guilty than they, chooſe to drive them to ſuch extremities, rather than lay down their arms."

43
Titus ſwears the total ruin of the city.

This dreadful action happened about the end of July, by which time the Romans, having purſued their attacks with freſh vigour, made themſelves maſters of the fortreſs Antonia; which obliged the Jews to ſet fire to thoſe ſtately galleries which joined it to the temple, leſt they ſhould afford an eaſy paſſage to the beſiegers into this laſt. About the ſame time Titus, with much difficulty, got materials for raiſing new mounds and terraces, in order to haſten the ſiege, and ſave, if poſſible, the ſad remains of that once glorious ſtructure; but his pity proved ſtill worſe and worſe beſtowed on thoſe obſtinate wretches, who only became the more furious and deſperate by it. Titus at length cauſed fire to be ſet to the gates, after having had a very bloody encounter, in which his men were repulſed with loſs. The Jews were ſo terrified at it, that they ſuffered themſelves to be devoured by the flames, without attempting either to extinguiſh them, or ſave themſelves. All this while Joſephus did not ceaſe exhorting the infatuated people to ſurrender, to repreſent to them the dreadful conſequences of an obſtinate reſiſtance, and to aſſure them that it was out of mere compaſſion to them that he thus hazarded his own life to ſave theirs: he received one day ſuch a wound in his head by a ſtone from the battlements, as laid him for dead on the ground. The Jews ſallied out immediately, to have ſeized on his body; but the Romans proved too quick and ſtrong for them, and carried him off.

44
John plu ders the temple.

By this time the two factions within, but eſpecially that of John, having plundered rich and poor of all they had, fell alſo on the treaſury of the temple, whence John took a great quantity of golden utenſils, together with thoſe magnificent gifts which had been preſented to that ſacred place by the Jewiſh kings, by Auguſtus, Livia, and many other foreign princes, and melted them all to his own uſe. The repoſitories of the ſacred oil which was to maintain the lamps, and of the wine which was reſerved to accompany the uſual ſacrifices, were likewiſe ſeized upon, and turned into common uſe; and the laſt of this to ſuch exceſs, as to make himſelf and his party drunk with it. All this while, not only the zealots, but many of the people, were ſtill under ſuch an infatuation, that tho' the fortreſs Antonia was loſt, and nothing left but the temple, which the Romans were preparing to batter down, yet they could not perſuade themſelves, that God would ſuffer that holy place to be taken by heathens, and were ſtill expecting ſome ſudden and miraculous deliverance. Even that vile monſter John, who commanded there, either ſeemed confident of it, or elſe endeavoured to make them think him ſo. For, when Joſephus was ſent for the laſt time to upbraid his obſtinately expoſing that ſacred building, and the miſerable remains of God's people, to ſudden and ſure deſtruction, he only anſwered him with the bittereſt invectives; adding, that he was defending the Lord's vineyard, which he was ſure could not be taken by any human force. Joſephus in vain reminded him of the many ways by which he had polluted both city and temple; and in particular of the ſeas of blood which he cauſed to be ſhed in both thoſe ſacred places, and which, he aſſured him from the old prophecies, were a certain ſign and forerunner of their ſpeedy ſurrender and deſtruction. John remained as inflexible as if all the prophets had aſſured him of a deliverance; till at length Titus, foreſeeing the inevitable ruin of that ſtately edifice, which he was ſtill extremely deſirous to ſave, vouchſafed even himſelf to ſpeak to them, and to perſuade them to ſurrender. But the factious, looking upon this condeſcenſion as the effects of his fear rather than generoſity, only grew the more furious upon it, and forced him at laſt to come to thoſe extremities, which he had hitherto endeavoured to avoid. That his army, which was to attack the temple, might have the freer paſſage towards it thro' the caſtle Antonia, he cauſed a conſiderable part of the wall to be pulled down, and levelled; which proved ſo very ſtrong, that it took him up ſeven whole days, by which time they were far advanced in the month of July.

45 The daily ſacrifice interrupted.

It was on the 17th day of that month, as all Joſephus's copies have it, that the daily ſacrifice ceaſed for the firſt time ſince its reſtoration by the brave Judas Maccabeus, there being no proper perſon left in the temple to offer it up. Titus cauſed the factious to be ſeverely upbraided for it; exhorted John to ſet up whom he would to perform that office, rather than ſuffer the ſervice of God to be ſet aſide; and then challenged him and his party to come out of the temple, and fight on a more proper ground, and thereby ſave that ſacred edifice from the fury of the Roman troops. When nothing could prevail on them, they began to ſet fire again to the gallery which yielded a communication between the temple and the caſtle Antonia. The Jews had already burnt about 20 cubits of it in length; but this ſecond blaze, which was likewiſe encouraged by the beſieged, conſumed about 14 more; after which, they beat down what remained ſtanding. On the 27th of July, the Jews, having filled part of the weſtern portico with combuſtible matter, made a kind of flight; upon which, ſome of the forwardeſt of the Romans having ſcaled up to the top, the Jews ſet fire to it, which flamed with ſuch ſudden fury, that many of the former were conſumed in it, and the reſt, venturing to jump down from the battlements, were, all but one, cruſhed to death.

46 e gates the ple ſet fire.

On the very next day, Titus having ſet fire to the north gallery, which incloſed the outer court of the temple, from fort Antonia to the valley of Cedron, got an eaſy admittance into it, and forced the beſieged into that of the prieſts. He tried in vain ſix days to batter down one of the galleries of that precinct with an helepolis: he was forced to mount his battering-rams on the terrace, which was raiſed by this time; and yet the ſtrength of this wall was ſuch, that it eluded the force of theſe alſo, tho' others of his troops were buſy in ſapping it. When they found that neither rams nor ſapping could gain gain ground, they bethought themſelves of ſcaling; but were vigorouſly repulſed in the attempt, with the loſs of ſome ſtandards, and a number of men. When Titus therefore found, that his deſire of ſaving that building was like to coſt ſo many lives, he ſet fire to the gates, which, being plated with ſilver, burnt all that night, whilſt the metal dropt down in the melting. The flame ſoon communicated itſelf to the porticoes and galleries; which the beſieged beheld without offering to ſtop it, but contented themſelves with ſending whole vollies of impotent curſes againſt the Romans. This was done on the eighth of Auguſt; and, on the next day, Titus, having given orders to extinguiſh the fire, called a council, to determine whether the remainder of the temple ſhould be ſaved or demoliſhed. That general was ſtill for the former, and moſt of the reſt declared for the latter; alleging, that it was no longer a temple, but a ſcene of war and ſlaughter, and that the Jews would never be at reſt as long as any part of it was left ſtanding: but when they found Titus ſtifly bent on preſerving ſo noble an edifice, againſt which, he told them, he could have no quarrel, they all came over to his mind. The next day, Auguſt the 10th, was therefore determined for a general aſſault: and the night before the Jews made two deſperate ſallies on the Romans; in the laſt of which, theſe, being timely ſuccoured by Titus, beat them back into their incloſure.

But whether this laſt Jewiſh effort exaſperated the beſiegers, or, which is more likely, as Joſephus thinks, puſhed by the hand of Providence, one of the Roman ſoldiers, of his own accord, took up a blazing firebrand, and, getting on his comrade's ſhoulders, threw it into one of the apartments that ſurrounded the ſanctuary, thro' a window. This immediately ſet the whole north-ſide in a flame up to the third ſtory, on the ſame fatal day and month in which it had been formerly burnt by Nebuchadnezzar. Titus, who was gone to reſt himſelf a while in his pavilion, was awaked at the noiſe, and ran immediately to give orders to have the fire extinguiſhed. He called, prayed, threatened, and even caned his men, but in vain; the confuſion was ſo great, and the ſoldiers ſo obſtinately bent upon deſtroying all that was left, that he was neither heard nor minded. Thoſe that flocked thither from the camp, inſtead of obeying his orders, were buſy, either in killing the Jews, or in increaſing the flames. When Titus obſerved that all his endeavours were vain, he entered into the ſanctuary and the moſt holy place, in which he found ſtill ſuch ſumptuous utenſils and other riches as even exceeded all that had been told him of it. Out of the former he ſaved the golden candleſtick, the table of ſhew-bread, the altar of perfumes, all of pure gold, and the book or volume of the law, wrapped up in a rich gold tiſſue: but in the latter he found no utenſils, becauſe, in all probability, they had not made a freſh ark, ſince that of Solomon had been loſt. Upon his coming out of that ſacred place, ſome other ſoldiers ſet fire to it, and obliged thoſe that had ſtaid behind to come out; they all fell foul on the plunder of it, tearing even the gold plating off the gates and timber-work, and carried off all the coſtly utenſils, robes, &c. they found, inſomuch that there was not one of them who did not enrich himſelf by it.

47 A dreadful maſſacre.

An horrid maſſacre followed ſoon after, in which a great many thouſands periſhed; ſome by the flames, others by the fall from the battlements, and a greater number by the enemy's ſword, which deſtroyed all it met with, without diſtinction of age, ſex, or quality. Among them were upwards of 6000 perſons who had been ſeduced thither by a falſe prophet, who promiſed them, that they ſhould find a ſpeedy and miraculous relief there on that very day. Some of them remained five whole days on the top of the walls, and afterwards threw themſelves on the general's mercy; but were anſwered that they had outſtaid the time, and were led to execution. The Romans carried their fury to the burning of all the treaſure-houſes of the place, tho' they were full of the richeſt furniture, plate, veſtments, and other things of value, which had been laid up in thoſe places for ſecurity. In a word, they did not ceaſe burning and butchering, till they had deſtroyed all, except two of the temple-gates, and that part of the court which was deſtined for the women.

In the mean time the ſeditious made ſuch a vigorous puſh, that they eſcaped the fury of the Romans, at leaſt for the preſent, and retired into the city. But here they found all the avenues ſo well guarded, that there was no poſſibility left for them to get out; which obliged them to ſecure themſelves as well as they could on the ſouth-ſide of it, from whence Simon, and John of Giſchala, ſent to deſire a parley with Titus. They were anſwered, that though they had been the cauſe of all this bloodſhed and ruin, yet they ſhould have their lives ſpared, if they laid down their arms, and ſurrendered themſelves priſoners. To this they replied, that they had engaged themſelves, by the moſt ſolemn oaths, never to ſurrender; and therefore, only begged leave to retire into the mountains with their wives and children: which inſolence ſo exaſperated the Roman general, that he cauſed an herald to bid them ſtand to their defence; for that not one of them ſhould be ſpared, ſince they had rejected his laſt offers of pardon. Immediately after this, he abandoned the city to the fury of the ſoldiers, who fell forthwith on plundering, ſetting fire every where, and murdering all that fell into their hands; whilſt the factious, who were left, went and fortified themſelves in the royal palace, where they killed 8000 Jews, who had taken refuge there.

In the mean time, great preparations were making for a vigorous attack on the upper city, eſpecially on the royal palace; and this took them up from the 20th of Auguſt to the 7th of September, during which time great numbers came and made their ſubmiſſion to Titus. The warlike engines then played ſo furiouſly on the factious, that they were taken with a ſudden panic; and, inſtead of fleeing into the towers of Hippicos, Phaſael, or Mariamne, which were yet untaken and ſo ſtrong, that nothing but famine could have reduced them, they ran like madmen towards Siloah, with a deſign to have attacked the wall of circumvallation, and to have eſcaped out of the city; but, being there repulſed, they were forced to go and hide themſelves in the public ſinks and common ſewers, ſome one way and ſome another. All whom the Romans could find were put to the ſword, and the city was ſet on fire. This was on the eighth of September, when the city was taken and entered by Titus. He would have put an end to the maſſacre; but his men killed all, except the moſt vigorous, whom they ſhut up in the porch of the women, juſt mentioned. Fronto, who had the care of them, reſerved the youngeſt and moſt beautiful for Titus's triumph; and ſent all that were above ſeventeen years of age into Egypt, to be employed in ſome public works there; and a great number of others were ſent into ſeveral cities of Syria, and other provinces, to be expoſed on the public theatres, to exhibit fights, or be devoured by wild beaſts. The number of thoſe priſoners amounted to 97,000, beſides about 11,000 more, who were either ſtarved thro' neglect, or ſtarved themſelves through ſullenneſs and deſpair.—The whole number of Jews who periſhed in this war is computed at upwards of 1,400,000.

Beſides theſe, however, a vaſt number periſhed in caves, woods, wilderneſſes, common-ſewers, &c. of whom no computation could be made. Whilſt the ſoldiers were ſtill buſy in burning the remains of the city, and viſiting all the hiding-places, where they killed numbers of poor creatures who had endeavoured to evade their cruelty, the two grand rebels Simon and John were found, and reſerved for the triumph of the conqueror. John, being pinched with hunger, ſoon came out; and having begged his life, obtained it; but was condemned to perpetual impriſonment. Simon, whoſe retreat had been better ſtored, held out till the end of October. The two chiefs, with 700 of the handſomeſt Jewiſh captives, were made to attend the triumphal chariot; after which Simon was dragged through the ſtreets with a rope about his neck, ſeverely ſcourged, and then put to death; and John was ſent into perpetual impriſonment.—Three caſtles ſtill remained untaken, namely, Herodion, Machæron, and Maſſada. The two former capitulated; but Maſſada held out. The place was exceedingly ſtrong both by nature and art, well ſtored with all kinds of proviſions, and defended by a numerous garriſon of zealots, at the head of whom was one Eleazar, the grandſon of Judas Gaulonites, formerly mentioned. The Roman general having in vain tried his engines and battering-rams againſt it, bethought himſelf of ſurrounding it with a high and ſtrong wall, and then ordered the gates to be ſet on fire. The wind puſhed the flames ſo fiercely againſt the Jews, that Eleazar in deſpair perſuaded them firſt to kill their wives and children, and then to chooſe ten men by lot, who ſhould kill all the reſt; and laſtly one out of the ſurviving ten to diſpatch them and himſelf; only this laſt man was ordered to ſet fire to the place before he put an end to his own life. All this was accordingly done; and on the morrow, when the Romans were preparing to ſcale the walls, they were greatly ſurpriſed neither to ſee nor hear any thing move. On this they made ſuch an hideous outcry, that two women, who had concealed themſelves in an aqueduct, came forth and acquainted them with the deſperate cataſtrophe of the beſieged.

48
Simon and John taken.

49
Deſperate end of the garriſon of Maſſada.

50
State of the Jews ſince the deſtruction of their city.

Thus ended the Jewiſh nation and worſhip; nor have they ever ſince been able to regain the ſmalleſt footing in the country of Judea, nor indeed in any other country on earth, though there is ſcarce any part of the globe where they are not to be found. They continue their vain expectations of a Meſſiah to deliver them from the low eſtate into which they are fallen; and, notwithſtanding their repeated diſappointments, there are few who can ever be perſuaded to embrace Chriſtianity. Their ceremonies and religious worſhip ought to be taken from the law of Moſes; but they have added a multitude of abſurdities not worth the inquiring after. In many countries, and in different ages, they have been terribly maſſacred, and in general have been better treated by the Mahometans and Pagans than by Chriſtians. Since the revival of arts and learning, however, they have felt the benefit of that increaſe of humanity which hath taken place almoſt all over the globe. It is ſaid, that in this country the life of a Jew was formerly at the diſpoſal of the chief lord where they lived, and likewiſe all his goods. Now, however, the caſe is altered, and they enjoy the protection of government. A Jew may be a witneſs by our law, being ſworn on the Old Teſtament, and taking the oaths of allegiance.

Jew's *Ears*, in botany. See Tremella.

JEZIDES, among the Mahometans; a term of ſimilar import with heretics among Chriſtians.

The Jezides are a numerous ſect inhabiting Turky and Perſia, ſo called from their head Jezid, an Arabian prince, who ſlew the ſons of Ali, Mahomet's father-in-law; for which reaſon he is reckoned a parricide, and his followers heretics. There are about 20,000 Jezides in Turky and Perſia; who are of two ſorts, black and white. The white are clad like Turks; and diſtinguiſhed only by their ſhirts, which are not ſlit at the neck like thoſe of others, but have only a round hole to thruſt their heads through. This is in memory of a golden ring, or circle of light, which deſcended from heaven upon the neck of their cheq, the head of their religion, after his undergoing a faſt of forty days. The black Jezides, though married, are the monks or religious of the order; and theſe are called *Fakirs*.

The Turks exact exceſſive taxes from the Jezides, who hate the Turks as their mortal enemies; and when, in their wrath, they curſe any creature, they call it *muſſulman:* but they are great lovers of the Chriſtians, being more fond of Jeſus Chriſt than of Mahomet, and are never circumciſed but when they are forced to it. They are extremely ignorant, and believe both the bible and the koran without reading either of them: they make vows and pilgrimages, but have no places of religious worſhip.

All the adoration they pay to God conſiſts of ſome ſongs in honour of Jeſus Chriſt, the virgin, Moſes, and ſometimes Mahomet; and it is a principal point of their religion never to ſpeak ill of the devil, leſt he ſhould reſent the injury, if ever he ſhould come to be in favour with God again, which they think poſſible; whenever they ſpeak of him, they call him the *angel Peacock*. They bury their dead in the firſt place they come at, rejoicing as at a feſtival, and celebrating the entry of the deceaſed into heaven. They go in companies like the Arabians, and change their habitations every fifteen days. When they get wine, they drink it to exceſs; and it is ſaid, that they ſometimes do this with a religious purpoſe, calling it the blood of Chriſt. They buy their wives; and the market-price is two hundred crowns for all women, handſome or not, without diſtinction.

JEZRAEL, or Jezreel, a town in the north of Samaria, towards mount Carmel, where ſtood a palace of the kings of Iſrael, 1 Kings xxi. 18. On the borders of Galilee (Joſhua xix.) ſaid to be one of the towns of Iſſachar.—The valley of Jezreel (Judges vi. 17.) was ſituated to the north of the town, running from weſt to eaſt for ten miles, between two mountains; the one to the north, commonly called *Hermon*, near mount Tabor; the other *Gilboa:* in breadth two miles.

IF, an iſland of France, in Provence, and the moſt eaſtern of the three before the harbour of Marſeilles. It is very well fortified, and its port one of the beſt in the Mediterranean.

IGIS, a town of the country of the Griſons, in Caddea, with a magnificent caſtle, in which is a cabinet of curioſities, and a handſome library; 23 miles ſouth-weſt of Choira, and 23 ſouth of Glaris. E. lon. 9. 0. N. lat. 49. 10.

IGLAW, a conſiderable and populous town of Germany, in Moravia, where they have a manufactory of good cloth, and excellent beer. It is ſeated on the river Igla, 40 miles weſt of Brin, and 80 ſouth-eaſt of Prague. E. long. 15. 5. N. lat. 49. 10.

IGNATIUS Loyola, (canonized), the founder of the well-known order of the Jesuits, was born at the caſtle of Loyola, in Biſcay, 1491; and became firſt page to Ferdinand V. king of Spain, and then an officer in his army. In this laſt capacity, he ſignalized himſelf by his valour; and was wounded in both legs at the ſiege of Pompeluna, in 1521. To this circumſtance the Jeſuits owe their origin; for, while he was under cure of his wound, a *Life of the ſaints* was put into his hands, which determined him to forſake the military for the eccleſiaſtical profeſſion. His firſt devout exerciſe was to dedicate himſelf to the bleſſed virgin as her knight: he then went a pilgrimage to the Holy Land; and on his return to Europe, he continued his theological ſtudies in the univerſities of Spain, though he was then 33 years of age. After this he went to Paris; and in France laid the foundation of this new order, the inſtitutes of which he preſented to Pope Paul III. who made many objections to them, but at laſt confirmed the inſtitution in 1540. The founder died in 1555, and left his diſciples two famous books; 1. Spiritual exerciſes; 2. Conſtitutions or rules of the order. But it muſt be remembered, that though theſe avowed inſtitutes contain many privileges obnoxious to the welfare of ſociety, the moſt diabolical are contained in the private rules intitled *Monita ſecreta*, which were not diſcovered till towards the cloſe of the laſt century; and moſt writers attribute theſe, and even the conſtitutions, to Laynez, the ſecond general of the order.

Ignatius (St), ſurnamed *Theophraſtus*, one of the apoſtolical fathers of the church, was born in Syria, and educated under the apoſtle and evangeliſt St John, and intimately acquainted with ſome other of the apoſtles, eſpecially St Peter and St Paul. Being fully inſtructed in the doctrines of Chriſtianity, he was, for his eminent parts and piety, ordained by St John, and confirmed, about the year 67, biſhop of Antioch, by thoſe two apoſtles, who firſt planted Chriſtianity in that city, where the diſciples alſo were firſt called *Chriſtians*. Antioch was then not only the metropolis of Syria, but a city the moſt famous and renowned of any in the eaſt, and the ancient ſeat of the Roman emperors, as well as of their viceroys and governors. In this important ſeat he continued to ſit ſomewhat above 40 years, both an honour and ſafeguard of the Chriſtian religion, till the year 107, when Trajan the emperor, fluſhed with a victory which he had lately obtained over the Scythians and Daci, about the ninth year of his reign, came to Antioch to make preparations for a war againſt the Parthians and Armenians. He entered the city with the pomp and ſolemnities of a triumph; and, as his firſt care uſually was about the concernments of religion, he began preſently to inquire into that affair. Chriſtianity had by this time made ſuch a progreſs, that the Romans grew jealous and uneaſy at it. This prince, therefore, had already commenced a perſecution againſt the Chriſtians in other parts of the empire, which he now reſolved to carry on here. However, as he was naturally of a mild diſpoſition, tho' he ordered the laws to be put in force againſt them if convicted, yet he forbad them to be ſought after.

In this ſtate of affairs, Ignatius, thinking it more prudent to go himſelf than ſtay to be ſent for, of his own accord preſented himſelf to the emperor, and, it is ſaid, there paſſed a long and particular diſcourſe between them, wherein the emperor expreſſing a ſurpriſe how he dared to tranſgreſs the laws, the biſhop took the opportunity to aſſert his own innocency, and to explain and vindicate his faith with freedom. The iſſue of this was, that he was caſt into priſon, and this ſentence paſſed upon him, That, being incurably over-run with ſuperſtition, he ſhould be carried bound by ſoldiers to Rome, and there thrown as a prey to wild beaſts.

He was firſt conducted to Seleucia, a port of Syria, at about 16 miles diſtance, the place where Paul and Barnabas ſet ſail for Cyprus. Arriving at Smyrna in Ionia, he went to viſit Polycarp biſhop of that place, and was himſelf viſited by the clergy of the Aſian churches round the country. In return for that kindneſs, he wrote letters to ſeveral churches, as the Epheſians, Magneſians, and Trallians, beſides the Romans, for their inſtruction and eſtabliſhment in the faith; one of theſe was addreſſed to the Chriſtians at Rome, to acquaint them with his preſent ſtate, and paſſionate deſire not to be hindered in that courſe of martyrdom which he was now haſtening to accompliſh.

His guard, a little impatient of their ſtay, ſet ſail with him for Troas, a noted city of the leſſer Phrygia, not far from the ruins of old Troy; where, at his arrival, he was much refreſhed with the news he received of the perſecution ceaſing in the church of Antioch: hither alſo ſeveral churches ſent their meſſengers to pay their reſpects to him; and hence too he diſpatched two epiſtles, one to the church of Philadelphia, and the other to that of Smyrna; and, together with this laſt, as Euſebius relates, he wrote privately to Polycarp, recommending to him the care and inſpection of the church of Antioch.

From Troas they ſailed to Neapolis, a maritime town in Macedonia; thence to Philippi, a Roman colony, where they were entertained with all imaginable kindneſs and courteſy, and conducted forwards on their journey, paſſing on foot through Macedonia and Epirus, till they came to Epidanium, a city of Dalmatia; where again taking ſhipping, they ſailed through the Adriatic, and arrived at Rhegium, a port-town in Italy; directing their courſe thence through the Tyrrhenian ſea to Puteoli, whence Ignatius deſired to proceed by land, ambitious to trace the ſame way by which St Paul went to Rome: but this wiſh was not complied with; and, after a ſtay of 24 hours, a proſperous wind quickly carried them to the Roman port, the great harbour and ſtation for their navy, built near Oſtia, at the mouth of the Tyber, about 16 miles from Rome; whither the martyr longed to come, as much deſirous to be at the end of his race, as his keepers, weary of their voyage, were to be at the end of their journey.

The Chriſtians at Rome, daily expecting his arrival, were come out to meet and entertain him, and accordingly received him with a mixture of joy and ſorrow; but when ſome of them intimated, that poſſibly the populace might be taken off from deſiring his death, he expreſſed a pious indignation, intreating them to caſt no rubs in his way, nor do any thing that might hinder him, now he was haſtening to his crown. There are many ſuch expreſſions as this in his epiſtle to the Romans, which plainly ſhew that he was highly ambitious of the crown of martyrdom. Yet it does not appear that he raſhly ſought or provoked danger. Among other expreſſions of his ardor for ſuffering, he ſaid, that the wild beaſts had feared and refuſed to touch ſome that had been thrown to them, which he hoped would not happen to him. Being conducted to Rome, he was preſented to the præfect, and the emperor's letters probably delivered concerning him. The interval before his martyrdom was ſpent in prayers for the peace and proſperity of the church. That his puniſhment might be the more pompous and public, one of their ſolemn feſtivals, the time of their Saturnalia, and that part of it when they celebrated their Sigillaria, was pitched on for his execution; at which time it was their cuſtom to entertain the people with the bloody conflicts of gladiators, and the hunting and fighting with wild beaſts. Accordingly, on the 13th kal. January, *i. e.* December 20. he was brought out into the amphitheatre, and the lions being let looſe upon him, quickly diſpatched their meal, leaving nothing but a few of the hardeſt of his bones. Theſe remains were gathered up by two deacons who had been the companions of his journey; and being tranſported to Antioch, were interred in the cemetery, without the gate that leads to Daphne; whence, by the command of the emperor Theodoſius, they were removed with great pomp and ſolemnity to the Tycheon, a temple within the city, dedicated to the public genius of it, but now conſecrated to the memory of the martyr.

St Ignatius ſtands at the head of thoſe Antenicene fathers, who have occaſionally delivered their opinions in defence of the true divinity of Chriſt, whom he calls the *Son of God, and his eternal Word.* He is alſo reckoned the great champion of the doctrine of the epiſcopal order, as diſtinct and ſuperior to that of prieſt and deacon. And one, the moſt important, uſe of his writings reſpects the authenticity of the holy Scriptures, which he frequently alludes to, in the very expreſſions as they ſtand at this day.—Archbiſhop Uſher's edition of his works printed in 1647, is thought the beſt; yet there is a freſher edition extant at Amſterdam, where, beſide the beſt notes, there are the diſſertations of Uſher and Pearſon.

St IGNATIUS'*s Bean*, the ſeed of a fruit of the gourd kind. The beſt account of the plant that has yet appeared, is that ſent by father Camelli to Ray and Petiver, and publiſhed in the philoſophical tranſactions for the year 1699: he obſerves, that it grows in the Philippine iſlands, and winds itſelf about the talleſt trees to the top; that it has large, ribbed, bitter leaves, a flower like that of the pomegranate, and a fruit larger than a melon. Some reſemble the fruit to a pomegranate, probably from miſapplying Camelli's words. The fruit is covered with a thin, gloſſy, blackiſh, green, and as it were marbled-ſhell, under which is lodged another of a ſtony hardneſs: within this is contained a ſoft, yellow, bitteriſh pulp, in which lie the ſeeds or beans, to the number commonly of 24, each covered with a ſilvery down.

The ſame gentleman gives an account of the virtues attributed to theſe ſeeds by the Indians; but experience has ſhewn that they are dangerous. Konig relates, that a perſon, by drinking ſome of a ſpirituous tincture of them inſtead of aqua vitæ, was thrown into ſtrong convulſions; and Dr Grim, that a dram of the ſeed in ſubſtance occaſioned, for a time, a total deprivation of the ſenſes. Others mention violent vomitings and purgings from its uſe. Neumann hath obſerved intermitting fevers removed by drinking, on the approach of a paroxyſm, an infuſion of ſome grains of the bean made in carduus water: We are not, however from hence to look upon this medicine as an univerſal febrifuge, or to uſe it indiſcriminately.

Theſe beans (for ſo cuſtom requires that we ſhould call them) are about the ſize of a moderately large nutmeg; in figure ſomewhat roundiſh, but extremely irregular, ſcarcely any two being entirely alike, full of unequal depreſſions and prominences; in colour, externally yellowiſh brown, but when the outer ſkin is taken off, of a blackiſh brown, and in part quite blackiſh; in conſiſtence hard and compact as horn, ſo as not to be reducible into a powdery form but by cutting or raſping: for all their hardneſs, however, they are not proof againſt worms. When freſh, they have ſomewhat of a muſky ſmell, which by age is loſt: their taſte is very bitter, reſembled by ſome to that of centaury.

Four drams of theſe beans, boiled in water, gave juſt two drams of gummy extract; after which, rectified ſpirit of wine ſcarcely took up half a grain. Half an ounce, treated firſt with ſpirit, gave two ſcruples and a half of a gummy one. The ſpirituous extract made at firſt is of a yellowiſh colour, and the watery greeniſh. They are both bitter: the ſpirituous impreſſes at firſt a very agreeable bitterneſs, ſomewhat like that of peach-kernels; which going off, leaves in the month a ſtrong bitter. The diſtilled liquors have no taſte or ſmell.

IGNAVUS, the Sloth, in zoology. See Bradypus.

IGNIS-fatuus, a kind of light, ſuppoſed to be of an electric nature, appearing frequently in mines, marſhy places, and near ſtagnating waters. It was formerly thought, and is ſtill by the ſuperſtitious believed, to have ſomething ominous in its nature, and to preſage death and other misfortunes. There have been inſtances of people being decoyed by theſe lights into marſhy places, where they have periſhed; whence the names of *Ignis-fatuus*, *Will-with-a-wiſp*, and *Jack-with-a-lanthorn*, as if this appearance was an evil ſpirit which took delight in doing miſchief of that kind. For a further account of the nature and properties of the ignis-fatuus, ſee the articles Light and Meteor.

IGNITION, properly ſignifies the ſetting fire to any ſubſtance; but the ſenſe is commonly reſtrained to that kind of burning which is not accompanied with flame, ſuch as that of charcoal, cinders, metals, ſtones, and other ſolid ſubſtances.

The effects of ignition are firſt to diſſipate what is called the *phlogiſton* of the ignited ſubſtance, after which it is reduced to aſhes. Vitrification next follows; and laſtly, the ſubſtance is totally diſſipated in vapour. All theſe effects, however, depend on the preſence of the air; for *in vacuo* the phlogiſton of any ſubſtance cannot be diſſipated. Neither can a body which is totally deſtitute of phlogiſton be ignited in ſuch a manner as thoſe which are not deprived of it: for as long as the phlogiſton remains, the heat is kept up in the body by the action of the external air upon it; but when the phlogiſton is totally gone, the air always deſtroys, inſtead of augmenting the heat. Philoſophers have therefore been greatly embarraſſed in explaining the phenomena of ignition. It hath been found a matter of no ſmall difficulty to determine how far the air, and how far the phlogiſton, is concerned in this operation; but as theſe inquiries cannot be entered into without firſt determining the nature of the Phlogiston, we muſt refer to that article for an account of the different theories of ignition.

IGNORAMUS, in Engliſh law, a phraſe which ſignifies "We are ignorant." This is uſed, when the grand jury impanelled on the inquiſition of criminal cauſes reject the evidence as too weak to make good the preſentment or indictment brought againſt a perſon, ſo as to bring him upon his trial by a petty jury; in which caſe they indorſe this word on the back of the bill of indictment. In conſequence of this, all further proceedings againſt the party accuſed are ſtopped, and the ſuppoſed offender is delivered without further anſwer.

IGNORANCE, the privation or abſence of knowledge. The cauſes of ignorance, according to Locke, are chiefly theſe three. 1. Want of ideas. 2. Want of a diſcoverable connection between the ideas we have. 3. Want of tracing and examining our ideas. See Metaphysics, n° 195—205.

Ignorance, or miſtake, in law, a defect of will, whereby a perſon is excuſed from the guilt of a crime, when, intending to do a lawful act, he does that which is unlawful. For here the deed and the will acting ſeparately, there is not that conjunction between them which is neceſſary to form a criminal act. But this muſt be an ignorance or miſtake of fact, and not an error in point of law. As if a man intending to kill a thief or houſe-breaker in his own houſe, by miſtake kills one of his own family, this is no criminal action: but if a man thinks he has a right to kill a perſon excommunicated or outlawed wherever he meets him, and does ſo; this is wilful murder. For a miſtake in point of law, which every perſon of diſcretion not only may, but is bound and preſumed to know, is, in criminal caſes, no ſort of defence. *Ignorantia juris quod quiſque tenetur ſcire, neminem excuſat*, is as well the maxim of our own law as it was of the Roman.

IGUANA, in zoology, a ſpecies of Lacerta.

IHOR, Johor, or *Jor*, a town of Aſia, in Malacca, and capital of a province of the ſame name in the peninſula beyond the Ganges. It was taken by the Portugueſe in 1603, who deſtroyed it, and carried off the cannon; but it has ſince been rebuilt, and is now in poſſeſſion of the Dutch. E. Long. 93. 55. N. Lat. 1. 15.

JIB, the foremoſt ſail of a ſhip, being a large ſtay-ſail extended from the outer end of the bowſprit prolonged by the jib-boom, towards the fore-top-maſthead. See Sail.

The jib is a ſail of great command with any ſide-wind, but eſpecially when the ſhip is *cloſe-hauled*, or has the wind upon her beam; and its effort in *caſting* the ſhip, or turning her head to leeward, is very powerful, and of great utility, particularly when the ſhip is working through a narrow channel.

Jib-*Boom*, a boom run out from the extremity of the bowſprit, parallel to its length, and ſerving to extend the bottom of the jib, and the ſtay of the fore-top-gallant maſt. This boom, which is nothing more than a continuation of the bowſprit forward, to which it may be conſidered as a top-maſt, is uſually attached to the bowſprit by means of two large boom-irons, or by one boom-iron, and a cap on the outer end of the bowſprit; or, finally, by the cap without, and a ſtrong laſhing within, inſtead of a boom-iron, which is generally the method of ſecuring it in ſmall merchant-ſhips. It may therefore be drawn in upon the bowſprit as occaſion requires; which is uſually practiſed when the ſhip enters a harbour, where it might very ſoon be broke or carried away, by the veſſels which are moored therein, or paſſing by under ſail.

JIG. See Music, n° 252.

JIN. See Genii.

IKENILD street, one of the four famous ways which the Romans made in England, called *Stratum Icenorum*, becauſe it began in the country of the *Iceni*, who inhabited Norfolk, Suffolk, and Cambridgeſhire.

ILA, or Isla, one of the weſtern iſles of Scotland, lying to the weſt of Jura, from which it is ſeparated by a narrow channel. It extends 24 miles in length from north to ſouth, and is 18 in breadth from eaſt to weſt. On the eaſt ſide, it is full of mountains covered with heath; to the ſouthward, the land is tolerably well cultivated. In ſome parts the inhabitants have found great plenty of limeſtone, and lead-mines are worked in three different places. The only harbour in Iſla is at Lochdale, near the north end of the iſland. Here are ſeveral rivers and lakes well ſtored with trout, eels, and ſalmon. In the centre is Loch Finlagan, about three miles in circuit, with the little iſle of that name in the middle. Here the great Macdonald, lord of the iſles, once reſided in all the pomp of royalty; but his palaces and offices are now in ruins. Here he held his ſupreme court of judicature, conſiſting of fourteen judges, to which there was an appeal from all the leſſer tribunals. Inſtead of a throne, Macdonald ſtood on a ſtone ſeven feet ſquare, in which there was an impreſſion made to receive his feet; here he was crowned and anointed by the biſhop of Argyle and ſeven inferior prieſts, in preſence of the chieftains, to whom he took a ſolemn oath, importing, that he would maintain their rights and poſſeſſions, and do juſtice to all his vaſſals. There are ſeveral forts built on the iſles in freſh-water lakes, and divers caverns in different parts of the iſland, which have been uſed occaſionally as places of ſtrength. The air of Iſla is not ſo ſalubrious as that of Jura, becauſe it is more low and marſhy; nevertheleſs, the people enjoy a good ſhare of health: they are all Proteſtants, and have a variety of churches and chapels. The property of the iſland is at preſent veſted in Campbell of Shawfield. On the coaſt of Ila are ſeveral ſmall iſles, ſuch as Texa, Ouerſa, and Nave; nay, the natives pretend that there is an iſland four miles in length about 30 leagues to the ſouth-weſt of Iſla. They ſay, it was diſcovered by the maſter of an Engliſh ſhip, who found it a low flat, covered with long graſs, and watered by a river, on the eaſt ſide of which he ſaw great heaps of fiſh bones. A great number of ſeals lay baſking on the rocks, and the cliffs were covered with ſea-fowl. Finding many planks and boards which the ſea had caſt on the ſhore, he ordered his men to raiſe a pile about two ſtories, as a land-mark for mariners. After his departure, the inhabitants of Collonſay, in fair weather, diſcerned from the top of an eminence an object which they ſuppoſed to be land; which, however, vaniſhed, by next winter, when in all probability the pile was blown down by a ſtorm.

ILCHESTER, a town of Somerſetſhire in England, ſeated on the river Yeovil. It is a place of great antiquity, as appears by the Roman coins which are ſometimes dug up. It once had 16 churches, but now has only two. It is a corporation, and ſends two members to parliament; here the county-gaol is kept. W. Long. 2. 45. N. Lat. 51. 5.

ILERDA, (anc. geog.) the capital of the Ilergetes; ſituated on an eminence between the rivers Sicoris and Cinga; an unhappy city, often beſieged, and often taken, becauſe lying expoſed to the incurſions from Gaul; and under Gallienus it was deſtroyed by the Germans. Now Lerida, in Catalonia, on the river Segra.

ILEX, the Holm, or *Holly-tree*, a genus of the tetragynia order, belonging to the tetrandria claſs of plants.

There are ſeveral ſpecies of this genus; but the moſt remarkable is the aquifolium, or common holly. Of this there are a great number of varieties with variegated leaves, which are propagated by the nurſery-gardeners for ſale, and ſome years paſt were in very great eſteem, but at preſent are but little regarded, the old taſte of filling gardens with ſhorn evergreens being pretty well aboliſhed; however, in the diſpoſition of clumps, or rather plantations, of evergreen trees and ſhrubs, a few of the moſt lively colours may be admitted, which will have a good effect in the winter-ſeaſon, if they are properly diſpoſed.

The beſt of theſe varieties are the painted lady holly, Britiſh holly, Bradley's beſt holly, phyllis or cream-holly, milkmaid holly, Pritchet's beſt holly, gold-edged hedgehog holly, Cheyney's holly, glory-of-the-weſt holly, Broaderick's holly, Partridge's holly, Herefordſhire white holly, Blind's cream holly, Longſtaff's holly, Eales's holly, ſilver-edged hedgehog holly. All theſe variegaties are propagated by budding or grafting them upon ſtocks of the common green holly: there is alſo a variety of the common holly with ſmooth leaves; but this is frequently found intermixed with the prickly-leaved on the ſame tree, and often on the ſame branch there are both ſorts of leaves.

The common holly grows naturally in woods and foreſts in many parts of England, where it riſes from 20 to 30 feet high, and ſometimes more, but their ordinary height is not above 25 feet: the ſtem by age becomes large, and is covered with a greyiſh ſmooth bark; and thoſe trees which are not lopped or browſed by cattle, are commonly furniſhed with branches the greateſt part of their length, ſo form a ſort of cone;

the branches are garniſhed with oblong oval leaves, of a lucid green on their upper ſurface, but are pale on their under, having a ſtrong midrib: the edges are indented and waved, with ſharp thorns terminating each of the points, ſo that ſome of the thorns are raiſed upward, and others are bent downward, and being very ſtiff they are troubleſome to handle. The leaves are placed alternate on every ſide of the branches; and from the baſe of their footſtalks come out the flowers in cluſters, ſtanding on very ſhort footſtalks; each of theſe ſuſtain five, ſix, or more flowers. They are of a dirty white, and appear in May; but are ſucceeded by roundiſh berries, which turn to a beautiful red about Michaelmas, and continue on the trees, if they are not deſtroyed, till after Chriſtmas.

The common holly is a very beautiful tree in winter; therefore deſerves a place in all plantations of evergreen trees and ſhrubs, where its ſhining leaves and red berries make a fine variety; and if a few of the beſt variegated kinds are properly intermixed, they will enliven the ſcene. It is propagated by ſeeds, which never come up the firſt year, but lie in the ground as the haws do; therefore the berries ſhould be buried in the ground one year, and then taken up and ſown at Michaelmas, upon a bed expoſed only to the morning ſun; the following ſpring the plants will appear, which muſt be kept clean from weeds; and if the ſpring ſhould prove dry, it will be of great ſervice to the plants if they are watered once a-week; but they muſt not have it oftener, nor in too great quantity, for too much moiſture is very injurious to theſe plants when young. In this ſeed-bed the plants may remain two years; and then ſhould be tranſplanted in the autumn, into beds at about ſix inches aſunder, where they may ſtand two years longer; during which time they muſt be conſtantly kept clean from weeds, and if the plants have thriven well, they will be ſtrong enough to tranſplant where they are deſigned to remain: for when they are tranſplanted at that age, there will be leſs danger of their failing, and they will grow to a larger ſize than thoſe which are removed when they are much larger; but if the ground is not ready to receive them at that time, they ſhould be tranſplanted into a nurſery in rows at two feet diſtance, and one foot aſunder in the rows, in which place the plants may remain two years longer; and if they are deſigned to be grafted or budded with any of the variegated kinds, that ſhould be performed after the plants have grown one year in the nurſery: but the plants ſo budded or grafted ſhould continue two years after in the nurſery, that they may make good ſhoots before they are removed; though the plain ones ſhould not ſtand longer than two years in the nurſery, becauſe when they are older they do not tranſplant ſo well. The beſt time for removing hollies is in the autumn, eſpecially in dry land; but where the ſoil is cold and moiſt, they may be tranſplanted with great ſafety in the ſpring, if the plants are not too old, or have not ſtood long unremoved, for if they have, there is great doubt of their growing when removed.

Uſes. Sheep in the winter are fed with croppings of holly. Birds eat the berries. The bark fermented and afterwards waſhed from the woody fibres, makes the common bird-lime. The plant makes an impenetrable fence, and bears cropping; however, it is not found in all reſpects to anſwer for this purpoſe equally well with the hawthorn. The wood is uſed in fineering, and is ſometimes ſtained black to imitate ebony. Handles for knives and cogs for mill-wheels are made of it. It is alſo made into hones for whetting of razors. Mr Miller ſays, he has ſeen the floor of a room laid with compartments of holly and mahogany, which had a very pretty effect.

ILFRACOMB, a town of Devonſhire, ſeated on the Severn ſea, almoſt oppoſite to Swanſea in Glamorganſhire, with a good harbour. W. Long. 4. 15. N. Lat. 51. 15.

ILIAD, the name of an ancient epic poem, the firſt and fineſt of thoſe compoſed by Homer.

The poet's deſign in the Iliad was to ſhew the Greeks, who were divided into ſeveral little ſtates, how much it was their intereſt to preſerve a harmony and good underſtanding among themſelves: for which end he ſets before them the calamities that befel their anceſtors from the wrath of Achilles, and his miſunderſtanding with Agamemnon; and the advantages that afterwards accrued to them from their union. The iliad is divided into 24 books or rhapſodies, which are marked with the letters of the alphabet.

ILIUM, Ilion, or *Ilios*, (anc. geog.) a name for the city of Troy, but moſt commonly uſed by the poets, and diſtinguiſhed by the epithet *Vetus*; at a greater diſtance from the ſea than what was afterwards called *Ilium Novum*, and thought to be the *Ilienſium Pagus* of Strabo. New or modern Ilium was a village nearer the ſea, with a temple of Minerva; where Alexander, after the battle of Granicus, offered gifts, and called it a city, which he ordered to be enlarged. His orders were executed by Lyſimachus, who encompaſſed it with a wall of 40 ſtadia. It was afterwards adorned by the Romans, who granted it immunities as to their mother-city. From this city the *Ilias* of Homer takes its name, containing an account of the war carried on between the Greeks and Trojans on account of the rape of Helen; a variety of diſaſters being the conſequence, gave riſe to the proverb *Ilias Malorum*.

ILKUCH, a royal town of Poland, in the palatinate of Cracow, remarkable for its ſilver-mines mixed with lead. It is ſeated in a barren and mountainous country, in E. Long. 20. 0. N. Lat. 50. 26.

ILLECEBRUM, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ſeveral ſpecies, of which the moſt remarkable are the paronychia and the capitatum. Both theſe have trailing ſtalks near two feet long, which ſpread on the ground, garniſhed with ſmall leaves like thoſe of knot-graſs. The heads of the flowers come out from the joints of the ſtalks, having neat ſilvery bractea ſurrounding them, which make a pretty appearance. Their flowers appear in June, and there is generally a ſucceſſion of them for at leaſt two months; and when the autumn proves warm, they will ripen their ſeeds in October. They are propagated by ſeeds which ſhould be ſown in a bed of light earth in the beginning of April: the plants will come up in May, when they ſhould be kept clean from weeds till they are fit to remove. Some ſhould be planted in ſmall pots, and the reſt in a warm border, obſerving to water and ſhade them till they have taken new root.

Theſe plants are ſometimes killed in ſevere winters; for which reaſon it is directed to plant ſome of them in pots, that they may be ſheltered during that ſeaſon.

ILLENOIS, a people of North America, inhabiting a country lying near a large lake of the ſame name, (called alſo *Michigan*), formed by the river St Laurence. The country is fertile; and the people plant Indian corn, on which they chiefly ſubſiſt. They are civil, active, lively, and robuſt; and are much leſs cruel in their diſpoſitions than the other Indian nations. They are, however, ſaid to be great libertines, and to marry a number of wives; but ſome of their villages have embraced Chriſtianity.

ILLICIUM, a genus of the octagynia order, belonging to the dodecandria claſs of plants. There is only one ſpecies, viz. the aniſatum, a native of the woods of China and Japan. It riſes with an erect branched ſtem to the height of a cherry-tree; and is covered with an aſh-coloured bark, under which is another bark that is green, fleſhy, ſomewhat mucous, and of an aromatic taſte, combined with a ſmall degree of aſtringency. The wood is hard and brittle; the pith ſmall in quantity, fungous, and of a green herbaceous colour. The leaves reſemble thoſe of laurel; the flowers, in ſome ſort, thoſe of narciſſus. Theſe laſt generally ſtand ſingle, are of a pale white, and conſiſt of 16 petals, which differ in their form. The extremity of the flower-ſtalk being continued into the *germen*, or ſeed-bud of the flower, forms eight conjoined capſules, or one deeply divided into eight parts. Of theſe capſules, ſome frequently decay; the reſt incloſe each a ſingle ſeed, ſomewhat reſembling that of palma chriſti, and which, when the hardiſh corticle that cloſely covers and involves it is broken, exhibits a kernel that is white, fleſhy, ſoft, and of a vapid taſte. The bonzes, or prieſts of China and Japan, infuſe into the inhabitants a ſuperſtitious belief, that the gods are delighted with the preſence of this tree. Hence, they generally place before their idols garlands and bundles made of the branches. A ſimilar opinion the Bramins inculcate into the Indians, of the Malabar-fig, or *ficus religioſa*. The bark of the aniſe-tree, reduced to powder, and equally burnt, the public watchmen in Japan, by a very curious contrivance deſcribed by Kempfer, render uſeful in the meaſuring of time during the darkneſs of the night. The ſame powder is frequently burnt in brazen veſſels on the Japaneſe altars, as incenſe is in other countries, from a belief that the idols in whoſe honour the ceremony is performed are greatly refreſhed with the agreeable fragrancy of its odour. It is remarkable, that a branch of this tree being added to a decoction of the poiſonous fiſh, termed by the Dutch *de opblaſer*, (a fiſh the moſt delicate, if the poiſonous matter be firſt properly expelled), increaſes its noxious quality, and exaſperates the poiſon to an aſtoniſhing degree of activity and power.

ILLUMINATING, a kind of miniature-painting much practiſed in Britain about the 12th and 13th centuries, and of which many curious ſpecimens are ſtill remaining, particularly in the Harleian collection. From this word is derived the modern one of *limning*. It was chiefly uſed as we uſe copperplates, in illuſtrating and adorning the bible and other books. This art was much practiſed by the clergy, and even by ſome in the higheſt ſtations in the church. "The famous Oſmund (ſays Bromton), who was conſecrated biſhop of Saliſbury A. D. 1076, did not diſdain to ſpend ſome part of his time in writing, binding, and *illuminating* books." Mr Strutt hath given the public an opportunity of forming ſome judgment of the degree of delicacy and art with which theſe illuminations were executed, by publiſhing prints of a prodigious number of them, in his *Regal and eccleſiaſtical antiquities of England*, and *View of the cuſtoms, &c. of England*. In the firſt of theſe works we are preſented with the genuine portraits, in miniature, of all the kings, and ſeveral of the queens, of England, from Edward the Confeſſor to Henry VII. moſtly in their crowns and royal robes, together with the portraits of many other eminent perſons of both ſexes.

The illuminators and painters of this period ſeem to have been in poſſeſſion of a conſiderable number of colouring materials, and to have known the arts of preparing and mixing them, ſo as to form a great variety of colours. In the ſpecimens of their miniature-paintings that are ſtill extant, we perceive not only the five primary colours, but alſo various combinations of them. There is even ſome appearance, that they were not ignorant of the art of painting in oil, from the following precept of Henry III. "Pay out of our treaſury, to Odo the goldſmith, and Edward his ſon, one hundred and ſeventeen ſhillings and ten pence, for oil, varniſh, and colours bought, and pictures made, in the chamber of our queen at Weſtminſter, between the octaves of the Holy Trinity, in the twenty-third year of our reign, and the feaſt of St Barnabas the apoſtle, in the ſame year, which is fifteen days." This was a conſiderable ſum (equal in quantity of ſilver to 17 pounds 14 ſhillings of our money, and in efficacy to 88 pounds) to be expended in painting one chamber in ſo ſhort a time.

ILLYRICA, (anc. geog.) a country extending from the Adriatic to Pannonia. Its boundaries are variouſly aſſigned. Pliny makes it extend in length from the river Arſia to the Drinius, thus including Liburnia to the weſt, and Dalmatia to the eaſt; which is alſo the opinion of Ptolemy, who ſettles its limits from mount Scardus and the Upper Mœſia on the eaſt to Iſtria in the weſt. The country is now called *Sclavonia*.

ILLYRIUS, (Matthias, Flaccus, or Francowitz), one of the moſt learned divines of the Augſburgh confeſſion, born in Iſtria, anciently called *Illyrica*, in 1520. He is ſaid to have been a man of vaſt genius, extenſive learning, of great zeal againſt Popery; but of ſuch a reſtleſs and paſſionate temper, as overbalanced all his good qualities, and occaſioned much diſturbance in the Proteſtant church. He publiſhed a great number of books, and died in 1575.

IMAGE, in a religious ſenſe, is an artificial repreſentation or ſimilitude of ſome perſon or thing, uſed either by way of decoration and ornament, or as an object of religious worſhip and adoration; in which laſt ſenſe, it is uſed indifferently with the word IDOL.

IMAGE, in optics, a figure in the form of any object, made by the rays of light iſſuing from the ſeveral points of it, and meeting in ſo many other points, either at the bottom of the eye, or on any other ground, or in any tranſparent medium, where there is no ſurface to reflect them. Thus we are ſaid to ſee all objects by means of their images formed in the eye.

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of ſenſe. See METAPHYSICS; and MORALS, n° 184.

Force of IMAGINATION. See MONSTER.

IMAN, a name applied by the Mahometans to him who is head of the congregations in their moſques; and, by way of eminence, to him who has the ſupreme authority both in reſpect to ſpirituals and temporals.

IMAUS, (anc. geog.), the largeſt mountain of Aſia, (Strabo); and a part of Taurus, (Pliny); from which the whole of India runs off into a vaſt plain, reſembling Egypt. It extends far and wide through Scythia, as far as to the Mare Glaciale, dividing it into the Hither or *Scythia intra Imaum*, and into the Farther or *Scythia extra Imaum*, (Ptolemy); and alſo ſtretching out along the north of India to the eaſtern ocean, ſeparates it from Scythia. It had various names according to the different countries it ran through: Poſtellus thinks it is the *Sephar* of Scripture.

IMBECILLITY, a languid, infirm ſtate of body, which, being greatly impaired, is not able to perform its uſual exerciſes and functions.

IMBIBING, the action of a dry porous body, that abſorbs or takes up a moiſt or fluid one: thus, ſugar imbibes water; a ſpunge, the moiſture of the air, &c.

IMBRICATED, among botaniſts. See BOTANY, p. 1298, n° 142.

IMITATION, derived from the Latin *imitare*, to *repreſent*, or *repeat*, a ſound or action, either exactly, or nearly in the ſame manner, as they were originally exhibited.

IMITATION, in muſic, admits of two different ſenſes. Sound and motion are either capable of imitating themſelves by a repetition of their own particular modes; or of imitating other objects of a nobler and more abſtracted nature. Nothing perhaps is ſo purely mental, nothing ſo remote from external ſenſe, as not to be imitable by muſic. But as the deſcription of this in M. Rouſſeau, article *Imitation*, is nobly animated, and comprehends all that is neceſſary to be ſaid on the ſubject, we tranſlate it as follows.

" Dramatic or theatrical muſic (ſays he), contributes to imitation no leſs than painting or poetry: it is in this common principle that we muſt inveſtigate both the origin and the final cauſe of all the fine arts; as M. le Batteaux has ſhown †. But this imitation is not equally extenſive in all the imitative arts. Whatever the imagination can repreſent to itſelf is in the department of poetry. Painting, which does not preſent its pictures to the imagination immediately, but to external ſenſe and to one ſenſe alone, paints only ſuch objects as are diſcoverable by ſight. Muſic might appear ſubjected to the ſame limits with reſpect to the ear; yet it is capable of painting every thing, even ſuch images as are objects of ocular perception alone: by a magic almoſt inconceivable, it ſeems to tranſform the ears into eyes, and endow them with the double function of perceiving viſible objects, by the mediums of their own; and it is the greateſt miracle of an art, which can only act by motion, that it can make that very motion repreſent abſolute quieſcence. Night, ſleep, ſilence, ſolitude, are the noble efforts, the grand images, repreſented by a pictureſque muſic. We know that noiſe can produce the ſame effect with ſilence, and ſilence the ſame effect with noiſe; as when one ſleeps at a lecture inſipidly and monotonically delivered, but wakes the inſtant when it ends. But muſic acts more intimately upon our ſpirits, in exciting by one ſenſe diſpoſitions ſimilar to thoſe which we find excited by another; and, as the relation between theſe images cannot be ſenſible unleſs the impreſſion be ſtrong, painting, when diveſted of this energy, cannot reſtore to muſic that aſſiſtance in imitations which ſhe borrows from it. Though all nature ſhould be aſleep, he who contemplates her does not ſleep; and the art of the muſician conſiſts in ſubſtituting, for this image of inſenſibility in the object, thoſe emotions which its preſence excites in the heart of the contemplator. He not only ferments and agitates the ocean, animates the flame to conflagration, makes the fountain murmur in his harmony, calls the rattling ſhower from heaven, and ſwells the torrent to reſiſtleſs rage; but he paints the horrors of a boundleſs and frightful deſart, involves the ſubterraneous dungeon in tenfold gloom, ſoothes the tempeſt, tranquillizes the diſturbed elements, and from the orcheſtra diffuſes a recent fragrance through imaginary groves; nay, he excites in the ſoul the ſame emotions which we feel from the immediate perception and full influence of theſe objects."

Under the word *Harmony*, Rouſſeau has ſaid, that no aſſiſtance can be drawn from thence, no original principle which leads to muſical imitation; ſince there cannot be any relation between chords and the objects which the compoſer would paint, or the paſſions which he would expreſs. In the article *Melody*, he imagines he has diſcovered that principle of imitation which harmony cannot yield, and what reſources of nature are employed by muſic in repreſenting theſe objects and theſe paſſions.

It is hoped, however, that, in our article of MELODY, we have ſhown upon what principle muſical imitation may be compatible with harmony; though we admit, that from melody it derives its moſt powerful energy, and its moſt attractive graces. Yet we muſt either be deceived beyond all poſſibility of cure, or we have felt the power of imitative harmony in a high degree. We are certain that the fury, the impetuoſity, the rapid viciſſitudes, of a battle, may be ſucceſsfully and vividly repreſented in harmony. We have participated the exultation and triumph of a conqueſt, inſpired by the ſound of a full chorus. We have felt all the ſolemnity and grandeur of devotion from the ſlow movement, the deep chords, the ſwelling harmony, of a ſentimental compoſition played upon the organ. Nor do we imagine harmony leſs capable of repreſenting the tender depreſſion, the fluctuating and tremulous agitation, of grief. As this kind of imitation is the nobleſt effort of muſic, it is aſtoniſhing that it ſhould have been overlooked by M. D'Alembert. He has indeed apologized, by informing us, that his treatiſe is merely elementary: but we are uncertain how far this apology ought to be regarded as ſufficient, when it is at the ſame time conſidered, that he has given an account of imitation in its mechanical, or what Rouſſeau calls its

Les Beaux rts reduits un meme incipe.

technical, ſenſe; which, however, to prevent ambiguity, we ſhould rather chooſe to call *mymeſis*, or *anacephalioſis*. To Rouſſeau's account of the word in this acceptation, we return.

“Imitation (ſays he), in its technical ſenſe, is a reiteration of the ſame air, or of one which is ſimilar, in ſeveral parts where it is repeated by one after the other, either in uniſon, or at the diſtance of a fourth, a fifth, a third, or any other interval whatever. The imitation may be happily enough purſued even though ſeveral notes ſhould be changed; provided the ſame air may always be recognized, and that the compoſer does not deviate from the laws of proper modulation. Frequently, in order to render the imitation more ſenſible, it is preceded by a general reſt, or by long notes which ſeem to obliterate the impreſſion formerly made by the air till it is renewed with greater force and vivacity by the commencement of the imitation. The imitation may be treated as the compoſer chooſes; it may be abandoned, reſumed, or another begun at pleaſure; in a word, its rules are as much relaxed as thoſe of the fugue are ſevere: for this reaſon, it is deſpiſed by the moſt eminent maſters; and every imitation of this kind too much affected, almoſt always betrays a novice in compoſition.”

IMMACULATE, ſomething without ſtain, chiefly applied to the conception of the holy virgin. See CONCEPTION *Immaculate*.

IMMATERIAL, ſomething devoid of matter, or that is pure ſpirit: thus God, angels, and the human ſoul, are immaterial beings.

IMMEDIATE, whatever is capable of producing an effect without the intervention of external means; thus we ſay, an immediate cauſe, in oppoſition to a mediate or remote one.

IMMENSITY, an unlimited extenſion, or which no finite and determinate ſpace, repeated ever ſo often, can equal.

IMMER, the moſt eaſterly iſland of all the New Hebrides in the South Sea. It lies about four leagues from TANNA, and ſeems to be about five leagues in circumference; it is of a conſiderable height, with a flat-top.

IMMERSION, that act by which any thing is plunged into water or other fluid.

It is uſed in chemiſtry for a ſpecies of calcination, when any body is immerſed in a fluid to be corroded: or it is a ſpecies of lotion; as when a ſubſtance is plunged into any fluid, in order to deprive it of a bad quality, or communicate to it a good one.

IMMERSION, in aſtronomy, is when a ſtar or planet is ſo near the ſun with regard to our obſervations, that we cannot ſee it; being, as it were, inveloped and hid in the rays of that luminary. It alſo denotes the beginning of an eclipſe of the moon, or that moment when the moon begins to be darkened, and to enter into the ſhadow of the earth.

IMMORTAL, that which will laſt to all eternity, as having in it no principle of alteration or corruption: thus God and the human ſoul are immortal. See SOUL.

IMMUNITY, a privilege or exemption from ſome office, duty, or impoſition, as an exemption from tolls, &c.

Immunity is more particularly underſtood of the liberties granted to cities and communities.

IMOLA, a town of Italy, in the territory of the church, and in Romagna, with a biſhop's ſee. It is a very handſome populous place; and is ſeated on the river Santerno, in E. Long. 11. 43. N. Lat. 44. 28.

IMPALE, in heraldry, is to conjoin two coats of arms pale-wiſe. Women impale their coats of arms with thoſe of their huſbands. See HERALDRY, p. 3589, 3610.

To impale cities, camps, fortifications, &c. is to incloſe them with palliſadoes.

To IMPALE, or *Empale*, ſignifies alſo to put to death by ſpitting on a ſtake fixed upright.

IMPALPABLE, that whoſe parts are ſo extremely minute, that they cannot be diſtinguiſhed by the ſenſes, particularly by that of feeling.

IMPANATION, a term uſed by divines to ſignify the opinion of the Lutherans with regard to the euchariſt, who believe that the ſpecies of bread and wine remain together with the body of our Saviour after conſecration.

IMPANNELLING, in law, ſignifies the writing down or entering into a parchment, liſt, or ſchedule, the names of a jury ſummoned by the ſheriff to appear for ſuch public ſervices as juries are employed in.

IMPARLANCE, in law, a petition in court for a day to conſider or adviſe what anſwer the defendant ſhall make to the plaintiff's action; and is the continuance of the cauſe till another day, or a longer time given by the court.

IMPASTATION, the mixtion of various materials of different colours and conſiſtencies, baked or bound together with ſome cement, and hardened either by the air or by fire.

IMPATIENS, TOUCH-ME-NOT, and *Balſamine*; a genus of the monogamia order, belonging to the ſyngeneſia claſs of plants.

Species. 1. The noli-me-tangere, or common yellow balſamine, is a native of Britain, but is cultivated in many gardens for curioſity. It hath a fibrous root, an upright, jointed, ſucculent, ſtalk, about 18 inches high, with alternate oval leaves; and, from the axillas of the ſtalks, long, ſlender, branching footſtalks, each ſuſtaining many yellow flowers; ſucceeded by taper capſules, that burſt open and dart forth their ſeeds with great velocity, whence its name. 2. The balſamina, or balſam, is a native of India. It hath a fibrous root, an upright, thick, ſucculent ſtalk, branching all around a foot and an half or two feet high; with long, ſpear-ſhaped, ſawed leaves, the upper ones alternate; and from the joints of the ſtalk and branches cluſters of ſhort foot-ſtalks, each ſuſtaining one large irregular flower, of different colours in the varieties; flowering from June or July till September.

Culture. The firſt ſpecies is very hardy, and will grow freely from the ſeeds in any common border; but the ſecond requires artificial warmth. The ſeeds will indeed grow in the full ground, but rarely before the month of May; and more freely then, if covered with a hand-glaſs, &c. But the plants raiſed by artificial heat will flower five or ſix weeks ſooner than thoſe raiſed in the natural ground. The ſeeds ought therefore always to be ſowed on a hotbed in March or April, and the plants continued therein till June, and if the frames be deep they will then be drawn up to the length of two or three feet; after which they may be planted in pots, which muſt likewiſe be continued in the hot-bed till the plants have taken freſh root.

IMPEACHMENT, an accuſation and proſecution for treaſon and other crimes and miſdemeanours. Any member of the lower houſe of parliament may impeach any one belonging either to that body, or to the houſe of lords. The method of proceeding is to exhibit articles on the behalf of the commons, by whom managers are appointed to make good their charge. Theſe articles are carried to the lords, by whom every perſon impeached by the commons is always tried; and if they find him guilty, no pardon under the great ſeal can be pleaded to ſuch an impeachment. 12 Will. III. cap. ii.

IMPENETRABILITY, in philoſophy, that property of body, whereby it cannot be pierced by another: thus, a body which ſo fills a ſpace as to exclude all others, is ſaid to be impenetrable.

IMPERATIVE, one of the moods of a verb, uſed when we would command, intreat, or adviſe: thus, *go read*, *take pity*, *be adviſed*, are imperatives in our language. But in the learned languages, this mood has a peculiar termination to diſtinguiſh it from others, as *i*, or *ito*, "go;" *lege*, or *legito*, "read," &c. and not only ſo, but the termination varies, according as you addreſs one or more perſons, as *audi* and *audite*; ακουετω, ακουετων, ακουετωσαν, &c.

IMPERATOR, in Roman antiquity, a title of honour conferred on victorious generals by their armies, and afterwards confirmed by the ſenate.

IMPERATORIA, MASTERWORT; a genus of the digynia order, belonging to the pentandria claſs of plants.—There is but one ſpecies, viz. the oſtruthium, a native of the Auſtrian and Styrian Alps, and other mountainous places of Italy. Mr Lightfoot alſo informs us, that he has found it in ſeveral places on the banks of the Clyde in Scotland; but whether indigenous or not, is uncertain. The root is as thick as a man's thumb, running obliquely in the ground; it is fleſhy, aromatic, and has a ſtrong acrid taſte, biting the tongue like pellitory of Spain: the leaves ariſe immediately from the root; they have long foot-ſtalks, dividing into three very ſhort ones at the top, each ſuſtaining a trilobate leaf, indented on the border. The footſtalks are deeply channelled, and, when broken, emit a rank odour. The flower-ſtalks riſe about two feet high, dividing into two or three branches, each being terminated by a pretty large umbel of white flowers whoſe petals are ſplit; theſe are ſucceeded by oval compreſſed ſeeds, ſomewhat like thoſe of dill, but larger.—The plant is cultivated in gardens for the ſake of its roots, which are uſed in medicine. It may be propagated either by ſeeds, or by parting the roots in autumn. They thrive beſt in a ſhady ſituation.—The root has a flavour ſimilar to that of angelica, and is eſteemed a good ſudorific. There are inſtances of its having cured the ague when the bark had failed. It ſhould be dug up in winter, and a ſtrong infuſion made in wine.

IMPERFECT, ſomething that is defective, or that wants ſome of the properties found in other beings of the ſame kind.

IMPERFECT *Tenſe*, in grammar, a tenſe that denotes ſome preterite caſe, or denotes the thing to be at that time preſent and not quite finiſhed; as *ſcribebam*, "I was writing."

IMPERIAL, ſomething belonging to an emperor, or empire. See EMPEROR, and EMPIRE.—Thus we ſay, his *imperial* majeſty, the *imperial* crown, *imperial* arms, &c.

IMPERIAL *Crown*. See HERALDRY, p. 3606.

IMPERIAL *Chamber*, is a ſovereign court, eſtabliſhed for the affairs of the immediate ſtates of the empire. See CHAMBER.

IMPERIAL *Cities*, in Germany, are thoſe which own no other head but the emperor.

Theſe are a kind of little commonwealths; the chief magiſtrate whereof does homage to the emperor, but in other reſpects, and in the adminiſtration of juſtice, is ſovereign.

Imperial cities have a right of coining money, and of keeping forces and fortified places. Their deputies aſſiſt at the imperial diets, where they are divided into two branches, that of the Rhine, and that of Suabia. There were formerly 22 in the former, and 37 in the latter; but there are now only 48 in all.

IMPERIAL *Diet*, is an aſſembly or convention of all the ſtates of the empire. See DIET.

IMPERIALI (John Baptiſt), a celebrated phyſician of Vicenza, where he was born in 1568. He compoſed ſeveral eſteemed works both in proſe and verſe, written in good Latin; and died in 1623.

IMPERSONAL VERB, in grammar, a verb to which the nominative of any certain perſon cannot be prefixed; or, as others define it, a verb deſtitute of the two firſt and primary perſons, as *decet*, *opportet*, &c. The imperſonal verbs of the active voice end in *t*, and thoſe of the paſſive in *tur*; they are conjugated thro' the third perſon ſingular of almoſt all the tenſes and moods: they want the imperative, inſtead of which we uſe the preſent of the ſubjunctive; as *pœniteat*, *pugnetur*, &c. nor, but a few excepted, are they to be met with in the ſupines, participles, or gerunds.

IMPERVIOUS, a thing not to be pervaded or paſſed through, either by reaſon of the cloſeneſs of its pores, or the particular configuration of its parts.

IMPETUS, in mechanics, the force with which one body ſtrikes or impells another.

IMPLICATION, in law, is where ſomething is implied that is not expreſſed by the parties themſelves in their deeds, contracts, or agreements.

To IMPLY, or CARRY, in *Muſic*. Theſe we have uſed as ſynonimous terms in that article. They are intended to ſignify thoſe ſounds, which ought to be the proper concomitants of any note, whether by its own nature, or by its poſition in artificial harmony. Thus every note, conſidered as an independent ſound, may be ſaid to *carry* or *imply* its natural harmonics, that is to ſay, its octave, its twelfth, and its ſeventeenth; or, when reduced, its eight, its fifth, and its third. But the ſame ſound when conſidered as conſtituting any part of harmony, is ſubjected to other laws and different limitations. It can then only be ſaid to *carry* or *imply* ſuch ſimple ſounds, or complications of ſound, as the preceding and ſubſequent chords admit or require. For theſe the laws of melody and harmony muſt be conſulted. See MELODY, and HARMONY.

IMPORTATION in commerce, the bringing merchandize into a kingdom from foreign countries;

in contradiſtinction to exportation. See Exportation.

We ſhall here give ſome of the principal laws relating to the importation of goods into this kingdom. Goods imported without entry or paying cuſtoms, are forfeited; and the lord-treaſurer, the barons of the exchequer, or chief magiſtrates of the place where the offence was committed, or next adjoining to it, may grant a warrant to any perſon, who, with the aſſiſtance of a conſtable, may break open doors, cheſts, &c. and take thence any prohibited or unaccuſtomed goods; but this is to be done within one month after the offence was committed. But if falſe information is given, the perſon wrongfully accuſed may recover coſts and damages.

No ſhip or veſſel arriving from beyond ſea is to be above three days in ſailing from Graveſend to the place of diſcharge on the river Thames, unleſs hindered by contrary winds or other impediment. And no ſhip bound for the port of London is to touch or ſtay at any place adjoining to any ſhore, between Graveſend and Cheſter-quay. True entries are to be made of all ſuch ſhips lading, upon oath of the maſter or purſer for that voyage; alſo where ſhe took in her lading, where ſhe was built, how manned, who were the owners, and who the maſter during the voyage. In all out-ports, ſhips are to come directly to the place of unlading, and make true entries as aforeſaid, upon penalty of the forfeiture of 100 l.

After any ſhip is cleared, and the watchmen and tideſmen diſcharged from their attendance, if there be found on board any concealed goods that have not paid the duty inwards, the maſter, or other perſon taking charge of the ſhip, ſhall forfeit 100 l.

Porters, carmen, watermen, &c. aſſiſting in landing unaccuſtomed goods, ſhall on conviction, for the firſt offence, be committed to the next jail till they find ſecurity for their good behaviour; and for their ſecond offence they are to be committed to priſon for two months, without bail or mainprize, or till they are diſcharged by the court of exchequer, or each of them pay 5 l. to the ſheriff of the county.

No merchant-denizen ſhall cover a ſtranger's goods, but ſhall, by himſelf or agent, ſign one of his bills of every entry, with the mark, number, and contents of every parcel of goods, without which no entry ſhall paſs. And no children of aliens under the age of 21 years, ſhall have entry made in their names, nor be permitted to trade.

Merchants, trading into the port of London, ſhall have free liberty to lade and unlade their goods at any of the lawful quays between the tower and London-bridge, from ſun-riſing to ſun-ſetting, from September 10. to March 10.; and between ſix o'clock in the morning and ſix in the evening, from March 10. to September 10.; giving notice thereof to the reſpective officers appointed to attend the lading and unlading of goods. And ſuch officers as ſhall refuſe to be preſent ſhall forfeit 5 l. for every default.

To prevent combination between importers, and ſeizers of goods unlawfully imported or exported, none ſhall ſeize them but the officers of the cuſtoms, or ſuch as ſhall be authoriſed ſo to do by the lord-treaſurer, under-treaſurer, or a ſpecial commiſſion from his majeſty under the great privy-ſeal.

If any ſeizer of prohibited or unaccuſtomed goods does not make due proſecution thereof, it is lawful for the cuſtom-houſe officers, or others deputed thereto, to make ſeizure of ſuch goods; and they ſhall be, in law, adjudged the firſt true informers and ſeizers, and have the benefit thereof, notwithſtanding any law and ſtatute to the contrary.

All foreign goods permitted to be landed by bills at ſight, bills at view or ſufferance, ſhall be landed at the moſt convenient quays and wharfs, as the officers of the cuſtoms ſhall direct; and there, or at the king's ſtore-houſe of the reſpective ports, ſhall be meaſured, weighed, numbered, &c. by the officers appointed, who ſhall perfect the entry, and ſubſcribe their names to it, and the next day make their report to the cuſtomer, collector, or comptroller; or, in default thereof, ſhall forfeit 100l.

Any merchant who ſhall import goods, ſhall have liberty to break bulk in any lawful port or quay, the maſter or purſer firſt making oath of the true contents of the ſhip's lading. No Engliſh merchant ſhall put on ſhore in Scotland or Ireland, any merchandize of the growth or produce of any of his majeſty's plantations, unleſs the ſame have been firſt landed in England, Wales, or Berwick, and paid the duties with which they are chargeable, under the penalty of forfeiting the ſhip and goods, three-fourths to the king, and one-fourth to the informer or him that ſhall ſue for the ſame: but if a ſhip be diſabled, or driven into any port of Ireland, and unable to proceed on her voyage, her goods may be put on ſhore, under the hands of the principal officers of the cuſtoms there reſiding, till the goods can be put on board ſome other veſſel, to be tranſported to ſome part of England or Wales.

Natives of England or Ireland may import into England, directly from Ireland, any hemp, flax, thread, yarn and linen, of the growth and manufacture of Ireland, cuſtom-free; the chief officer ſo importing bringing a certificate from the chief office in Ireland, expreſſing the particulars of the goods, with the names and places of abode of the exporters thence, and of ſuch as have ſworn that the ſaid goods are *bona fide* of the growth and manufacture of that kingdom, and who they are conſigned to in England; and the chief officer ſhall make oath, that the ſaid goods are the ſame that are on board by virtue of that certificate.

IMPOST, in law, ſignifies in general a tribute or cuſtom, but is more particularly applied to ſignify that tax which the crown receives for merchandizes imported into any port or haven.

IMPOSTHUME, in ſurgery, &c. See Abscess.

IMPOTENCE, or Impotency, in general, denotes want of ſtrength, power, or means, to perform any thing.

Divines and philoſophers diſtinguiſh two ſorts of impotency; natural, and moral. The firſt is a want of ſome phyſical principle, neceſſary to an action; or where a being is abſolutely defective, or not free and at liberty to act: The ſecond only imports a great difficulty; as a ſtrong habit to the contrary, a violent paſſion, or the like.

Impotency is more particularly uſed for a natural inability to coition. Impotence with reſpect to men is the ſame as ſterility in women; that is, an inability of propagating the ſpecies. There are many cauſes of impotence; as, a natural defect in the organs of generation, which ſeldom admits of a cure: accidents, or diſeaſes; and in ſuch caſes the impotence may, or may not, be remedied, according as theſe are curable or otherwiſe.—The moſt common cauſes are, early and immoderate venery, or the venereal diſeaſe. We have inſtances, however, of unfitneſs for generation in men by an impediment to the ejection of the ſemen in coition, from a wrong direction which the orifice at the *verumontanum* got, whereby the ſeed was thrown up into the bladder. M. Petit cured one patient under ſuch a difficulty of emiſſion, by making an inciſion like to that commonly made in the great operation for the ſtone.

IMPREGNATION, the getting a female with child. See PREGNANCY.

The term *impregnation* is alſo uſed, in pharmacy, for communicating the virtues of one medicine to another, whether by mixture, coction, digeſtion, &c.

IMPRESSING SEAMEN. The power of impreſſing ſea-faring men for the ſea-ſervice by the king's commiſſion, has been a matter of ſome diſpute, and ſubmitted to with great reluctance; though it hath very clearly and learnedly been ſhewn by Sir Michael Foſter, that the practice of impreſſing, and granting powers to the admiralty for that purpoſe, is of very ancient date, and hath been uniformly continued by a regular ſeries of precedents to the preſent time: whence he concludes it to be part of the common law. The difficulty ariſes from hence, that no ſtatute has expreſsly declared this power to be in the crown, though many of them very ſtrongly imply it. The ſtatute 2 Ric. II. c. 4. ſpeaks of mariners being arreſted and retained for the king's ſervice, as of a thing well known, and practiſed without diſpute; and provides a remedy againſt their running away. By a later ſtatute, if any waterman, who uſes the river Thames, ſhall hide himſelf during the execution of any commiſſion of preſſing for the king's ſervice, he is liable to heavy penalties. By another, (5 *Eliz.* c. 5.) no fiſherman ſhall be taken by the queen's commiſſion to ſerve as a mariner; but the commiſſion ſhall be firſt brought to two juſtices of the peace, inhabiting near the ſea-coaſt where the mariners are to be taken, to the intent that the juſtices may chooſe out and return ſuch a number of able-bodied men, as in the commiſſion are contained, to ſerve her majeſty. And, by others, eſpecial protections are allowed to ſeamen in particular circumſtances, to prevent them from being impreſſed. Ferrymen are alſo ſaid to be privileged from being impreſſed, at common law. All which do moſt evidently imply a power of impreſſing to reſide ſomewhere; and, if any where, it muſt, from the ſpirit of our conſtitution, as well as from the frequent mention of the king's commiſſion, reſide in the crown alone.—After all, however, this method of manning the navy is to be conſidered as only defenſible from public neceſſity, to which all private conſiderations muſt give way.

The following perſons are exempted from being impreſſed: Apprentices for three years; the maſter, mate, and carpenter, and one man for every 100 tons, of veſſels employed in the coal-trade; all under 18 years of age, and above 55; foreigners in merchant-ſhips and privateers; landmen betaking themſelves to ſea for two years; ſeamen in the Greenland fiſhery, and harpooners, employed, during the interval of the fiſhing ſeaſon, in the coal-trade, and giving ſecurity to go to the fiſhing next ſeaſon.

IMPRESSION is applied to the ſpecies of objects which are ſuppoſed to make ſome mark or impreſſion on the ſenſes, the mind, and the memory. The Peripatetics aſſert, that bodies emit ſpecies reſembling them, which are conveyed to the common *ſenſorium*, and they are rendered intelligible by the active intellect; and, when thus ſpiritualized, are called *expreſſions*, or *expreſs ſpecies*, as being expreſſed from the others.

IMPRESSION alſo denotes the *edition* of a book, regarding the mechanical part only; whereas *edition*, beſides this, takes in the care of the editor, who corrected or augmented the copy, adding notes, &c. to render the work more uſeful.

IMPRISONMENT, the ſtate of a perſon reſtrained of his liberty, and detained under the cuſtody of another.

No perſon is to be impriſoned but as the law directs, either by the command or order of a court of record, or by lawful warrant; or the king's proceſs, on which one may be lawfully detained. And at common law, a perſon could not be impriſoned unleſs he were guilty of ſome force and violence, for which his body was ſubject to impriſonment, as one of the higheſt executions. Where the law gives power to impriſon, in ſuch caſe it is juſtifiable, provided he that does it in purſuance of a ſtatute, exactly purſues the ſtatute in the manner of doing it; for otherwiſe it will be deemed falſe impriſonment, and of conſequence it is unjuſtifiable. Every warrant of commitment for impriſoning a perſon, ought to run, "Till delivered by due courſe of law," and not "Until farther order;" which has been held ill: and thus it alſo is, where one is impriſoned on a warrant not mentioning any cauſe for which he is committed. See ARREST and COMMITMENT.

Falſe IMPRISONMENT. Every confinement of the perſon is an impriſonment, whether it be in a common priſon, or in a private houſe, or in the ſtocks, or even by forcibly detaining one in the public ſtreets. Unlawful or *falſe impriſonment*, conſiſts in ſuch confinement or detention without ſufficient authority: which authority may ariſe either from ſome proceſs from the courts of juſtice; or from ſome warrant from a legal power to commit, under his hand and ſeal, and expreſſing the cauſe of ſuch commitment; or from ſome other ſpecial cauſe warranted, for the neceſſity of the thing, either by common law, or act of parliament; ſuch as the arreſting of a felon by a private perſon without warrant, the impreſſing of mariners for the public ſervice, or the apprehending of waggoners for miſbehaviour in the public highways. Falſe impriſonment alſo may ariſe by executing a lawful warrant or proceſs at an unlawful time, as on a Sunday; or in a place privileged from arreſts, as in the verge of the king's court. This is the injury. The remedy is of two ſorts; the one *removing* the injury, the other *making ſatisfaction* for it.

The means of *removing* the actual injury of falſe impriſonment, are four-fold, 1. By writ of MAINPRIZE. 2. By writ *De* ODIO *et Atia*. 3. By writ *De* HOMINE *Replegiando*.

Replegiando. 4. By writ of HABEAS *Corpus*. See thoſe articles.

The *ſatisfactory* remedy for this injury of falſe impriſonment, is by an action of treſpaſs *vi et armis*, uſually called *an action of falſe impriſonment;* which is generally, and almoſt unavoidably, accompanied with a charge of aſſault and battery alſo: and therein the party ſhall recover damages for the injuries he has received; and alſo the defendant is, as for all other injuries committed with force, or *vi et armis*, liable to pay a fine to the king for the violation of the public peace.

IMPROMPTU, or INPROMPTU, a Latin word frequently uſed among the French, and ſometimes in Engliſh, to ſignify a piece made off-hand, or *extempore*, without any previous meditation, by mere force and vivacity of imagination.——Many authors pique themſelves on their *impromptu's*, which yet were done at leiſure and in cold blood.

IMPROBATION, in Scots law, the name of an action brought for ſetting any deed or writing aſide upon the head of forgery.

IMPROPRIATION, in eccleſiaſtical law. See APPROPRIATION.

IMPURITY, in the law of Moſes, is any legal defilement. Of theſe there were ſeveral ſorts. Some were voluntary, as the touching a dead body, or any animal that died of itſelf, or any creature that was eſteemed unclean; or the touching things holy, by one who was not clean, or was not a prieſt; the touching one who had a leproſy, one who had a gonorrhœa, or who was polluted by a dead carcaſe, &c. Sometimes theſe impurities were involuntary; as when any one inadvertently touched bones, or a ſepulchre, or any thing polluted; or fell into ſuch diſeaſes as pollute, as the leproſy, &c.

The beds, clothes, and moveables, which had touched any thing unclean, contracted alſo a kind of impurity, and in ſome caſes communicated it to others.

Theſe legal pollutions were generally removed by bathing, and laſted no longer than the evening. The perſon polluted plunged over head in the water, and either had his clothes on when he did ſo, or waſhed himſelf and his clothes ſeparately. Other pollutions continued ſeven days, as that which was contracted by touching a dead body. That of women in their monthly courſes laſted till this was over with them. Other impurities laſted 40 or 50 days; as that of women who were lately delivered, who were unclean 40 days after the birth of a boy, and 50 after the birth of a girl. Others again laſted till the perſon was cured.

Many of theſe pollutions were expiated by ſacrifices; and others by a certain water or lye, made with the aſhes of a red heifer, ſacrificed on the great day of expiation. When the leper was cured, he went to the temple, and offered a ſacrifice of two birds, one of which was killed and the other ſet at liberty. He who had touched a dead body, or had been preſent at a funeral, was to be purified with the water of expiation, and this upon pain of death. The woman who had been delivered, offered a turtle and a lamb for her expiation; or if ſhe was poor, two turtles or two young pigeons.

Theſe impurities, which the law of Moſes has expreſſed with the greateſt accuracy and care, were only figures of other more important impurities, ſuch as the ſins and iniquities committed againſt God, or faults committed againſt our neighbour. The ſaints and prophets of the Old Teſtament were ſenſible of this; and our Saviour, in the goſpel, has ſtrongly inculcated, that they are not outward and corporeal pollutions which render us unacceptable to God, but ſuch inward pollutions as infect the ſoul, and are violations of juſtice, truth, and charity.

IMPUTATION, in general, the charging ſomething to the account of one, which belonged to another: thus, the aſſertors of original ſin maintain, that Adam's ſin is imputed to all his poſterity.

In the ſame ſenſe, the righteouſneſs and merits of Chriſt are imputed to true believers.

INACCESSIBLE, ſomething that cannot be come at, or approached, by reaſon of intervening obſtacles, as a river, rock, &c. It is chiefly uſed in ſpeaking of heights and diſtances. See GEOMETRY.

INACHUS, founder of the kingdom of Argos, 1856 B. C. See ARGOS.

INALIENABLE, that which cannot be legally alienated or made over to another: thus the dominions of the king, the revenues of the church, the eſtates of a minor, &c. are inalienable, otherwiſe than with a reſerve of the right of redemption.

INANIMATE, a body that has either loſt its ſoul, or that is not of a nature capable of having any.

INANITION, among phyſicians, denotes the ſtate of the ſtomach when empty, in oppoſition to repletion.

INARCHING, in gardening, is a method of grafting, commonly called *grafting by approach;* and is uſed when the ſtock intended to graft on, and the tree from which the graft is to be taken, ſtand ſo near, or can be brought ſo near, that they may be joined together. The branch to be inarched is to be fitted to that part of the ſtock where it is to be joined; the rind and wood are to be paired away on one ſide for the length of three inches, and the ſtock or branch where the graft is to be united muſt be ſerved in the ſame manner, ſo that the two may join equally, and the ſap meet. A little tongue is then to be cut upwards in the graft, and a notch made in the ſtock to admit it; ſo that, when they are joined, the tongue will prevent their ſlipping, and the graft will more cloſely unite to the ſtock. Having thus brought them exactly together, they muſt be tied with ſome baſs, or worſted, or other ſoft tying; and then the place muſt be covered with ſome grafting clay, to prevent the air from drying the wound, and the wet from rotting the ſtock. A ſtake muſt be fixed in the ground, to which both the ſtock and the graft muſt be tied to prevent the winds from diſplacing them. When they have remained in this ſtate for four months, they will be ſufficiently united, and the graft may then be cut off from the mother-tree, obſerving to ſlope it cloſe to the ſtock; and at this time there ſhould be freſh clay laid all round the part. This operation ſhould be performed in April or May, that the graft may be perfectly united to the ſtock before the enſuing winter.

Inarching is chiefly practiſed upon oranges, myrtles, jeſſamines, walnuts, firs, and ſome other trees which do not ſucceed well in the common way of grafting. But it is a wrong practice when orange-trees are de-

deſigned to grow large, for theſe are ſeldom long-lived after the operation.

INAUGURATION, the coronation of an emperor or king, or the conſecration of a prelate: ſo called from the ceremonies uſed by the Romans, when they were received into the college of augurs.

INCA, or YNCA, a name given by the natives of Peru to their kings and the princes of the blood. Pedro de Cieca, in his Chronicle of Peru, gives the origin of the incas; and ſays, that that country was, for a long time, the theatre of all manner of crimes, of war, diſſention, and the moſt dreadful diſorders, till at laſt two brothers appeared, one of whom was called *Mangocapa;* of this perſon, the Peruvians relate many wonderful ſtories. He built the city of Cuſco, made laws, eſtabliſhed order and harmony by his wiſe regulations; and he and his deſcendants took the name of *inca*, which ſignifies king or great lord. Theſe incas became ſo powerful, that they rendered themſelves maſters of all the country from Paſto to Chili, and from the river Maule on the ſouth to the river Augaſmago on the north; theſe two rivers forming the bounds of their empire, which extended above thirteen hundred leagues in length. This they enjoyed till the diviſions between inca Guaſcar and Atabalipa; which the Spaniards laying hold of, made themſelves maſters of the country, and deſtroyed the empire of the incas. See PERU.

INCAMERATION, a term uſed in the chancery of Rome, for the uniting of lands, revenues, or other rights, to the pope's domain.

INCANTATION, denotes certain ceremonies, accompanied with a formula of words, and ſuppoſed to be capable of raiſing devils, ſpirits, &c. See CHARM, &c.

INCAPACITY, in the canon-law, is of two kinds: 1. The want of a diſpenſation for age in a minor, for legitimation in a baſtard, and the like: this renders the proviſion of a benefice void in its original. 2. Crimes and heinous offences, which annul proviſions at firſt valid.

INCARNATION, in theology, the act whereby the ſecond Perſon of the Holy Trinity aſſumed the human nature, viz. a true body and reaſonable ſoul, in order to accompliſh the redemption of fallen mankind.

INCARNATIVES, in ſurgery, medicines which aſſiſt nature in filling up wounds or ulcers with fleſh; or rather remove the obſtructions thereto.

INCENSE, or FRANKINCENSE, in the materia medica, &c. a dry reſinous ſubſtance, known among authors by the names THUS and OLIBANUM.

Incenſe is a rich perfume, with which the Pagans, and the Roman-Catholics ſtill, perfume their temples, altars, &c.——The word comes from the Latin *incenſum*, q. d. *burnt;* as taking the effect for the thing itſelf.

The burning of incenſe made part of the daily ſervice of the ancient Jewiſh church. The prieſts drew lots to know who ſhould offer it: the deſtined perſon took a large ſilver diſh, in which was a cenſer full of incenſe; and being accompanied by another prieſt carrying ſome live coals from the altar, went into the temple. There, in order to give notice to the people, they ſtruck upon an inſtrument of braſs placed between the temple and the altar; and being returned to the altar, he who brought the fire left it there, and went away. Then the offerer of incenſe having ſaid a prayer or two, waited the ſignal, which was the burning of the holocauſt; immediately upon which he ſet fire to the incenſe, the whole multitude continuing all the time in prayer. The quantity of incenſe offered each day, was half a pound in the morning, and as much at night.

One reaſon of this continual burning of incenſe might be, that the multitude of victims that were continually offered up, would have made the temple ſmell like a ſlaughter-houſe, and conſequently have inſpired the comers rather with diſguſt and averſion, than awe and reverence, had it not been overpowered by the agreeable fragrance of thoſe perfumes.

INCEST, the crime of venereal commerce between perſons who are related in a degree wherein marriage is prohibited by the law of the country.

Some are of opinion, that marriage ought to be permitted between kinsfolks, to the end that the affection ſo neceſſary in marriage might be heightened by this double tie: yet the rules of the church have formerly extended this prohibition even to the ſeventh degree; but time has now brought it down to the third or fourth degree.

Moſt nations look on inceſt with horror, Perſia and Egypt alone excepted. In the hiſtory of the ancient kings of thoſe countries we meet with inſtances of the brother's marrying the ſiſter; the reaſon was, becauſe they thought it too mean to join in alliance with their own ſubjects, and ſtill more ſo to have married into any foreign family.

INCEST *Spiritual*, a crime committed in like manner between perſons who have a ſpiritual alliance by means of baptiſm or confirmation.

Spiritual inceſt is alſo underſtood of a vicar, or other beneficiary, who enjoys both the mother and daughter; that is, holds two benefices, the one whereof depends upon the collation of the other.

Such a ſpiritual-inceſt renders both the one and the other of theſe benefices vacant.

INCH, a well-known meaſure of length; being the twelfth part of a foot, and equal to three barley-corns in length.

INCH *of Candle*, (ſale by). See CANDLE.

INCHANTMENT. See WITCHCRAFT.

INCIDENCE, denotes the direction in which one body ſtrikes on another. See OPTICS and MECHANICS.

Angle of INCIDENCE. See ANGLE.

INCIDENT DILIGENCE, in Scots law, a warrant granted by a lord ordinary in the court of ſeſſion, for citing witneſſes for proving any point, or for production of any writing neceſſary for preparing the cauſe for a final determination, or before it goes to a general proof.

INCISIVE, an appellation given to whatever cuts or divides: thus, the foreteeth are called *dentes inciſivi*, or cutters; and medicines of an attenuating nature, *incidents*, or inciſive medicines.

INCLE, a kind of tape made of linen yarn.

INCLINATION, is a word frequently uſed by mathematicians, and ſignifies the mutual approach, tendency, or leaning of two lines or two planes towards each other, ſo as to make an angle.

INCLINED PLANE, in mechanics, one that makes an oblique angle with the horizon. See MECHANICS.

INCOGNITO, or INCOG, is applied to a perſon who is in any place where he would not be known: but it is more particularly applied to princes, or great men, who enter towns, or walk the ſtreets, without their ordinary train or the uſual marks of their diſtinction and quality.

INCOMBUSTIBLE, ſomething that cannot be burnt, or conſumed by fire. See ASBESTUS.

INCOMMENSURABLE, a term in geometry, uſed where two lines, when compared to each other, have no common meaſure, how ſmall ſoever, that will exactly meaſure them both. And in general, two quantities are ſaid to be incommenſurable, when no third quantity can be found that is an aliquot part of both.

INCOMMENSURABLE *Numbers*, are ſuch as have no common diviſor that will divide them both equally.

INCOMPATIBLE, that which cannot ſubſiſt with another without deſtroying it: thus cold and heat are incompatible in the ſame ſubject, the ſtrongeſt overcoming and expelling the weakeſt.

INCORPORATION, in pharmacy, is much the ſame as impaſtation, being a reduction of dry ſubſtances to the conſiſtence of a paſte, by the admixture of ſome fluid: thus pills, boles, troches, and plaſters, are made by incorporation. Another incorporation is when things of different conſiſtencies are by digeſtion reduced to one common conſiſtence.

INCORPORATION, or *Body-Corporate*. See CORPORATION.

INCRASSATING, in pharmacy, &c. the rendering of fluids thicker by the mixture of other ſubſtances leſs fluid, or by the evaporation of the thinner parts.

INCUBATION, the action of a hen, or other fowl, brooding on her eggs. See HATCHING.

INCUBUS, NIGHT-MARE, a diſeaſe conſiſting in an oppreſſion of the breaſt, ſo very violent, that the patient cannot ſpeak or even breathe. The word is derived from the Latin *incubare*, to "lie down" on any thing and preſs it: the Greeks call it εφιαλτης, q. d. *ſaltator*, "leaper," or one that ruſheth on a perſon.

In this diſeaſe the ſenſes are not quite loſt, but drowned and aſtoniſhed, as is the underſtanding and imagination; ſo that the patient ſeems to think ſome huge weight thrown on him, ready to ſtrangle him. Children are very liable to this diſtemper; ſo are fat people, and men of much ſtudy and application of mind; by reaſon the ſtomach in all theſe finds ſome difficulty in digeſtion. See (*Index* ſubjoined to) MEDICINE.

INCUMBENT, a clerk or miniſter who is reſident on his benifice; he is called *incumbent*, becauſe he does, or at leaſt ought to bend his whole ſtudy to diſcharge the cure of his church.

INCURVATION *of the* RAYS *of* LIGHT, their bending out of a rectilinear ſtraight courſe, occaſioned by refraction. See OPTICS.

INCUS, in anatomy, a bone of the internal ear, ſomewhat reſembling one of the anterior dentes molares. See ANATOMY, n° 405. *e*.

INDEFEASIBLE, a term in law for what cannot be defeated or made void; as an indefeaſible eſtate of inheritance, &c.

INDEFEASIBLE *Right to the Throne*. See HEREDITARY *Right*.

INDEFINITE, that which has no certain bounds, or to which the human mind cannot affix any.

INDEFINITE, in grammar, is underſtood of nouns, pronouns, verbs, participles, articles, &c. which are left in an uncertain indeterminate ſenſe, and not fixed to any particular time, thing, or other circumſtance.

INDELIBLE, ſomething that cannot be cancelled or effaced.

INDEMNITY, in law, the ſaving harmleſs; or a writing to ſecure one from all damage and danger that may enſue from any act.

INDENTED, in heraldry, is when the outline of an ordinary is notched like the teeth of a ſaw.

INDEPENDENTS, a ſect of Proteſtants in Britain and Holland, ſo called from their independency on other churches, and their maintaining, that each church or congregation has ſufficient power to act and perform every thing relating to religious government within itſelf, and is no way ſubject or accountable to other churches or their deputies.

They therefore diſallow parochial and provincial ſubordination, and form all their congregations upon a ſcheme of co-ordinancy. But though they do not think it neceſſary to aſſemble ſynods, yet if any be held, they look upon their reſolutions as prudential counſels, but not as deciſions to which they are obliged to conform.

The preſent Independents differ from the Preſbyterians only in their church-government; in being generally more attached to the doctrines diſtinguiſhed by the term *orthodoxy*, ſuch as original ſin, election, reprobation, &c.; and in adminiſtring the Lord's Supper at the cloſe of the afternoon's ſervice. See PRESBYTERIANS.

The ſeveral ſects of Baptiſts are all Independents with reſpect to church-government; and, like them, adminiſter the Lord's Supper in the evening; whereas the Preſbyterians adminiſter it after the forenoon's ſervice. See ANABAPTISTS.

INDETERMINATE, in general, an appellation given to whatever is not certain, fixed, and limited; in which ſenſe it is the ſame with *indefinite*.

INDEX, in arithmetic and algebra, ſhews to what power any quantity is involved, and is otherwiſe called its *exponent*. See ALGEBRA, n° 9.

Expurgatory INDEX, a catalogue of prohibited books in the church of Rome.

The firſt catalogues of this kind were made by the inquiſitors; and theſe were afterwards approved of by the council of Trent, after ſome alteration was made in them by way of retrenchment or addition. Thus an index of heretical books being formed, it was confirmed by a bull of Clement VIII. in 1595, and printed with ſeveral introductory rules; by the fourth of which, the uſe of the ſcriptures in the vulgar tongue if forbidden to all perſons without a particular licence; and by the tenth rule it is ordained, that no book ſhall be printed at Rome, without the approbation of the Pope's vicar, or ſome perſon delegated by the Pope;

nor in any other places, unleſs allowed by the biſhop of the dioceſe, or ſome perſon deputed by him, or by the inquiſitor of heretical pravity.

The Trent index being thus publiſhed, Philip II. of Spain ordered another to be printed at Antwerp, in 1571, with conſiderable enlargements. Another index was publiſhed in Spain in 1584; a copy of which was ſnatched out of the fire when the Engliſh plundered Cadiz. Afterwards there were ſeveral expurgatory indexes printed at Rome and Naples, and particularly in Spain.

INDIA proper, or Hither India, a large peninſula in Aſia, bounded on the north by Uſbec Tartary and Thibet; on the eaſt, by another part of Thibet, the kingdom of Aſem, Ava, and Pegu; on the ſouth, by the bay of Bengal and the Indian ocean; and by the ſame ocean and Perſia, on the weſt; ſituated between 66° and 92° of eaſt longitude, and between 7° and 40° of north latitude: being about 2000 miles in length from north to ſouth, and 1500 miles in breadth from eaſt to weſt where broadeſt; though the ſouthern part of the peninſula is not 300 miles broad. All the country within theſe limits is either ſubject or tributary to the great Mogul. It is frequently called *Indoſtan*; a name ſuppoſed to be derived from the river Indus, on its weſtern frontiers: it is alſo called the *Mogulſtan*, from the imperial family now upon the throne, who trace their pedigree from Tamerlane, a Mogul Tartar. See Moguls.

India *beyond the Ganges*, is a country bounded by Thibet and Boutan on the north; by China, Tonquin, and Cochin-China, on the eaſt; by the Indian Ocean, on the ſouth; and by the hither India, the bay of Bengal, and the ſtraits of Malacca, on the weſt: it is ſituated between 92° and 104° of eaſt longitude, and between the equator and 30° degrees of north latitude: being near 2000 miles in length from north to ſouth, but of a very unequal breadth; in which limits are comprehended the kingdoms of Aſem, Ava, Pegu, Laos, Siam, Cambodia, and Malacca, governed by as many Indian princes; only the Dutch have uſurped the dominion of Malacca.

Indian *Berry*. See Cocculus.

Indian *Ink*. See Ink.

INDICATION, in phyſic, whatever ſerves to direct the phyſician how to act.

INDICATIVE, in grammar, the firſt mood or manner of conjugating a verb, by which we ſimply affirm, deny, or aſk ſomething: as, *amant*, they love; *non amant*, they do not love; *amantne?* do they love?

INDICTION, in chronology, a cycle of 15 years. See Cycle.

INDICTMENT, in law, one of the modes of proſecuting an offender. See Prosecution.

In Engliſh law, it is a written accuſation of one or more perſons of a crime or miſdemeanor, preferred to, and preſented upon oath by, a grand jury. To this end, the ſheriff of every county is bound to return to every ſeſſion of the peace, and every commiſſion of *oyer* and *terminer*, and of general gaol-delivery, twenty-four good and lawful men of the county, ſome out of every hundred, to inquire, preſent, do, and execute all thoſe things, which on the part of our lord the king ſhall then and there be commanded them. They ought to be freeholders; but to what amount is uncertain: which ſeems to be *caſus omiſſus*, and as proper to be ſupplied by the legiſlature as the qualifications of the petit jury; which were formerly equally vague and uncertain, but are now ſettled by ſeveral acts of parliament. However, they are uſually gentlemen of the beſt figure in the county. As many as appear upon this pannel, are ſworn upon the grand jury, to the amount of twelve at the leaſt, and not more than twenty-three; that twelve may be a majority. Which number, as well as the conſtitution itſelf, we find exactly deſcribed ſo early as the laws of King Ethelred: *Exeant ſeniores duodecim thani, et præfectus cum eis, et jurent ſuper ſanctuarium quod eis in manus datur, quod nolint ullum innocentem accuſare, nec aliquem noxium celare.* In the time of King Richard I. (according to Hoveden), the proceſs of electing the grand jury, ordained by that prince, was as follows: Four knights were to be taken from the county at large, who choſe two more out of every hundred; which two aſſociated to themſelves ten other principal freemen, and thoſe twelve were to anſwer concerning all particulars relating to their own diſtrict. This number was probably found too large and inconvenient; but the traces of this inſtitution ſtill remain, in that ſome of the jury muſt be ſummoned out of every hundred. This grand jury are previouſly inſtructed in the articles of their inquiry, by a charge from the judge who preſides upon the bench. They then withdraw to ſit and receive indictments, which are preferred to them in the name of the king, but at the ſuit of any private proſecutor; and they are only to hear evidence on behalf of the proſecution: for the finding of an indictment is only in the nature of an inquiry or accuſation, which is afterwards to be tried and determined; and the grand jury are only to inquire upon their oaths, whether there be ſufficient cauſe to call upon the party to anſwer it. A grand jury, however, ought to be thoroughly perſuaded of the truth of an indictment, ſo far as their evidence goes; and not to reſt ſatisfied merely with remote probabilities: a doctrine that might be applied to very oppreſſive purpoſes.

Wilk. *LL. Ang. Sax.* 117.

The grand jury are ſworn to inquire only for the body of the county, *pro corpore comitatus*; and therefore they cannot regularly inquire of a fact done out that county for which they are ſworn, unleſs particularly enabled by act of parliament. And to ſo high a nicety was this matter anciently carried, that where a man was wounded in one county, and died in another, the offender was at common law indictable in neither, becauſe no complete act of felony was done in any one of them: but by ſtatute 2 and 3 Ed. VI. c. 24. he is now indictable in the county where the party died. And, by ſtatute 2 Geo. II. c. 21. if the ſtroke or poiſoning be in England, and the death upon the ſea or out of England, or *vice verſa*, the offenders, and their acceſſories, may be indicted in the county where either the death, poiſoning, or ſtroke, ſhall happen. And ſo in ſome other caſes; as, particularly, where treaſon is committed out of the realm, it may be inquired of in any county within the realm, as the king ſhall direct, in purſuance of ſtatutes 26 Hen. VIII. c. 13. 33.; Hen. VIII. c. 23. 35.; Hen. VIII. c. 2. 5. 6.; Edw. VI. c. 11. And counterfeiters, waſhers, or miniſhers, of the current coin, together with all manner of felons and their acceſſories, may, by ſtatute 26 Hen. VIII. c. 6. (confirmed and explained by 34 and 35 Hen. VIII. c. 26. § 75. 76.) be indicted and tried for thoſe offences, if committed in any part of Wales, before the juſtices of gaol-delivery and of the peace, in the next adjoining county of England, where the king's writ runneth: that is, at preſent in the county of Hereford or Salop; and not, as it ſhould ſeem, in the county of Cheſter or Monmouth: the one being a county palatine where the king's writ did not run; and the other a part of Wales, in 26 Hen. VIII. Murders alſo, whether committed in England or in foreign parts, may, by virtue of the ſtatue 33 Hen. VIII. c. 23. be inquired of and tried by the king's ſpecial commiſſion in any ſhire or place in the kingdom. By ſtatute 10 and 11 W. III. c. 25. all robberies, and other capital crimes, committed in Newfoundland, may be inquired of and tried in any county in England. Offences againſt the black act, 9 Geo. I. c. 22. may be inquired of and tried in any county of England, at the option of the proſecutor. So felonies in deſtroying turnpikes, or works upon navigable rivers, erected by authority of parliament, may, by ſtatutes 8 Geo. II. c. 20. and 13 Geo. III. c. 84. be inquired of and tried in any adjacent county. By ſtatute 26 Geo. II. c. 19. plundering or ſtealing from any veſſel in diſtreſs or wrecked, or breaking any ſhip contrary to 12 Ann. ſt. 2. c. 18. may be proſecuted either in the county where the fact is committed, or in any county next adjoining; and if committed in Wales, then in the next adjoining Engliſh county: by which is underſtood to be meant, ſuch Engliſh county as, by the ſtatute 26 Hen. VIII. above mentioned, had before a concurrent juriſdiction of felonies committed in Wales. Felonies committed out of the realm, in burning or deſtroying the king's ſhips, magazines, or ſtores, may, by ſtatute 12 Geo. III. c. 24. be inquired of and tried in any county of England, or in the place where the offence is committed. By ſtatute 13 Geo. III. c. 63. miſdemeanors committed in India may be tried upon information or indictment in the court of king's-bench in England; and a mode is marked out for examining witneſſes by commiſſion, and tranſmitting their depoſitions to the court. But, in general, all offences muſt be inquired into, as well as tried, in the county where the fact is committed. Yet if larciny be committed in one county, and the goods carried into another, the offender may be indicted in either; for the offence is complete in both. Or he may be indicted in England for larciny in Scotland, and carrying the goods with him into England, or *vice verſa;* or for receiving in one part of the united kingdom goods that have been ſtolen in another. But for robbery, burglary, and the like, he can only be indicted where the fact was actually committed: for though the carrying away and keeping of the goods is a continuation of the original taking, and is therefore larciny in the ſecond county, yet it is not a robbery or burglary in that juriſdiction. And if a perſon be indicted in one *county* for larciny of goods originally taken in another, and be thereof convicted, or ſtands mute, he ſhall not be admitted to his clergy; provided the original taking be attended with ſuch circumſtances as would have ouſted him of his clergy by virtue of any ſtatute made previous to the year 1691.

When the grand jury have heard the evidence, if they think it a groundleſs accuſation, they uſed formerly to endorſe on the back of the bill, *Ignoramus*; or, We know nothing of it: intimating, that though the facts might poſſibly be true, that truth did not appear to them. But now they aſſert in Engliſh more abſolutely, *Not a true bill;* or (which is the better way) *Not found:* and then the party is diſcharged without farther anſwer. But a freſh bill may afterwards be preferred to a ſubſequent grand jury. If they are ſatiſfied of the truth of the accuſation, they then endorſe upon it, "A true bill;" anciently, *Billa vera.* The indictment is then ſaid to be found, and the party ſtands indicted. But to find a bill, there muſt at leaſt twelve of the jury agree: for ſo tender is the law of England of the lives of the ſubjects, that no man can be convicted at the ſuit of the king of any capital offence, unleſs by the unanimous voice of twenty-four of his equals and neighbours; that is, by twelve at leaſt of the grand jury, in the firſt place, aſſenting to the accuſation; and afterwards by the whole petit jury, of twelve more, finding him guilty upon his trial. But if twelve of the grand jury aſſent, it is a good preſentment, though ſome of the reſt diſagree. And the indictment, when ſo found, is publicly delivered into court.

Indictments muſt have a preciſe and ſufficient certainty. By ſtatute 1 Hen. V. c. 5. all indictments muſt ſet forth the Chriſtian name, ſirname, and addition of the ſtate and degree, myſtery, town, or place, and the county of the offender; and all this to identify his *perſon*. The *time* and *place* are alſo to be aſcertained, by naming the day and townſhip in which the fact was committed: though a miſtake in theſe points is in general not held to be material, provided the *time* be laid previous to the finding of the indictment, and the *place* to be within the juriſdiction of the court; unleſs where the place is laid, not merely as a *venue*, but as part of the deſcription of the fact. But ſometimes the *time* may be very material, where there is any limitation in point of time aſſigned for the proſecution of offenders; as by the ſtatute 7 Will. III. c. 3. which enacts, that no proſecution ſhall be had for any of the treaſons or miſpriſions therein mentioned, (except an aſſaſſination deſigned or attempted on the perſon of the king), unleſs the bill of indictment be found within three years after the offence committed: and, in caſe of murder, the time of the death muſt be laid within a year and a day after the mortal ſtroke was given. The offence itſelf muſt alſo be ſet forth with clearneſs and certainty; and in ſome crimes particular words of art muſt be uſed, which are ſo appropriated by the law to expreſs the preciſe idea which it entertains of the offence, that no other words, however ſynonimous they may ſeem, are capable of doing it. Thus, in treaſon, the facts muſt be laid to be done "treaſonably, and againſt his allegiance;" anciently, *proditoriè et contra ligeantiæ ſuæ debitum;*" elſe the indictment is void. In indictments for murder, it is neceſſary to ſay that the party indicted "murdered," not "killed" or "ſlew," the other; which, till the late ſtatute, was expreſſed in Latin by the word *mur-*

dravit. In all indictments for felonies, the adverb "feloniouſly," *felonicè*, muſt be uſed; and for burglaries alſo, *burglariter*, or, in Engliſh, "burglariouſly:" and all theſe to aſcertain the intent. In rapes, the word *rapuit*, or "raviſhed," is neceſſary, and muſt not be expreſſed by any periphraſis, in order to render the crime certain. So in larcinies alſo, the words *felonicè cepit et aſportavit*, "feloniouſly took or carried away," are neceſſary to every indictment; for theſe only can expreſs the very offence. Alſo, in indictments for murder, the length and depth of the wound ſhould in general be expreſſed, in order that it may appear to the court to have been of a mortal nature: but if it goes through the body, then its dimenſions are immaterial; for that is apparently ſufficient to have been the cauſe of the death. Alſo, where a limb, or the like, is abſolutely cut off, there ſuch deſcription is impoſſible. Laſtly, in indictments, the *value* of the thing which is the ſubject or inſtrument of the offence, muſt ſometimes be expreſſed. In indictments for larcinies this is neceſſary, that it may appear whether it be grand or petit larciny; and whether intitled or not to the benefit of clergy. In homicides of all ſorts it is neceſſary; as the weapon with which it is committed is forfeited to the king as a deodand. For the manner of proceſs upon an indictment, ſee PROCESS.

INDICTMENT, in Scots law, the name of the ſummons, or libel, upon which criminals are cited before the court of juſticiary to ſtand trial. See LAW, Part III. nº clxxxvi. 44.

Plea to INDICTMENT. See PLEA.

INDIES, Eaſt and Weſt. See INDIA, and AMERICA.

INDIGESTION, in medicine, a crudity, or want of due coction, either in the food, an humour of the body, or an excrement. See ANOREXIA, APEPSIA, and (*Index* ſubjoined to) MEDICINE.

INDIGETES, a name which the ancients gave to ſome of their gods.—There are various opinions about the ſignification of this word; ſome maintaining it was given to all the gods in general; others only to the ſemi-gods, or great men deified. Others ſay, it was given to ſuch gods as were originally of the country, or rather ſuch as were the gods of the country that bore this name. Others, again, hold that it was aſcribed to ſuch gods as were patrons and protectors of particular cities.

INDIGO, a dye prepared from the leaves and ſmall branches of the *Indigofera Tinctoria*. See INDIGOFERA.

INDIGOFERA, the INDIGO PLANT; a genus of the decandria order, belonging to the diadelphia claſs of plants.—There are five ſpecies; the moſt remarkable of which is the *tinctoria*, a native of the warm parts of Aſia, Africa, and America, and from which the Indigo dye is made. The root of this plant is three or four lines thick, and more than a foot long, of a faint ſmell ſomething like parſley. From this root iſſues a ſingle ſtem nearly of the ſame thickneſs, about two feet high, ſtraight, hard, almoſt woody, covered with a bark ſlightly ſplit, of a grey aſh-colour towards the bottom, green in the middle, reddiſh at the extremity, and without appearance of pith in the inſide. The leaves, ranged in pairs around the ſtalk, are of an oval form, ſmooth, ſoft to the touch, furrowed above, of a deep green on the under-ſide, and connected by a very ſhort peduncle. From about one-third of the ſtem to the extremity there are ears that are loaded with very ſmall flowers from a dozen to 15, but deſtitute of ſmell. The piſtil, which is in the midſt of each flower, changes into a pod, in which the ſeeds are incloſed.

This plant requires a ſmooth rich ſoil, well tilled, and not too dry. The ſeed of it, which, as to figure and colour, reſembles gun-powder, is ſowed in little furrows that are about the breadth of the hoe, two or three inches deep, at a foot's diſtance from each other, and in as ſtraight a line as poſſible. Continual attention is required to pluck up the weeds, which would ſoon choak the plant. Though it may be ſown in all ſeaſons, the ſpring is commonly preferred. Moiſture cauſes this plant to ſhoot above the ſurface in three or four days. It is ripe at the end of two months. When it begins to flower, it is cut with pruning-knives; and cut again at the end of every ſix weeks, if the weather is a little rainy. It laſts about two years, after which term it degenerates; it is then plucked up, and planted afreſh. As this plant ſoon exhauſts the ſoil, becauſe it does not abſorb a ſufficient quantity of air and dew to moiſten the earth, it is of advantage to the planter to have a vaſt ſpace which may remain covered with trees, till it becomes neceſſary to fell them in order to make room for the indigo.

Indigo is diſtinguiſhed into two kinds, the *true* and the *baſtard*. Though the firſt is ſold at a higher price on account of its ſuperiority, it is uſually advantageous to cultivate the other, becauſe it is heavier. The firſt will grow in many different ſoils; the ſecond ſucceeds beſt in thoſe which are moſt expoſed to the rain. Both are liable to great accidents. Sometimes the plant becomes dry, and is deſtroyed by an inſect frequently found on it; at other times, the leaves, which are the valuable part of the plant, are devoured in the ſpace of 24 hours by caterpillars. This laſt misfortune, which is but too common, has given occaſion to the ſaying, "that the planters of indigo go to bed rich, and riſe in the morning totally ruined."

This production ought to be gathered in with great precaution, for fear of making the farina that lies on the leaves, and is very valuable, fall off by ſhaking it. When gathered, it is thrown into the ſteeping-vat, which is a large tub filled with water. Here it undergoes a fermentation, which in 24 hours at furtheſt is completed. A cock is then turned, to let the water run into the ſecond tub, called the *mortar* or *pounding tub*. The ſteeping-vat is then cleaned out, that freſh plants may be thrown in; and thus the work is continued without interruption.

The water which has run into the pounding-tub is found impregnated with a very ſubtile earth, which alone conſtitutes the dregs or blue ſubſtance that is the object of this proceſs, and which muſt be ſeparated from the uſeleſs ſalt of the plant, becauſe this makes the dregs ſwim on the ſurface. To effect this, the water is forcibly agitated with wooden buckets, that are full of holes and fixed to a long handle. This part of the proceſs requires the greateſt precautions. If the agitation be diſcontinued too ſoon, the part that is uſed in dying, not being ſufficiently ſeparated from the ſalt, would be loſt. If, on the other hand, the dye were to be agitated too long after the complete ſeparation, the parts would be brought together again, and form a new combination; and the ſalt reacting on the dregs, would excite a ſecond fermentation, that would alter the dye, ſpoil its colour, and make what is called *burnt indigo*. Theſe accidents are prevented by a cloſe attention to the leaſt alterations that the dye undergoes, and by the precaution which the workmen take to draw out a little of it from time to time in a clean veſſel. When they perceive that the coloured particles collect by ſeparating from the reſt of the liquor, they leave off ſhaking the buckets, in order to allow time to the blue dregs to precipitate to the bottom of the tub, where they are left to ſettle till the water is quite clear.—Holes made in the tub, at different heights, are then opened one after another, and this uſeleſs water is let out.

The blue dregs remaining at the bottom having acquired the conſiſtence of a thick muddy liquid, cocks are then opened, which draw it off into the ſettler. After it is ſtill more cleared of much ſuperfluous water in this third and laſt tub, it is drained into ſacks; from whence, when water no longer filters through the cloth, this matter, now become of a thicker conſiſtence, is put into cheſts, where it entirely loſes its moiſture. At the end of three months the indigo is fit for ſale.

It is uſed, in waſhing, to give a blueiſh colour to linen: painters alſo employ it in their water-colours; and dyers cannot make fine blue without indigo. The ancients procured it from the Eaſt-Indies; in modern times, it has been tranſplanted into America. The cultivation of it, ſucceſſively attempted at different places, appears to be fixed at Carolina, St. Domingo, and Mexico. That which is known under the name of *Guatimala* indigo, from whence it comes, is the moſt perfect of all.

INDIVIDUAL, a particular being of any ſpecies, or that which cannot be divided into two or more beings equal or alike.

The uſual diviſion in logic is made into *genera*, or into *genus's*; thoſe *genera* into *ſpecies*; and thoſe *ſpecies* into *individuals*.

INDIVISIBLE, among metaphyſicians.—A thing is ſaid to be abſolutely *indiviſible*, that is a ſimple being, and conſiſts of no parts into which it may be divided. Thus, God is *indiviſible* in all reſpects; as is alſo the human mind; not having extenſion, or other properties of body.

INDIVISIBLES, in geometry, the elements or principles into which any body or figure may be ultimately reſolved; which elements are ſuppoſed to be infinitely ſmall: thus, a line may be ſaid to conſiſt of points, a ſurface of parallel lines, and a ſolid of parallel and ſimilar ſurfaces.

INDORSEMENT, in law, any thing written on the back of a deed; as a receipt for money reeived.

There is likewiſe an *indorſement*, by way of aſſignment, on bills of exchange and notes of hand; which is done by writing a perſon's name on the back thereof.

INDOSTAN, PROPER INDIA, or *the Empire of the Great Mogul*; a country of Aſia, bounded on the weſt by Perſia, on the ſouth by the weſtern peninſula of India, on the eaſt by the eaſtern peninſula, and on the north by ſeveral kingdoms of Independent Tartary, and comprehending a conſiderable part of the ancient India; more, indeed, than the ancient Greeks and Romans ever had any diſtinct knowledge of.

The period in which the country of Indoſtan was originally peopled is now totally unknown. The averſion which the Indians themſelves have to diſcover their hiſtory to foreigners, has involved it in deep obſcurity; and what can be collected from the hiſtorians of Greece and Rome, does little more than let us know that ſuch a people as the Indians exiſted in their days. The only light we have to direct ns on this obſcure ſubject, is derived from an hiſtorical poem founded upon fact, and tranſlated into the Perſian language in the reign of Mohammed Akbar, who died in the 1605th year of the Chriſtian æra; and even this account is exceedingly barren of intereſting particulars: ſo that, till the time of the invaſion of the Moguls, the hiſtory of Indoſtan affords nothing either inſtructing or amuſing; for which reaſon, it more properly comes under the articles MOGUL, and MOGUL's *Empire*.

In almoſt all ages, the inhabitants of this country have been remarkable for their riches, their ſloth, and their effeminacy; which have rendered them a prey to many barbarous invaders, who in their turn have degenerated and been ſubdued by others. Their ſloth and effeminacy ſeems in a great meaſure to be owing to their ſyſtem of religion; though no doubt ſome natural cauſes, ſuch as the climate, &c. alſo concur. The Indians are directed by their religion to eſteem abſolute inactivity or idleneſs the ſummit of all earthly, and indeed heavenly happineſs; ſince, according to them, their great god Brama himſelf hath been eternally doing nothing, and will continue to eternity in the ſame ſtate of inactivity. In conſequence of this principle, they carry their inactivity to a ſurprizing and almoſt incredible height; they yield to every oppreſſor, and ſuffer themſelves to be tyrannized over by foreign as well as domeſtic deſpots.—A great part of the country is now ſubject to the Engliſh Eaſt-India Company: but for a full account of the extent of their juriſdiction, as well as the diſpoſitions, manners, cuſtoms, &c. of the inhabitants, ſee the articles abovementioned; alſo BRAMA, BRACHMAN, and BRAMIN.

INDUCTION. See LOGIC, n° 98, 99; and ORATORY, n° 32.

INDUCTION, in law, is putting a clerk or clergyman in poſſeſſion of a benefice or living to which he is collated or preſented. See the article PARSON.—Induction is performed by a mandate from the biſhop to the arch-deacon, who uſually iſſues out a precept to other clergymen to perform it for him. It is done by giving the clerk corporal poſſeſſion of the church, as by holding the ring of the door, tolling a bell, or the like; and is a form required by law, with intent to give all the pariſhioners due notice, and ſufficient certainty of their new miniſter, to whom their tythes are to be paid. This therefore is the inveſtiture of the temporal part of the benefice, as inſtitution

tion is of the ſpiritual. And when a clerk is thus preſented, inſtituted, and inducted into a rectory, he is then, and not before, in full and complete poſſeſſion; and is called in law *perſona imperſonata*, or *parſon imparſonee*.

INDULGENCES, in the Romiſh church, are a remiſſion of the puniſhment due to ſins, granted by the church, and ſuppoſed to ſave the ſinner from Purgatory.

According to the doctrine of the Romiſh church, all the good works of the ſaints over and above thoſe which were neceſſary towards their own juſtification, are depoſited, together with the infinite merits of Jeſus Chriſt, in one inexhauſtable treaſury. The keys of this were committed to St Peter, and to his ſucceſſors the popes, who may open it at pleaſure, and by tranſferring a portion of this ſuperabundant merit to any particular perſon, for a ſum of money, may convey to him either the pardon of his own ſins, or a releaſe for any one in whom he is intereſted, from the pains of Purgatory. Such indulgences were firſt invented in the 11th century, by Urban II. as a recompenſe for thoſe who went in perſon upon the glorious enterprize of conquering the Holy Land. They were afterwards granted to thoſe who hired a ſoldier for that purpoſe; and in proceſs of time were beſtowed on ſuch as gave money for accompliſhing any pious work enjoined by the Pope.

The power of granting indulgences has been greatly abuſed in the church of Rome. Pope Leo X. in order to carry on the magnificent ſtructure of St Peter's at Rome, publiſhed indulgences, and a plenary remiſſion to all ſuch as ſhould contribute money towards it. Finding the project take, he granted to Albert elector of Mentz, and archbiſhop of Magdeburg, the benefit of the indulgences of Saxony and the neighbouring parts, and farmed out thoſe of other countries to the higheſt bidders; who, to make the beſt of their bargain, procured the ableſt preachers to cry up the value of the ware. The form of theſe indulgences was as follows. "May our Lord Jeſus Chriſt have mercy upon thee, and abſolve thee by the merits of his moſt holy paſſion. And I, by his authority, that of his bleſſed apoſtles Peter and Paul, and of the moſt holy Pope, granted and committed to me in theſe parts, do abſolve thee, firſt, from all eccleſiaſtical cenſures, in whatever manner they have been incurred; then from all thy ſins, tranſgreſſions, and exceſſes, how enormous ſoever they may be, even from ſuch as are reſerved for the cognizance of the holy ſee, and as far as the keys of the holy church extend: I remit to you all puniſhment which you deſerve in Purgatory on their account; and I reſtore you to the holy ſacraments of the church, to the unity of the faithful, and to that innocence and purity which you poſſeſſed at baptiſm; ſo that when you die, the gates of puniſhment ſhall be ſhut, and the gates of the paradiſe of delight ſhall be opened: and if you ſhall not die at preſent, this grace ſhall remain in full force when you are at the point of death. In the name of the Father, and of the Son, and of the Holy Ghoſt."

ertſon's rles V. ii. 89.

The terms in which the retailers of indulgences, deſcribed their benefits and the neceſſity of purchaſing them, are ſo extravagant, that they appear almoſt incredible. If any man (ſaid they) purchaſes letters of indulgence, his ſoul may reſt ſecure with reſpect to its ſalvation. The ſouls confined in purgatory, for whoſe redemption indulgences are purchaſed, as ſoon as the money tinkles in the cheſt, inſtantly eſcape from that place of torment, and aſcend into heaven. That the efficacy of indulgences was ſo great, that the moſt heinous ſins, even if one ſhould violate (which was impoſſible) the mother of God, would be remitted and expiated by them, and the perſon be freed both from puniſhment and guilt. That this was the unſpeakable gift of God, in order to reconcile men to himſelf. That the croſs erected by the preachers of indulgences was equally efficacious with the croſs of Chriſt itſelf. "Lo! the heavens are open; if you enter not now, when will you enter? For twelve pence you may redeem the ſoul of your father out of purgatory; and are you ſo ungrateful, that you will not reſcue your parent from torment? If you had but one coat, you ought to ſtrip yourſelf inſtantly, and ſell it, in order to purchaſe ſuch benefits," &c.

It was this great abuſe of indulgences that contributed not a little to the firſt reformation of religon in Germany, where Martin Luther began firſt to declaim againſt the preachers of indulgences, and afterwards againſt indulgences themſelves: but ſince that time the popes have been more ſparing in the exerciſe of this power: however, they ſtill carry on a great trade with them to the Indies, where they are purchaſed at two rials a-piece, and ſometimes more.

The pope likewiſe grants indulgences to perſons at the point of death; that is, he grants them, by a brief, power to chooſe what confeſſor they pleaſe, who is authorized thereby to abſolve them from all their ſins in general.

INDULT, in the church of Rome, the power of preſenting to benefices granted to certain perſons by the pope. Of this kind is the indult of kings and ſovereign princes in the Romiſh communion, and that of the parliament of Paris granted by ſeveral popes. By the concordat for the abolition of the pragmatic ſanction, made between Francis I. and Leo X. in 1516, the French king has the power of nominating to biſhoprics, and other conſiſtorial benefices, within his realm. At the ſame time, by a particular bull, the pope granted him the privilege of nominating to the churches of Britany and Provence. In 1648 pope Alexander VIII. and in 1668 Clement IX. granted the king an indult for the biſhoprics of Metz, Toul, and Verdun, which had been yielded to him by the treaty of Munſter; and in 1668 the ſame pope Clement IX. granted him an indult for the benefices in the counties of Rouſillon, Artois, and the Netherlands. The cardinals likewiſe have an indult granted them by agreement between pope Paul IV. and the ſacred college in 1555, which is always confirmed by the popes at the time of their election. By this treaty the cardinals have the free diſpoſal of all the benefices depending on them, and are empowered likewiſe to beſtow a benefice *in commendam*.

INDULTO, a duty, tax, or cuſtom, paid to the king of Spain for all ſuch commodities as are imported from the Weſt Indies in the galleons.

INDUS, a large river of Aſia, which riſes in the mountains which ſeparate Tartary from India, and diſcharges itſelf into the Indian ocean.

INERTIA *of* MATTER, in philoſophy, is defined by Sir Iſaac Newton to be a paſſive principle by which bodies perſiſt in their motion or reſt, receive motion in proportion to the force impreſſing it, and reſiſt as much as they are reſiſted. It is alſo defined by the ſame author to be a power implanted in all matter, whereby it reſiſts any change endeavoured to be made in its ſtate. See MECHANICS.

IN ESSE is applied to things which are actually exiſting.

Authors make a difference between a thing *in eſſe*, and a thing *in poſſe*: a thing that is not, but may be, they ſay is *in poſſe*, or *potentia*; but a thing apparent and viſible, they ſay is *in eſſe*, that is, has a real being *eo inſtanti*, whereas the other is caſual, and at beſt but a poſſibility.

INFALLIBLE, ſomething that cannot err, or be deceived.

One of the great controverſies between the Proteſtants and Papiſts, is the infallibility which the latter attribute to the pope; though, in fact, they themſelves are not agreed on that head, ſome placing this pretended infallibility in the pope and a general council.

INFAMY, in law, is a term which extends to forgery, perjury, groſs cheats, &c. by which a perſon is rendered incapable of being a witneſs or juror, even though he is pardoned for his crimes.

INFANCY, the firſt part of life.—Fred. Hoffman ſays, that the human ſpecies are *infants* until they begin to talk, and *children* to the age of puberty.—Anatomy diſcovers to us, that during infancy there is much imperfection in the human frame; *e. g.* its parts are diſproportioned, and its organs incapable of thoſe functions which in future life they are deſigned to perform. The head is larger in proportion to the bulk of the body than that of an adult. The liver and pancreas are much larger in proportion than in advanced life; their ſecretions are more in quantity alſo. The bile is very inert; the heart is ſtronger and larger than in future life; the quantity of blood ſent through the heart of an infant, in a given time, is alſo more in proportion than in adults. Though theſe circumſtances have their important uſefulneſs, yet the imperfection attending them ſubjects this age to many injuries and dangers from which a more perfect ſtate is exempted. Dr Percival obſerves, in his *Eſſays Med. and Exp.* that of all the children who are born alive, two thirds do not live to be two years old.

Infants have a larger proportion of brain than adults, hence are more ſubject to nervous diſorders; and hence the diagnoſtics of diſeaſes are in many reſpects obſcure or uncertain, as particularly thoſe taken from the pulſe, which, from the irritability of the tender bodies of infants, is ſuddenly affected by a variety of accidents too numerous, and ſeemingly too trivial to gain our attention. However, no very great embarraſſment ariſes to the practitioner from hence; for the diſorders in this ſtate are generally acute, leſs complicated than thoſe in adults, and are more eaſily diſcovered than is generally apprehended.—See (the *Index* ſubjoined to) MEDICINE.

INFANT, denotes a young child. See INFANCY.

INFANT, in law, is a perſon under 21 years of age; whoſe capacities, incapacities, and privileges, are various.

1. In *criminal* matters. The law of England does in ſome caſes privilege an infant under the age of 21, as to common miſdemeanours; ſo as to eſcape fine, impriſonment, and the like: and particularly in the caſes of omiſſion, as not repairing a bridge, or a high way, and other ſimilar offences; for not having the command of his fortune till the age of 21, he wants the capacity to do thoſe things which the law requires. But where there is any notorious breach of the peace, a riot, battery, or the like, (which infants when full-grown are at leaſt as liable as others to commit); for thoſe, an infant above the age of 14 is equally liable to ſuffer, as a perſon of the full age of 21.

Blackſt. Comment.

With regard to capital crimes, the law is ſtill more minute and circumſpect; diſtinguiſhing with greater nicety the ſeveral degrees of age and diſcretion. By the ancient Saxon law, the age of twelve years was eſtabliſhed for the age of poſſible diſcretion, when firſt the underſtanding might open: and from thence till the offender was 14, it was *ætas pubertati proxima*, in which he might, or might not, be guilty of a crime, according to his natural capacity or incapacity. This was the dubious ſtage of diſcretion: but, under twelve, it was held, that he could not be guilty in will, neither after fourteen could be ſuppoſed innocent, of any capital crime which he in fact committed. But by the law, as it now ſtands, and has ſtood at leaſt ever ſince the time of Edward III. the capacity of doing ill, or contracting guilt, is not ſo much meaſured by years and days, as by the ſtrength of the delinquent's underſtanding and judgment. For one lad of 11 years old may have as much cunning as another of 14; and in theſe caſes our maxim is, that *malitia ſupplet ætatem*. Under ſeven years of age, indeed, an infant cannot be guilty of felony; for then a felonious diſcretion is almoſt an impoſſibility in nature: but at eight years old, he may be guilty of felony. Alſo, under 14, though an infant ſhall be *prima facie* adjudged to be *doli incapax*; yet if it appear to the court and jury, that he was *doli capax*, and could diſcern between good and evil, he may be convicted and ſuffer death. Thus a girl of 13 has been burnt for killing her miſtreſs: and one boy of ten, and another of nine years old, who had killed their companions, have been ſentenced to death, and he of ten years actually hanged; becauſe it appeared upon their trials, that the one hid himſelf, and the other hid the body he had killed; which hiding manifeſted a conſciouſneſs of guilt, and a diſcretion to diſcern between good and evil. And there was an inſtance in the laſt century, where a boy of eight years old was tried at Abingdon for firing two barns; and, it appearing that he had malice, revenge, and cunning, he was found guilty, condemned, and hanged accordingly. Thus alſo, in very modern times, a boy of ten years old was convicted on his own confeſſion of murdering his bedfellow; there appearing in his whole behaviour plain tokens of a miſchievous diſcretion; and, as the ſparing this boy merely on account of his tender years might be of dangerous conſequence to the public, by propagating a notion that children might commit ſuch atrocious crimes with impunity, it was unanimouſly agreed by all the judges, that he was a proper ſubject of capital puniſhment. But, in all ſuch caſes, the evidence of that malice, which is to ſupply age, ought to be ſtrong and clear beyond all doubt and contradiction.

2. In *civil* matters. The ages of male and female are different for different purpoſes. A male at 12 years old may take the oath of allegiance; at 14 is at the years of diſcretion, and therefore may conſent or diſagree to marriage, may chooſe his guardian, and, if his diſcretion be actually proved, may make his teſtament of his perſonal eſtate; at 17 may be an executor; and at 21 is at his own diſpoſal, and may aliene his lands, goods, and chattels. A female alſo at ſeven years of age may be betrothed or given in marriage; at nine is entitled to dower; at 12 is at years of maturity, and therefore may conſent or diſagree to marriage, and, if proved to have ſufficient diſcretion, may bequeath her perſonal eſtate; at 14 is at years of legal diſcretion, and may chooſe a guardian; at 17 may be executrix; and at 21 may diſpoſe of herſelf and her lands. So that full age in male or female is 21 years, which age is completed on the day preceding the anniverſary of a perſon's birth; who till that time is an infant, and ſo ſtyled in law. Among the ancient Greeks and Romans, women were never of age, but ſubject to perpetual guardianſhip, unleſs when married, *niſi conveniſſent in manum viri:* and, when that perpetual tutelage wore away in proceſs of time, we find that, in females as well as males, full age was not till 25 years. Thus by the conſtitution of different kingdoms, this period, which is merely arbitrary, and *juris poſitivi*, is fixed at different times. Scotland agrees with England in this point; (both probably copying from the old Saxon conſtitutions on the continent, which extended the age of minority *ad annum vigeſimum primum, et eo uſque juvenes ſub tutelam reponunt*): but in Naples perſons are of full age at 18; in France, with regard to marriage, not till 30; and in Holland at 25.

The very diſabilities of infants are privileges; in order to ſecure them from hurting themſelves by their own improvident acts. An infant cannot be ſued but under the protection, and joining the name, of his guardian; for he is to defend him againſt all attacks as well by law as otherwiſe: but he may ſue either by his guardian, or *prochein amy*, his next friend who is not his guardian. This *prochein amy* may be any perſon who will undertake the infant's cauſe; and it frequently happens, that an infant, by his *prochein amy*, inſtitutes a ſuit in equity againſt a fraudulent guardian.

With regard to eſtates and civil property, an infant hath many privileges. In general, an infant ſhall loſe nothing by nonclaim, or neglect of demanding his right; nor ſhall any other *laches* or negligence be imputed to an infant, except in ſome very particular caſes.

It is generally true, that an infant can neither aliene his lands, nor do any legal act, nor make a deed, nor indeed any manner of contract, that will bind him. But ſtill to all theſe rules there are ſome exceptions: part of which were juſt now mentioned in reckoning up the different capacities which they aſſume at different ages: and there are others, a few of which it may not be improper to recite, as a general ſpecimen of the whole. And, firſt, it is true, that infants cannot aliene their eſtates: but infant-truſtees, or mortgagees, are enabled to convey, under the direction of the court of chancery or exchequer, or other courts of equity, the eſtates they hold in truſt or mortgage, to ſuch perſon as the court ſhall appoint. Alſo it is generally true, that an infant can do no legal act: yet an infant, who has an advowſon, may preſent to the benefice when it becomes void. For the law in this caſe diſpenſes with one rule, in order to maintain others of far greater conſequence: it permits an infant to preſent a clerk (who, if unfit, may be rejected by the biſhop), rather than either ſuffer the church to be unſerved till he comes of age, or permit the infant to be debarred of his right by lapſe to the biſhop. An infant may alſo purchaſe lands, but his purchaſe is incomplete: for, when he comes to age, he may either agree or diſagree to it, as he thinks prudent or proper, without alleging any reaſon; and ſo may his heirs after him, if he dies without having completed his agreement. It is, farther, generally true, that an infant, under 21, can make no deed but what is afterwards voidable: yet in ſome caſes he may bind himſelf apprentice by deed indented or indentures, for ſeven years; and he may by deed or will appoint a guardian to his children, if he has any. Laſtly, it is generally true, that an infant can make no other contract that will bind him: yet he may bind himſelf to pay for his neceſſary meat, drink, apparel, phyſic, and ſuch other neceſſaries; and likewiſe for his good teaching and inſtruction, whereby he may profit himſelf afterwards.

INFANTE, and INFANTA, all the ſons and daughters of the kings of Spain and Portugal, except the eldeſt; the princes being called *infantes*, and the princeſſes *infantas*.

INFANTRY, in military affairs, the whole body of foot-ſoldiers, whether independent companies or regiments.—The word takes its origin from one of the infantas of Spain, who, finding that the army commanded by the king her father had been defeated by the Moors, aſſembled a body of foot-ſoldiers, and with them engaged and totally routed the enemy. In memory of this event, and to diſtinguiſh the foot-ſoldiers, who were not before held in much conſideration, they received the name of *infantry*.

Heavy-armed INFANTRY, among the ancients, were ſuch as wore a complete ſuit of armour, and engaged with broad ſhields and long ſpears. They were the flower and ſtrength of the Grecian armies, and had the higheſt rank of military honour.

Light-Armed INFANTRY, among the ancients, were deſigned for ſkirmiſkes, and for fighting at a diſtance. Their weapons were arrows, darts, or ſlings.

Light INFANTRY, among the moderns, have only been in uſe ſince the year 1656. They have no camp-equipage to carry, and their arms and accoutrements are much lighter than thoſe of the infantry. Light infantry are the eyes of a general, and the givers of ſleep and ſafety to an army. Wherever there is found light cavalry, there ſhould be light infantry. They ſhould be accuſtomed to the pace of four miles an hour, as their uſual marching pace, and to be able to march at five miles an hour upon all particular occaſions. Moſt of the powers on the continent have light infantry.

INFATUATE, to prepoſſeſs any one in favour of ſome perſon or thing that does not deſerve it, ſo far as that he cannot eaſily be diſabuſed.—The word *infatuate* comes from the Latin *fatuus*, "fool;" of *fari*, "to ſpeak out," which is borrowed from the Greek φαω, whence φατης, which ſignifies the ſame with *vates* in Latin, or *prophet* in Engliſh; and the reaſon is, becauſe their prophets or prieſts uſed to be ſeized with a kind of madneſs or folly, when they began to make their predictions, or deliver oracles.

The Romans called thoſe perſons *infatuati*, who fancied they had ſeen viſions, or imagined the god Faunus, whom they called *Fatuus*, had appeared to them.

INFECTION, among phyſicians. See CONTAGION.

INFEFTMENT, in Scots law, the ſolemnity of the delivery of an heritable ſubject to the purchaſer.

INFIBULATION, in ſurgery, an operation which is the reverſe of circumciſion; for it confines the prepuce ſo over the glans penis, that it cannot be drawn back. The operation is thus performed. Extend the ſkin which is above the glans, and with ink mark the part on each ſide through which the perforation is to be made; then let it retract itſelf. If the marks recur upon the glans, too much of the ſkin hath been taken up, and the marks muſt be made nearer to the end of the prepuce, but only ſo as that they may not return upon the glans, and thus the ſeat of the fibula is determined. Then a needle, armed with a waxed thread, is paſſed through, and moved backward and forward every day, until a cicatrix is formed. After this the fibula is fixed.

Thus the ancient Romans were uſed to preſerve their ſinging boys from all premature and prepoſterous ideal venery, and ſo preſerve their voices longer. The fibula ſeems to have been a kind of ring.

INFINITE, that which has neither beginning nor end: in which ſenſe God alone is infinite.

Infinite is alſo uſed to ſignify that which has had a beginning, but will have no end, as angels and human ſouls. This makes what the ſchoolmen call *infinitum a parte poſt*; as, on the contrary, by *infinitum a parte ante*, they mean that which has an end but had no beginning.

INFINITE *Quantities*. The very idea of magnitudes infinitely great, or ſuch as exceed any aſſignable quantities, does include a negation of limits; yet if we nearly examine this notion, we ſhall find that ſuch magnitudes are not equal among themſelves, but that there are really, beſides infinite length and infinite area, three ſeveral ſorts of infinite ſolidity; all of which are *quantitates ſui generis*, and that thoſe of each ſpecies are in given proportions.

Infinite length, or a line infinitely long, is to be conſidered either as beginning at a point, and ſo infinitely extended one way, or elſe both ways from the ſame point; in which caſe the one, which is a beginning infinity, is the one half of the whole, which is the ſum of the beginning and ceaſing infinity; or, as may be ſaid, of infinity *a parte ante* and *a parte poſt*, which is analogous to eternity in time and duration, in which there is always as much to follow as is paſt, from any point or moment of time; nor doth the addition or ſubduction of finite length, or ſpace of time, alter the caſe either in infinity or eternity, ſince both the one or the other cannot be any part of the whole.

INFINITESIMALS, among mathematicians, are defined to be infinitely ſmall quantities.

In the method of infiniteſimals, the element, by which any quantity increaſes or decreaſes, is ſuppoſed to be infinitely ſmall; and is generally expreſſed by two or more terms, ſome of which are infinitely leſs than the reſt, which being neglected as of no importance, the remaining terms form what is called the *difference of the propoſed quantity*. The terms that are neglected in this manner, as infinitely leſs than the other terms of the element, are the very ſame which ariſe in conſequence of the acceleration, or retardation, of the generating motion, during the infinitely ſmall time in which the element is generated; ſo that the remaining terms expreſs the elements that would have been produced in that time, if the generating motion had continued uniform: therefore thoſe differences are accurately in the ſame ratio to each other as the generating motions or fluxions. And hence, though in this method infiniteſimal parts of the elements are neglected, the concluſions are accurately true without even an infinitely ſmall error, and agree preciſely with thoſe that are deduced by the method by fluxions *.

INFINITY. See METAPHYSICS, n° 66—69.

INFIRMARY, a kind of hoſpital, where the weak and ſickly are properly taken care of.

INFLAMMABILITY, that property of bodies which diſpoſes them to kindle or catch fire. See FIRE, FLAME, PHLOGISTON, &c.

INFLAMMATION, in medicine and ſurgery, a redneſs and ſwelling of any part of the body, attended with heat, pain, and ſymptoms of fever. See (the *Index* ſubjoined to) MEDICINE.

INFLAMMATION *of Oils by concentrated Acids*. See CHEMISTRY, n° 219.

INFLECTED RAYS. See *Inflected* RAYS.

INFLECTION, or *Point of* INFLECTION, in the higher geometry, is a point where a curve begins to bend a contrary way.

INFLECTION, in grammar, the variation of nouns and verbs, by declenſion and conjugation.

INFLUENCE, a quality ſuppoſed to flow from the heavenly bodies, either with their light or heat; to which aſtrologers idly aſcribe all ſublunary events.

INFORMATION, in law, is nearly the ſame in the crown-office, as what in other courts is called a *declaration*. See PROSECUTION.

Informations are of two ſorts; firſt, thoſe which are partly at the ſuit of the king, and partly at that of a ſubject; and ſecondly, ſuch as are only in the name of the king. The former are uſually brought upon penal ſtatutes, which inflict a penalty upon conviction of the offender, one part to the uſe of the king, and another to the uſe of the informer. By the ſtatute 31 Eliz. c. 5. no proſecution upon any penal ſtatute, the ſuit and benefit whereof are limited in part to the king and in part to the proſecutor, can be brought by any common informer after one year is expired ſince the commiſſion of the offence; nor on behalf of the crown, after the lapſe of two years longer; nor, where the forfeiture is originally given only to the king, can ſuch proſecution be had after the expiration of two years from the commiſſion of the offence.

The informations that are exhibited in the name of the king alone, are alſo of two kinds: firſt, thoſe which are truly and properly his own ſuits, and filed *ex officio* by his own immediate officer, the attorney-ge-

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* See Fluxions.

general: ſecondly, thoſe in which, though the king is the nominal proſecutor, yet it is at the relation of ſome private perſon or common informer; and they are filed by the king's coroner and attorney in the court of king's bench, uſually called the *maſter of the crown-office*, who is for this purpoſe the ſtanding officer of the public. The objects of the king's own proſecutions, filed *ex officio*, by his own attorney-general, are properly ſuch enormous miſdemeanors, as peculiarly tend to diſturb or endanger his government, or to moleſt or affront him in the regular diſcharge of his royal functions. For offences ſo high and dangerous, in the puniſhing or preventing of which a moment's delay would be fatal, the law has given to the crown the power of an immediate proſecution, without waiting for any previous application to any other tribunal: which power, thus neceſſary, not only to the eaſe and ſafety, but even to the very exiſtence, of the executive magiſtrate, was originally reſerved in the great plan of the Engliſh conſtitution; wherein proviſion is wiſely made for the due preſervation of all its parts. The objects of the other ſpecies of informations, filed by the maſter of the crown-office upon the complaint or relation of a private ſubject, are any groſs and notorious miſdemeanors, riots, batteries, libels, and other immoralities of an atrocious kind, not peculiarly tending to diſturb the government (for thoſe are left to the care of the attorney-general), but which, on account of their magnitude or pernicious example, deſerve the moſt public animadverſion. And when an information is filed, either thus, or by the attorney-general *ex officio*, it muſt be tried by a petit jury of the county where the offence ariſes: after which, if the defendant be found guilty, he muſt reſort to the court for his puniſhment. See a hiſtory and vindication of this made of proſecution in the work quoted on the margin, vol. iv. p. 309,—312.

Blackſt. Comment.

INFRACTION, a term chiefly uſed to ſignify the violation of a treaty.

INFRA-SCAPULARIS, in anatomy. See ANATOMY, *Table of the Muſcles*.

INFRA-*Spinatus*, in anatomy. See ANATOMY, *ibid.*

INFULA, in antiquity, a broad kind of fillet, made of white wool, which the prieſts uſed to tie round their heads.

INFUNDIBULIFORM, in botany, an appellation given to ſuch monopetalous or one-leaved flowers as reſemble a funnel in ſhape, or which have a narrow tube at one end, and gradually widen towards the limb or mouth.

INFUSION, in chemiſtry, taken in its moſt general ſenſe, conſiſts in placing compound bodies in a liquor intended to be impregnated with ſome of their principles, either without heat, or with a heat leſs than that of the boiling liquor.

From this definition we may ſee that *infuſion* is one of the principal operations of the analyſis by menſtruums, in the ſame manner in which decoction is, of which *infuſion* may be conſidered as the firſt degree.

Infuſion may may be made in watery, ſpirituous, oily, acid, or alkaline liquors, according to the nature of the matters to be infuſed, and of the principles intended to be extracted. It is nevertheleſs practiſed upon vegetable matters only; and almoſt always for the preparation of remedies, which are alſo called *infuſions*.

Aromatic plants, and other odoriferous vegetable matters, are generally infuſed, when their odoriferous principle is to be preſerved, in which their virtue conſiſts, and which is at the ſame time ſo volatile as to be diſſipated and loſt by the heat of ebullition. To preſerve ſtill better theſe volatile principles, the ſmalleſt heat requiſite for the extraction ought to be employed; and theſe *infuſions* ought to be made in matraſſes, or other veſſels, which may be exactly cloſed.

The principles extracted by *infuſion* are different according to the menſtruum employed. Pure water may be impregnated with the odoriferous principle, or *ſpiritus rector*, with ſaline, ſaponaceous, mucilaginous, extractive principles. Spirit of wine diſſolves the *ſpiritus rector*, the eſſential oils, thoſe reſinous matters the baſe of which is an oil of the nature of eſſential oils, and the greateſt part of the ſaponaceous extractive matter. Thoſe *infuſions* made by ſpirit of wine are particularly called *tinctures*, eſpecially in pharmacy. Oils diſſolve the *ſpiritus rector*, and any oily matter. Acids and alkalis diſſolve the earthy ſubſtances of vegetables, and almoſt all their other principles: but they diſguiſe them, alter them, and change conſiderably their virtues by the combination. They are therefore not much uſed for theſe kinds of extractions.

INGELSHEIM, a town of Germany, in the palatinate of the Rhine, remarkable for having been the reſidence of the emperors; ſeated on the river Salva, on an eminence, from whence there is a charming proſpect. E. Long. 8. 5. N. Lat. 49. 58.

INGENUOUS, in a general ſenſe, ſignifies *open*, *fair*, and *candid*.

INGENUOUS, (*ingenuus*,) in Roman antiquity, an appellation given to perſons born of free parents, who had never been ſlaves: for the children of the *liberti*, or perſons who had obtained their liberty, were called *libertini*, not *ingenui*; this appellation of *ingenuus* being reſerved for their children, or the third generation.

INGLUVIES, the crop or craw of granivorous birds, ſerving for the immediate reception of the food, where it is macerated for ſome time, before it is tranſmitted to the true ſtomach.

INGOLSTADT, a handſome town of Germany, and the ſtrongeſt in Bavaria, with a famous univerſity, and a handſome church. The houſes are built with ſtone, and the ſtreets large. It is ſeated on the Danube, in E. Long. 11. 10. N. Lat. 48. 42.

INGOT, a maſs of gold, or ſilver, melted down, and caſt in a mould, but not coined or wrought.

INGRAFTING, in gardening. See GRAFTING.

INGRESS, in aſtronomy, ſignifies the ſun's entering the firſt ſcruple of one of the four cardinal ſigns, eſpecially Aries.

INGRIA, a province of the Ruſſian empire, lying on the gulph of Finland, being about 130 miles in length, and 50 in breadth. It abounds in game and fiſh; and here are a great number of elks, which come in troops from Finland in the ſpring and autumn. It was conquered by the czar Peter the Great, and Peterſburgh is the capital town. It is bounded by the river Nieva, and the gulph of Finland, on the north; by Great Novogorod, on the eaſt and ſouth; and by Livonia, on the weſt.

INGROSSER, one who buys up great quantities of any commodity, before it comes to market, in order to raiſe the price.

INGUEN, in anatomy, the ſame with what is otherwiſe called *groin*, or *pubes*.

INGULPHUS, abbot of Croyland, and author of the hiſtory of that abbey, was born in London about A. D. 1030. He received the firſt part of his education at Weſtminſter; and when he viſited his father, who belonged to the court of Edward the Confeſſor, he was ſo fortunate as to engage the attention of queen Edgitha. That amiable and learned princeſs took a pleaſure in examining our young ſcholar on his progreſs in grammar, and in diſputing with him in logic; nor did ſhe ever diſmiſs him without ſome preſent as a mark of her approbation. From Weſtminſter he went to Oxford, where he applied to the ſtudy of rhetoric, and of the Ariſtotelian philoſophy, in which he made greater proficiency than many of his contemporaries. When he was about 21 years of age, he was introduced to William duke of Normandy, (who viſited the court of England, A. D. 1051,) and made himſelf ſo agreeable to that prince, that he appointed him his ſecretary, and carried him with him into his own dominions. In a little time he became the prime favourite of his prince, and the diſpenſer of all preferments, humbling ſome, and exalting others, at his pleaſure; in which difficult ſtation, he confeſſeth, he did not behave with a proper degree of modeſty and prudence. This excited the envy and hatred of many of the courtiers; to avoid the effects of which, he obtained leave from the duke to go in pilgrimage to the Holy Land, which was then become faſhionable. With a company of 30 horſemen, he joined Sigfrid duke of Mentz, who, with many German nobles, biſhops, clergy, and others, was preparing for a pilgrimage to Jeruſalem. When they were all united, they formed a company of no fewer than 7000 pilgrims. In their way they ſpent ſome time at Conſtantinople, performing their devotions in the ſeveral churches. In their paſſage through Lycia, they were attacked by a tribe of Arabs, who killed and wounded many of them, and plundered them of a prodigious maſs of money. Thoſe who eſcaped from this diſaſter, at length reached Jeruſalem, viſited all the holy places, and bedewed the ruins of many churches with their tears, giving money for their reparation. They intended to have bathed in Jordan; but being prevented by the roving Arabs, they embarked on board a Genoeſe fleet at Joppa, and landed at Brunduſium, from whence they travelled through Apulia to Rome. Having gone through a long courſe of devotions in this city, at the ſeveral places diſtinguiſhed for their ſanctity, they ſeparated, and every one made the beſt of his way into his own country. When Ingulph and his company reached Normandy, they were reduced to 20 half-ſtarved wretches, without money, cloaths, or horſes: A faithful picture of the fooliſh diſaſtrous journeys into the Holy Land, ſo common in thoſe times. Ingulph was now ſo much diſguſted with the world, that he reſolved to forſake it, and became a monk in the abbey of Fontenelle in Normandy; in which, after ſome years, he was advanced to the office of prior. When his old maſter was preparing for his expedition into England, A. D. 1066, he was ſent by his abbot, with 100 merks in money, and 12 young men, nobly mounted and completely armed, as a preſent from their abbey. Ingulph having found a favourable opportunity, preſented his men and money to his prince, who received him very graciouſly; ſome part of the former affection for him reviving in his boſom. In conſequence of this he raiſed him to the government of the rich abbey of Croyland in Lincolnſhire, A. D. 1076, in which he ſpent the laſt 34 years of his life, governing that ſociety with great prudence, and protecting their poſſeſſions from the rapacity of the neighbouring barons by the favour of his royal maſter. The lovers of Engliſh hiſtory and antiquities are much indebted to this learned abbot, for his excellent hiſtory of the abbey of Croyland, from its foundation, A. D. 664, to A. D. 1091, into which he hath introduced much of the general hiſtory of the kingdom, with a variety of curious anecdotes that are nowhere elſe to be found. Ingulph died of the gout, at his abbey, A. D. 1109, in the 79th year of his age.

INHALER, in medicine, a machine for breathing-in warm ſteams into the lungs, recommended by Mr Mudge in the cure of the catarrhous cough. The body of the inſtrument holds about a pint; and the handle, which is fixed to the ſide of it, is hollow. In the lower part of the veſſel, where it is ſoldered to the handle, is a hole, by means of which, and three others on the upper-part of the handle, the water, when it is poured into the *inhaler*, will riſe to the ſame level in both. To the middle of the cover a flexible tube about five or ſix inches long is fixed, with a mouth-piece of wood or ivory. Underneath the cover there is a valve fixed, which opens and ſhuts the communication between the upper and internal part of the *inhaler* and the external air. When the mouth is applied to the end of the tube in the act of inſpiration, the air ruſhes into the handle, and up through the body of warm water, and the lungs become, conſequently, filled with hot vapours. In exſpiration, the mouth being ſtill fixed to the tube, the breath, together with the ſteam on the ſurface of the water in the *inhaler*, is forced up through the valve in the cover. In this manner, therefore, the whole act of reſpiration is performed through the *inhaler*, without the neceſſity, in the act of exſpiration, of either breathing through the noſe, or removing the pipe from the mouth. See (the *Index* ſubjoined to) MEDICINE.

INHERITANCE, a perpetual right or intereſt in lands, inveſted in a perſon and his heirs. See DESCENT.

INHIBITION, in Scots law, a diligence obtained at the ſuit of a creditor againſt his debtor, prohibiting him from ſelling or contracting debts upon his eſtate to the creditor's prejudice.

INHUMATION, in chemiſtry, a method of digeſting ſubſtances, by burying the veſſel in which they are contained in horſe-dung or earth.

INJECTION, the forcibly throwing certain liquid medicines into the body by means of a ſyringe, tube, clyſter-pipe, or the like.

Anatomical INJECTION, the filling the veſſels of a human, or other animal body, with ſome coloured ſubſtance, in order to make their figures and ramifications viſible. The beſt account of the method of injecting the veſſels of animals, is that by the late Dr Monro, publiſhed in the Medial Eſſays, vol. i. p. 79.

"The inſtrument with which the liquor is commonly thrown into the veſſels is a tight eaſy going ſyringe of braſs, to which ſeveral ſhort pipes are fitted, and can be fixed by ſcrews, the other extremities of theſe pipes being of different diameters without any ſcrew, that they may ſlide into other pipes, which are ſo exactly adapted to them at one end, that when they are preſſed a little together, nothing can paſs between them: and becauſe their coheſion is not ſo great as to reſiſt the puſhing force of the injection, which would drive off this ſecond pipe, and ſpoil the whole operation; therefore the extremity of this ſecond ſort of pipes, which receives the firſt kind, is formed on the outſide into a ſquare, bounded behind and before by a riſing circle, which hinders the key that cloſely graſps the ſquare part from ſliding backwards or forwards; or a bar of braſs muſt ſtand out from each ſide of it to be held with the fingers. The other extremity of each of theſe ſecond ſort of pipes is of different diameter; and near it a circular notch, capable of allowing a thread to be ſunk into it, is formed; by this, the thread tying the veſſel at which the injection is to be made, will not be allowed to ſlide off.

"Beſides this form deſcribed, common to all this ſecond ſort of pipes, we ought to have ſome of the larger ones, with an additional mechaniſm, for particular purpoſes; as, for inſtance, when the larger veſſels are injected, the pipe faſtened into the veſſel ought either to have a valve or a ſtop-cock, that may be turned at pleaſure, to hinder any thing to get out from the veſſel by the pipe; otherwiſe, as the injection, in ſuch a caſe, takes time to coagulate, the people employed in making the injection muſt either continue all that while in the ſame poſture; or, if the ſyringe is too ſoon taken off, the injected liquor runs out, and the larger veſſels are emptied. When the ſyringe is not large enough to hold at once all the liquor neceſſary to fill the veſſels, there is a neceſſity of filling it again. If, in order to do this, the ſyringe was to be taken off from the pipe fixed in the veſſel, ſome of the injection would be loſt, and what was expoſed to the air would cool and harden; therefore ſome of the pipes ought to have a reflected curve tube coming out of their ſide, with a valve ſo diſpoſed, that no liquor can come from the ſtraight pipe into the crooked one, but, on the contrary, may be allowed to paſs from the crooked to the ſtraight one: the injector then, taking care to keep the extremity of the reflected pipe immerſed in the liquor to be injected, may, as ſoon as he has puſhed out the firſt ſyringeful, fill it again by only drawing back the ſucker; and, repeating this quickly, will be able to throw ſeveral ſyringefuls into the veſſels.

"All theſe different ſorts of pipes are commonly made of braſs.

"The liquors thrown into the veſſels with a deſign to fill the ſmall capillary tubes, are either ſuch as will incorporate with water, or ſuch as are oily; both kinds have their advantages and inconveniencies, which I ſhall mention in treating of each, and ſhall conclude with that which I have found by experience to ſucceed beſt.

"All the different kinds of glue, or ichthyocolla, ſyths, common glue, &c. diſſolved and pretty much diluted, mix eaſily with the animal-fluids, which is of great advantage, and will paſs into very ſmall veſſels of a well-choſen and prepared ſubject, and often anſwer the intention ſufficiently, where the deſign is only to prepare ſome very fine membrane, on which no veſſels can be expected to be ſeen ſo large as the eye can diſcover whether the tranſverſe ſections of the veſſels would be circular, or if their ſides are collapſed. But when the larger veſſels are alſo to be prepared, there is a manifeſt diſadvantage to the uſefulneſs and beauty of the preparation; for if nothing but the glutinous liquor is injected, one cannot keep a ſubject ſo long as the glue takes of becoming firm; and therefore, in diſſecting the injected part, ſeveral veſſels will probably be cut and emptied. To prevent this, one may indeed either ſoak the part well in alcohol, which coagulates the glue; but then it becomes ſo brittle, that the leaſt handling makes it crack; and if the preparation is to be kept, the larger veſſels appear quite ſhrivelled, when the watery part of the injection is evaporated: or the efflux of the injection may be prevented, by carefully tying every veſſel before we are obliged to cut it; ſtill, however, that does not hinder the veſſels to contract when the glue is drying. If, to obviate theſe difficulties, the glutinous liquor ſhould firſt be injected in ſuch quantity as the capillary veſſels will contain, and the common oily or waxy injection is puſhed in afterwards to keep the larger veſſels diſtended, the wax is very apt to harden before it has run far enough; the two ſorts of liquors never miſs to mix irregularly, and the whole appears interrupted and broken by their ſoon ſeparating from each other; which is ſtill more remarkable afterwards, when the watery particles are evaporated.

"Spirits of wine coloured mixes with water and oils, and ſo far is proper to fill the very ſmaller veſſels with: but, on the other hand, it coagulates any of our liquors it meets, which ſometimes block up the veſſels ſo much, that no more injection will paſs; then it ſcarce will ſuſpend ſome of the powders that prove the moſt durable colours; and as it entirely evaporates, the veſſels muſt become very ſmall; and the ſmall quantity of powder left, having nothing to ſerve for connecting its particles together, generally is ſeen ſo interrupted, that the ſmall ramifications of veſſels rather have the appearances of random ſcratches of a pencil, than of regular continued canals.

"Melted tallow, with a little mixture of oil of turpentine, may ſometimes be made to fill very ſmall veſſels, and keeps the larger ones at a full ſtretch; but where any quantity of the animal liquors are ſtill in the veſſels, it is liable to ſtop too ſoon, and never can be introduced into numbers of veſſels which other liquors enter; and it is ſo brittle, that very little handling makes it crack, and thereby renders the preparation very ugly (A).

“The method I have always ſucceeded beſt with, in making what may be called *ſubtile* or *fine injections*, is, firſt to throw in coloured oil of turpentine, in ſuch a quantity as might fill the very ſmall veſſels; and, immediately after, to puſh the common coarſe injection into the larger ones. The oil is ſubtile enough to enter rather ſmaller capillary tubes than any colouring can; its reſinous parts, which remain after the ſpiritous are evaporated, give a ſufficient adheſion to the particles of the ſubſtance with which it is coloured, to keep them from ſeparating, and it intimately incorporates with the coarſer injection; by which, if the injection is rightly managed, it is impoſſible for the ſharpeſt eye to diſcover that two ſorts have been made uſe of (B.)

“All the liquors with which the veſſels of animals are artificially filled, having very faint, and near the ſame colours, would not at all appear in the very ſmall veſſels, becauſe of their becoming entirely diaphanous, without a mixture of ſome ſubſtance to impart its colour to them; and where ſeveral ſorts of even the larger veſſels of any part were filled, one ſort could not be diſtinguiſhed from another, unleſs the colour of each was different; which has likewiſe a good effect in making preparations more beautiful. Wherefore anatomiſts have made uſe of a variety of ſuch ſubſtances, according to their different fancies or intentions; ſuch as gamboge, ſaffron, ink, burnt ivory, &c. which can be eaſily procured from painters. My deſign being only to conſider thoſe that are fit to be mixed with the injecting liquors propoſed to fill capillary veſſels, which is ſcarce ever to be done in any other, except the branches of the arteries and of ſome veins, I ſhall confine myſelf to the common colours employed to theſe laſt named two ſorts of veſſels, which colours are red, green, and ſometimes blue, without mentioning the others which require very little choice.

“Anatomiſts have, I imagine, propoſed to imitate the natural colours of the arteries and veins in a living creature, by filling the arteries with a red ſubſtance, and the veins with a blue or green: from which, however, there are other advantages, ſuch as the ſtrong reflection which ſuch bodies make of the rays of light, and the unaptneſs moſt ſuch bodies have to tranſmit theſe ſame rays, without at leaſt a conſiderable reflection of the rays peculiar to themſelves; or, in other words, their unfitneſs to become completely pellucid; without which, the very fine veſſels, after being injected, would ſtill be imperceptible. The animal or vegetable ſubſtances made uſe of for colouring injections, ſuch as chochineal, laque, *rad. anchuſæ*, brazil-wood, indigo, &c. have all one general fault of being liable to run into little knots which ſtop ſome of the veſſels; their colour fades ſooner when kept dry; they more eaſily yield their tincture when the parts are preſerved in a liquor; and rats, mice, and inſects, will take them for food: for which reaſons, though I have frequently ſucceeded in injecting them, I rather prefer the mineral kind, ſuch as minium or vermilion for red; of which this laſt is, in my opinion, the beſt, becauſe it gives the brighteſt colour, and is commonly to be bought finely levigated. The green-coloured powder generally uſed is verdigreaſe; but I rather chuſe that preparation of it called *diſtilled verdigreaſe*; becauſe its colour is brighter, and it does not ſo often run into ſmall knots as the common verdigreaſe, but diſſolves in the oily liquors.

“The method of preparing the injection compoſed of theſe materials, is to take, for the fine one, a pound of clear oil of turpentine, which is gradually poured on three ounces of vermilion, or diſtilled verdigreaſe finely powdered, or rather well levigated by grinding on marble; ſtir them well with a ſmall wooden ſpatula till they are exactly mixed, then ſtrain all through a fine linen rag. The ſeparation of the groſſer particles is, however, rather better made, by pouring ſome ounces of the oil upon the powder, and, after ſtirring them together ſtrongly, ſtop rubbing with the ſpatula for a ſecond or ſo, and pour off into a clean veſſel the oil with the vermilion or verdigreaſe ſuſpended in it; and continue this ſort of operation till you obſerve no more of the powder come off; and all that remains is granulated. The coarſer injection is thus prepared: Take tallow, 1 pound; wax, bleached white, 5 ounces; ſallad oil, 3 ounces; melt them in a ſkillet put over a lamp; then add Venice turpentine, 2 ounces; and as ſoon as this is diſſolved, gradually ſprinkle in of vermilion or verdigreaſe prepared, 3 ounces; then paſs all through a clean, dry, warmed linen-cloth, to ſeparate all the groſſer particles; and, when you deſign to make it run far into the veſſels, ſome oil of turpentine may be added immediately before it is uſed.

“The next thing to be conſidered, and indeed what chiefly contributes to the ſucceſs of injections, is the choice and preparation of the ſubject whoſe veſſels are to be filled.

“In chuſing a fit ſubject, take theſe few general rules: 1. The younger the creature to be injected is, the injection will, *cæteris paribus*, go fartheſt, and *vice verſa*. 2. The more the creature's fluids have been diſſolved and exhauſted in life, the ſucceſs of the operation will be greater. 3. The leſs ſolid the part deſigned to be injected is, the more veſſels will be filled. 4. The more membranous and tranſparent parts are, the injection ſhows better; whereas, in the ſolid very hard parts of a rigid old creature, that has died with its veſſels full of thick ſtrong blood, it is ſcarce poſſible to inject great numbers of ſmall veſſels.

“Therefore, in preparing a ſubject for injecting, the principal things to be aimed at are, To diſſolve the fluids, empty the veſſels of them, relax the ſolids, and prevent the injection's coagulating too ſoon. To an-

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(A) Rigierus (*introduct. in notitiam rerum natur.* &c. *4to, Hagae*, 1743, *titul. Balſamum*) gives Ruyſch's method of injecting and preſerving animals, which, he ſays, Mr Blumentroſt, preſident of the Peterſburgh academy, aſſured him was copied from the receipt given in Ruyſch's own hand-writing to the Czar. According to this receipt, melted tallow, coloured with vermilion, to which, in the ſummer, a little white wax was added, was Ruyſch's injecting *ceracea materies*.

(B) Mr Ranby's injecting matter, as publiſhed by Dr Hales, (*Hæmaſt.* Ex. 21.), is white roſin and tallow, of each two ounces, melted and ſtrained through linen; to which was added three ounces of vermilion, or finely ground indigo, which was firſt well rubbed with eight ounces of turpentine varniſh.

anſwer all theſe intentions, authors have propoſed to inject tepid or warm water by the arteries, till it returns clear and untinged by the veins, and the veſſels are thereby ſo emptied of blood, that all the parts appear white; after which, they puſh out the water by forcing in air; and, laſtly, by preſſing with their hands, they ſqueeze the air alſo out. After this preparation, one can indeed inject very ſubtilely; but generally there are inconveniencies attend it. For in all the parts where there is a remarkable *tunica celluloſa*, it never miſſes to be full of the water, which is apt to ſpoil any parts deſigned to be preſerved either wet or dry; and ſome particles of the water ſeldom miſs to be mixed in the larger as well as ſmaller veſſels with the oily injection, and make it appear diſcontinued and broken: wherefore it is much better to let this injection of water alone, if it can be poſſibly avoided, and rather to macerate the body or part to be injected a conſiderable time in water, made ſo warm (C) as one can hold his hand eaſily in it; taking care to keep it of an equal warmth all the time, by taking out ſome of the water as it cools, and pouring in hot water in its place; by which the veſſels will be ſufficiently ſoftened and relaxed, the blood will be melted down, and the injection can be in no danger of hardening too ſoon; whereas, if the water is too hot, the veſſels ſhrink, and the blood coagulates. From time to time we ſqueeze out the liquids as much as poſſible at the cut veſſel by which the injection is to be thrown in (D). The time this maceration is to be continued, is always in proportion to the age of the ſubject, the bulk and thickneſs of what we deſign to inject, and the quantity of blood we obſerve in the veſſels, which can only be learned by experience; at leaſt, however, care ought to be taken, that the whole ſubject, or part macerated, is perfectly well warmed all through; and that we continue the preſſure with our hands, till no more blood can be brought away, whatever poſition we put the ſubject in.

When the ſyringe, injections, and ſubject, are all in readineſs, one of the ſecond ſort of pipes is choſen, as near to the diameter of the veſſel by which the injection is to be thrown as poſſible; for if the pipe is too large, it is almoſt needleſs to tell it cannot be introduced. If the pipe is much ſmaller than the veſſel, it is ſcarce poſſible to tie them ſo firmly together, but, by the wrinkling of the coats of the veſſel, ſome ſmall paſſage will be left, by which part of the injection will ſpring back on the injector, in the time of the operation, and the neareſt veſſels remain afterwards undiſtended, by the loſs of the quantity that oozes out. Having choſen a fit pipe, it is introduced at the cut orifice of the veſſel, or at an inciſion made in the ſide of it; and then a waxed thread being brought round the veſſel, as near to its coats as poſſible, by the help of a needle, or a flexible eyed probe, the ſurgeon's knot is made with the thread, and it is drawn as firmly as the thread can allow; taking care that it ſhall be ſunk into the circular notch of the pipe all round, otherwiſe it will very eaſily ſlide off, and the pipe will be brought out probably in the time of the operation, which ruins it.

"If there have been large veſſels cut, which communicate with the veſſels you deſign to inject, or if there are any others proceeding from the ſame trunk, which you do not reſolve to fill, let them be all carefully now tied up, to ſave the injected liquor, and make the operation ſucceed better in the view you then have.

"When all this is done, both ſorts of injections are to be warmed over a lamp, taking care to ſtir them conſtantly, leſt the colouring powder fall to the bottom and burn (E). The oil of turpentine needs be made no warmer than will allow the finger to remain in it, if the ſubject has been previouſly well warmed in water; when the maceration has not been made, the oil ought to be ſcalding hot, that it may warm all the parts which are deſigned to be injected. The coarſe injection ought to be brought near to a boiling. In the mean time, having wrapt ſeveral folds of linen round the parts of the ſyringe which the operator is to grip, and ſecured the linen with thread, the ſyringe is to be made very hot by ſucking boiling water ſeveral times up (F), and the pipe within the veſſel is to be warmed by applying a ſponge dipped in boiling water to it (G).

"After all is ready, the ſyringe being cleared of the water, the injector fills it with the finer injection; and then introducing the pipe of the ſyringe into that in the veſſel, he preſſes them together, and either with one hand holds this laſt pipe firm, with the other grips the ſyringe, and with his breaſt puſhes the ſucker; or, giving the pipe in the veſſel to be held by an aſſiſtant, in any of the ways mentioned in the deſcription of theſe ſorts of pipes, he grips the ſyringe with one hand, and puſhes the ſucker with the other, and conſequently throws in the injection, which ought to be done ſlowly, and with no great force, but proportioned to the length and bulk of the part to be injected and ſtrength of the veſſels. The quantity of this fine injection to be thrown in is much to be learned by uſe. The only rule I could ever fix to myſelf in this matter, was to continue puſhing till I was ſenſible of a ſtop which would require a conſiderable force to overcome. But this will not hold where all the branches of any veſſel are not injected; as for inſtance, when the veſſels of the thorax only are to be injected: for the aorta bears too great a proportion to the branches ſent from it, and therefore leſs fine injection is requiſite here. As ſoon as that ſtop is felt, the ſucker of the ſyringe is to be drawn back, that the neareſt large veſſels may be emptied. Then the ſyringe is taken off, emptied of the fine injection, and filled with the coarſer, which is to be puſhed into the veſſels quickly and forcibly, having always regard to the ſtrength and firmneſs of the veſſels, bulk, &c. of the part. Continue to thruſt the ſucker, till a full ſtop, or a ſort of puſh backwards,

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(C) Ruyſch orders a previous maceration for a day or two in cold water; which muſt have a better effect in melting the blood than warm water has.

(D) When Ruyſch intended to inject the whole body, he put one pipe upwards, and another downwards, in the deſcending aorta.

(E) Ruyſch melts his tallow by the heat of warm water, into which he puts the veſſel containing the injection.

(F) He warms his ſyringe by laying it on hot coals.

(G) He warms his pipe, by putting the body, after the pipe is fixed in the veſſel, into hot water. When this is to be done, a cork ought to be put into the pipe, to prevent the water getting into the veſſel that is to be injected.

wards is felt, when you muſt beware of thruſting any more, otherwiſe ſome of the veſſels will be burſted, and the whole, or a conſiderable ſhare of the preparation you deſigned, will be ſpoiled by the extravaſation; but rather immediately ſtop the pipe by the turn-cock, and take out the ſyringe to clean it, and allow ſufficient time for the coarſe injection to coagulate fully, before any part is diſſected. Ruyſch, immediately after throwing in the injection, put the body into cold water, and ſtirred it continually for ſome time, to prevent the vermilion to ſeparate from the tallow.

INJURY, any wrong done to a man's perſon, reputation, or goods. See Assault.

INK, a black liquor uſed in writing, generally made of an infuſion of galls, copperas, and gum-arabic.

The properties which this liquid ought to have, are, 1. To flow freely from the pen, and ſink a little into the paper, that the writing be not eaſily diſcharged. 2. A very deep black colour, which ſhould be as deep at firſt as at any time afterwards. 3. Durability, ſo that the writing may not be ſubject to decay by age. 4. Ink ſhould be deſtitute of any corroſive quality, that it may not deſtroy the paper, or go through it in ſuch a manner as to render the writing illegible. No kind of ink, however, hath yet appeared which is poſſeſſed of all theſe qualities. The ink uſed by the ancients was poſſeſſed of the ſecond, third, and fourth qualities above-mentioned, but wanted the firſt. Dr Lewis hath diſcovered its compoſition from ſome paſſages in ancient authors. "Pliny and Vitruvius, (ſays he), expreſsly mention the preparation of ſoot, or what we now call *lamp-black*, and the compoſition of writing-ink from lamp-black and gum. Dioſcorides is more particular, ſetting down the proportions of the two ingredients, viz. three ounces of the ſoot to one of the gum. It ſeems the mixture was formed into cakes or rolls; which being dried in the ſun, were occaſionally tempered with water, as the cakes of Indian ink are among us for painting."

In Mr Delaval's Treatiſe on Colours, p. 37. he acquaints us, that with an infuſion of galls and iron filings, he had not only made an exceedingly black and durable ink, but by its means, without the addition of any acid, dyed ſilk and woollen cloth of a good and laſting black. This kind of ink, however, tho' the colour is far ſuperior to that of any other, hath the inconvenience of being very eaſily diſcharged, either by the ſmalleſt quantity of any acid, or even by ſimple water; becauſe it doth not penetrate the paper in ſuch a manner as is neceſſary to preſerve it from the inſtantaneous action of the acid or of the water. During the action of the infuſion of galls upon the iron in making this kind of ink, a very conſiderable efferveſcence takes place, and a quantity of air is diſcharged, the nature of which hath not yet been examined.

The materials uſually employed for the making of ink are, common green vitriol, or copperas, and galls; but almoſt all of them are deficient in durability, which is a property of ſuch importance, that Dr Lewis hath thought the ſubject of ink-making not unworthy of his attention. From experiments made by that author, he infers, that the decay of inks is chiefly owing to a deficiency of galls; that the galls are the moſt periſhable ingredient, the quantity of theſe, which gives the greateſt blackneſs at firſt, (which is about equal parts with the vitriol), being inſufficient to maintain the colour: that for a durable ink, the quantity of galls cannot be much leſs than three times that of the vitriol; that it cannot be much greater, without leſſening the blackneſs of the ink: that by diminiſhing the quantity of water, the ink was rendered blacker and more durable; that diſtilled water, rain water, and hard ſpring-water, had the ſame effects: that white-wine produced a deeper black colour than water; that the colour produced by vinegar was deeper than that by wine; that proof-ſpirit extracted only a reddiſh brown tinge: that the laſt-mentioned tincture ſunk into, and ſpread upon, the paper; and hence the impropriety of adding ſpirit of wine to ink, as is frequently directed, to prevent mouldineſs or freezing: that other aſtringents, as oak-bark, biſtort, ſloe-bark, &c. were not ſo effectual as galls, nor gave ſo good a black, the colour produced by moſt of theſe, excepting oak-bark, being greeniſh: that the juice of ſloes did not produce a black colour with martial vitriol; but that, nevertheleſs, the writing made with it became black, and was found to be more durable than common ink: that inks made with ſaturated ſolutions of iron in nitrous, marine, or acetous acids, in tartar, or in lemon-juice, were much inferior to the ink made with martial vitriol: that the colour of ink was depraved by adding quicklime, which was done with an intention of deſtroying any ſuperabundant acid which might be ſuppoſed to be the cauſe of the loſs of the colour of ink: that the beſt method of preventing the effects of this ſuperabundant acid is probably by adding pieces of iron to engage it; and that this conjecture was confirmed by an inſtance the author had heard, of the great durability of the colour of an ink in which pieces of iron had been long immerſed: and laſtly, that a decoction of logwood uſed inſtead of water, ſenſibly improved both the beauty and deepneſs of the black, without diſpoſing it to fade. The ſame author obſerves, that the addition of gum-arabic is not only uſeful, by keeping the colouring matter ſuſpended in the fluid, but alſo by preventing the ink from ſpreading, by which means a greater quantity of it is collected on each ſtroke of the pen. Sugar, which is ſometimes added to ink, was found to be much leſs effectual than gums, and to have the inconvenience of preventing the drying of the ink. The colour of ink is found to be greatly injured by keeping the ink in veſſels made of copper or of lead, and probably of any other metal, excepting iron, which the vitriolic acid can diſſolve.

The foregoing experiments point out for the beſt proportions of the ingredients for ink, One part of green vitriol, one part of powdered logwood, and three parts of powdered galls. The beſt menſtruum appears to be vinegar or white-wine, though for common uſe water is ſufficient. If the ink be required to be of a full colour, a quart, or at moſt three pints, of liquor, may be allowed to three ounces of galls, and to one ounce of each of the other two ingredients. Half an ounce of gum may be added to each pint of the liquor. The ingredients may be all put together at once in a convenient veſſel, and well ſhaken four or five times each day. In 10 or 12 days the ink will be fit for uſe, though it will improve by re-

remaining longer on the ingredients. Or it may be made more expeditiouſly, by adding the gum and vitriol to a decoction of galls and logwood in the menſtruum. To the ink, after it has been ſeparated from the feculencies, ſome coarſe powder of galls, from which the fine duſt has been ſifted, together with one or two pieces of iron, may be added, by which its durability will be ſecured.

In ſome attempts made by the Doctor to endow writing ink with the great durability of that of the ancients, as well as the properties which it hath at preſent, he firſt thought of uſing animal-glues, and then of oily matters. “I mixed both lamp-black (ſays he) and ivory-black with ſolution of gum arabic, made of ſuch conſiſtence as juſt to flow ſufficiently from the pen. The liquors wrote of a fine black colour; but when dry, part of the colour could be rubbed off, eſpecially in moiſt weather, and a pencil dipped in water waſhed it away entirely.

“I tried ſolutions of the animal-glues, with the ſame event. Iſinglaſs or fiſh-glue being the moſt difficultly diſſoluble of theſe kinds of bodies, I made a decoction of it in water, of ſuch ſtrength, that the liquor concreted into a jelly before it was quite cold: with this jelly, kept fluid by ſufficient heat, I mixed ſome ivory-black: characters drawn with this mixture on paper bore rubbing much better than the others, but were diſcharged without much difficulty by a wet pencil.

“It was now ſuſpected, that the colour could not be ſufficiently fixed on paper without an oily cement. As oils themſelves are made miſcible with watery fluids by the intervention of gum, I mixed ſome of the ſofter printers varniſh, after-mentioned, with about half its weight of a thick mucilage of gum arabic, working them well together in a mortar, till they united into a ſmooth uniform maſs: this was beaten with lamp-black, and ſome water added by little and little, the rubbing being continued till the mixture was diluted to a due conſiſtence for writing. It wrote freely, and of a full browniſh-black colour: the characters could not be diſcharged by rubbing, but water waſhed them out, though not near ſo readily as any of the foregoing. Inſtead of the printers varniſh or boiled oil, I mixed raw linſeed oil in the ſame manner with mucilage and lamp-black; and on diluting the mixture with water, obtained an ink not greatly different from the other.

“Though theſe oily mixtures anſwered better than thoſe with ſimple gums or glues, it was apprehended that their being diſchargeable by water would render them unfit for the purpoſes intended. The only way of obviating this imperfection appeared to be, by uſing a paper which ſhould admit the black liquid to ſink a little into its ſubſtance. Accordingly I took ſome of the more ſinking kinds of paper, and common paper made damp as for printing; and had the ſatiſfaction to find, that neither the oily nor the ſimple gummy mixtures ſpread upon them ſo much as might have been expected, and that the characters were as fixed as could be deſired, for they could not be waſhed out without rubbing off part of the ſubſtance of the paper itſelf.

“All theſe inks muſt be now and then ſtirred or ſhaken during the time of uſe, to mix up the black powder, which ſettles by degrees to the bottom: thoſe with oil muſt be well ſhaken alſo, though not uſed, once a-day, or at leaſt once in three or four days, to keep the oil united with the water and gum; for if once the oil ſeparates, which it is apt to do by ſtanding at reſt for ſome days, it can no longer be mixed with the thin fluid by any agitation. But though this imperfect union of the ingredients renders theſe inks leſs fit for general uſe than thoſe commonly employed, I apprehend there are many occaſions in which theſe kinds of inconveniences will not be thought to counterbalance the advantage of having writings which we may be aſſured will be as laſting as the paper they are written upon. And indeed the inconvenience may be in a great meaſure obviated by uſing cotton in the ink-ſtand, which, imbibing the fluid, prevents the ſeparation of the black powder diffuſed through it.

“All the inks, however, made on the principle we are now ſpeaking of, can be diſcharged by waſhing, unleſs the paper admits them to ſink into its ſubſtance. The ancients were not inſenſible of this imperfection; and ſometimes endeavoured to obviate it, according to Pliny, by uſing vinegar, inſtead of water, for tempering the mixture of lamp-black and gum. I tried vinegar, and found it to be of ſome advantage, not as giving any improvement to the cement, but by promoting the ſinking of the matter into the paper. As this waſhing out of the ink may be prevented, by uſing a kind of paper eaſy enough to be procured, it is ſcarcely to be conſidered as an imperfection; and indeed, on other kinds of paper, it is an imperfection only ſo far as it may give occaſion to fraud, for none of theſe inks are in danger of being otherwiſe diſcharged than by deſign. The vitriolic inks themſelves, and thoſe of printed books and copperplates, are all diſchargeable; nor can it be expected of the ink-maker to render writings ſecure from frauds.

“But a further improvement may yet be made, namely, that of uniting the ancient and modern inks together; or uſing the common vitriolic ink inſtead of water, for tempering the ancient mixture of gum and lamp-black. By this method it ſhould ſeem that the writings would have all the durability of thoſe of former times, with all the advantage that reſults from the vitriolic ink fixing itſelf in the paper. Even where the common vitriolic mixture is depended on for the ink, it may in many caſes be improved by a ſmall addition of the ancient compoſition, or of the common Indian ink which anſwers the ſame purpoſe: when the vitriolic ink is dilute, and flows ſo pale from the pen, that the fine ſtrokes, on firſt writing, are ſcarcely viſible, the addition of a little Indian ink is the readieſt means of giving it the due blackneſs. By this admixture it may be preſumed alſo that the vitriolic ink will be made more durable, the Indian ink in ſome meaſure covering it, and defending it from the action of the air. In all caſes, where Indian ink or other ſimilar compoſitions are employed, cotton ſhould be uſed in the ink-ſtand, as already mentioned, to prevent the ſettling of the black powder.”

Indian INK, a valuable black for water-colours, brought from China and other parts of the Eaſt Indies, ſometimes in large rolls, but more commonly in ſmall quadrangular cakes, and generally marked with Chineſe characters. Dr Lewis, from experiments made on this ſubſtance, hath ſhewn that it is compoſed of fine lamp-black and animal-glue: and accordingly, for the preparation of it, he deſires us to mix the lamp-black with as much melted glue as is ſufficient to give it a tenacity proper for being made into cakes; and theſe when dry, he tells us, anſwered as well as thoſe imported from the Eaſt Indies, both with regard to the colour, and the freedom of working. Ivory-black, and other charcoal-blacks, levigated to a great degree of fineneſs, anſwered as well as the lamp-black; but in the ſtate in which ivory-black is commonly ſold, it proved much too gritty, and ſeparated too haſtily from the water.

Printing Ink, is totally different from Indian ink, or that made uſe of in writing. It is an oily compoſition, of the conſiſtence of an ointment: the method of preparing it was long kept a ſecret by thoſe whoſe employment it was to make it, and who were intereſted in concealing it; and even yet is but imperfectly known. The properties of good printing-ink are, to work clean and eaſily, without daubing the types, or tearing the paper; to have a fine black colour; to waſh eaſily off the types; to dry ſoon; and to preſerve its colour, without turning brown. This laſt, which is a moſt neceſſary property, is effectually obtained by ſetting fire to the oil with which the printing ink is made for a few moments, and then extinguiſhing it by covering the veſſel (A). It is made to waſh eaſily off the types, by uſing ſoap as an ingredient; and its working clean depends on its having a proper degree of ſtrength, which is given by a certain addition of roſin. A good deal, however, depends on the proportion of the ingredients to each other; for if too much ſoap is added, the ink will work very foul, and daub the types to a great degree. The ſame thing will happen from uſing too much black, at the ſame time that both the ſoap and black hinder the ink from drying; while too much oil and roſin tear the paper, and hinder it from waſhing off.—The following receipt has been found to make printing ink of a tolerable good quality. "Take a Scots pint of linſeed oil, and ſet it over a pretty briſk fire in an iron or copper veſſel capable of holding three or four times as much. When it boils ſtrongly, and emits a thick ſmoke, kindle it with a piece of paper, and immediately take the veſſel off the fire. Let the oil burn for about a minute; then extinguiſh it by covering the veſſel; after it has grown pretty cool, add two pounds of black roſin, and one pound of hard ſoap cut into thin ſlices. If the oil is very hot when the ſoap is added, almoſt the whole mixture will run over the veſſel. The mixture is then to be ſet again over the fire; and when the ingredients are thoroughly melted, a pound of lamp-black, previouſly put through a lawn ſieve, is to be ſtirred into it. The whole ought then to be ground on a marble ſtone, or in a mill like the levigating mill deſcribed under the article Chemistry, n° 97."

Though the above receipt is greatly ſuperior to any that hath been hitherto publiſhed, all of which are capitally deficient in not mentioning the neceſſary ingredients of roſin and ſoap; yet it muſt be acknowledged, that ink made in this manner is inferior in point of colour, and is likewiſe more apt to daub the types and make an indiſtinct impreſſion, than ſuch as is prepared by ſome of thoſe who make the manufacture of this commodity their employment; ſo that either a variation in the proportion of the ingredients, a nicety in the mixture, or ſome additional ingredient, ſeems neceſſary to bring it to the requiſite perfection.

Ink *for the Rolling Preſs*, is made of linſeed oil burnt in the ſame manner as that for common printing-ink, and then mixed with Francfort-black, and finely ground. There are no certain proportions which can be determined in this kind of ink; every workman adding oil or black to his ink, as he thinks proper, in order to make it ſuit his own taſte.—Some, however, mix a portion of common boiled oil which has never been burnt: but this muſt neceſſarily be a bad practice, as ſuch oil is apt to go through the paper; a fault very common in prints, eſpecially if the paper is not very thick. No ſoap is added; becauſe the ink is not cleared off from the copperplates with alkaline ley as in common printing, but with a bruſh dipped in oil.

Ink is alſo an appellation given to any coloured liquor uſed in writing, whether red, yellow, green, &c. Many different kinds of theſe inks may be prepared by the directions given under the article Colour-making, which it would be ſuperfluous here to repeat.

Sympathetic Ink, a liquor with which a perſon may write, and yet nothing appear on the paper after it is dry, till ſome other means are uſed, ſuch as holding the paper to the fire, rubbing it over with ſome other liquor, &c.

Theſe kinds of ink may be divided into ſeven claſſes, and that with reſpect to the means uſed to make them viſible; viz. 1. Such as become inviſible by paſſing another liquor over them, or by expoſing them to the vapour of that liquor. 2. Thoſe that do not appear ſo long as they are kept cloſe, but ſoon become viſible on being expoſed to the air. 3. Such as appear by ſtrewing or ſifting ſome very fine powder of any colour over them. 4. Thoſe which become viſible by being expoſed to the fire. 5. Such as become viſible by heat, but diſappear again by cold or the moiſture of the air. 6. Thoſe which become viſible by being wetted with water. 7. Such as appear of various colours, red, yellow, blue, &c.

I. The firſt claſs contains four kinds of ink, viz. ſolutions of lead, biſmuth, gold, and green vitriol. The firſt two become viſible in the ſame manner, viz. by the contact of ſulphureous liquids or fumes. For the firſt, a ſolution of common ſugar-of-lead in water will anſwer as well as more troubleſome preparations. If you write with this ſolution with a clean pen, the writing when dry will be totally inviſible: but if it be wetted with a ſolution of *hepar ſulphuris*, or of orpiment, diſſolved by means of quick-lime; or if it be expoſed to the ſtrong vapours of theſe ſolutions, but eſpecially to the vapour of volatile tincture of ſulphur; the writing will appear of a brown colour, more or leſs deep according to the ſtrength of the ſulphureous fume. By the ſame means, what is wrote with the ſolution of biſmuth in ſpirit of nitre will appear of a deep black.

The ſympathetic ink prepared from gold, depends on

(A) This is mentioned by Dr Lewis in his Philoſophical Commerce of Arts; but he ſeems not to have been acquainted with the method of giving it the other neceſſary properties.

on the property by which that metal precipitates from its ſolvent on the addition of a ſolution of tin. If you write with a ſolution of gold in *aqua regia*, and let the paper dry gently in the ſhade, nothing will appear for the firſt ſeven or eight hours. Dip a pencil or a ſmall fine ſponge in the ſolution of tin, and drawing it lightly over the inviſible characters, they will immediately appear, of a purple colour.

Characters wrote with a ſolution of green vitriol carefully depurated, will likewiſe be inviſible when the paper is dry; but if wetted with an infuſion of galls, they will immediately appear as if wrote with common ink. If, inſtead of this infuſion, a ſolution of the phlogiſticated alkali, impregnated with the colouring matter Pruſſian blue is made up of, the writing will appear of a very deep blue.

II. To the ſecond claſs belong the ſolutions of all thoſe metals which are apt to attract phlogiſton from the air, ſuch as lead, biſmuth, ſilver, &c. The ſympathetic ink of gold already mentioned belongs alſo to this claſs; for if the characters wrote with it are long expoſed to the air, they become by degrees of a deep violet colour, nearly approaching to black. In like manner, characters wrote with a ſolution of ſilver in *aqua fortis* are inviſible when newly dried, but being expoſed to the ſun, appear of a grey colour like ſlate. To this claſs alſo belong ſolutions of lead in vinegar; copper in *aqua fortis;* tin in *aqua regia;* emery, and ſome kinds of pyrites, in ſpirit of ſalt; mercury, in *aqua fortis;* or iron, in vinegar. Each of theſe has a particular colour when expoſed to the air; but they have the diſagreeable property of corroding the paper, ſo that after ſome time the characters appear like holes cut out of the paper.

III. The third claſs of ſympathetic inks contains ſuch liquids as have ſome kind of glutinous viſcoſity, and at the ſame time are long a drying; by which means, though the eye cannot diſcern the characters wrote with them upon paper, the powders ſtrewed upon them immediately adhere, and thus make the writing become viſible. Of this kind are urine, milk, the juices of ſome vegetables, weak ſolutions of the deliqueſcent ſalts, &c.

IV. This claſs, comprehending all thoſe that become viſible by being expoſed to the fire, is very extenſive, as it contains all thoſe colourleſs liquids in which the matter diſſolved is capable of being reduced, or of reducing the paper, into a ſort of charcoal by a ſmall heat. A very eaſily procured ink of this kind is oil of vitriol diluted with as much water as will prevent it from corroding the paper. Letters wrote with this fluid are perfectly inviſible when dry, but inſtantly appear as black as if wrote with the fineſt ink on being held near the fire. Juice of lemons or onions, a ſolution of ſal-ammoniac, green vitriol, &c. will anſwer the ſame purpoſe, though not ſo eaſily, or with ſo little heat.

V. The fifth claſs comprehends only ſolutions of Regulus of Cobalt in ſpirit of ſalt; for the properties of which, ſee CHEMISTRY, nº 259.

VI. This claſs comprehends ſuch inks as become viſible when characters wrote with them are wetted with water. They are made of all ſuch ſubſtances as depoſit a copious ſediment when mixed with water, diſſolving only imperfectly in that fluid. Of this kind are dried alum, ſugar-of-lead, vitriol, &c. We have therefore only to write with a ſtrong ſolution of theſe ſalts upon paper, and the characters will be inviſible when dry; but when we apply water, the ſmall portion of dried ſalt cannot again be diſſolved in the water. Hence the inſoluble part becomes viſible on the paper, and ſhews the characters wrote in white, grey, brown, or any other colour which the precipitate aſſumes.

VII. Characters may be made to appear of a fine crimſon, purple, or yellow, by writing on paper with ſolution of tin in *aqua regia*, and then paſſing over it a pencil dipt in a decoction of cochineal, Brazil-wood, logwood, yellow-wood, &c.—For an account of the nature of all theſe ſympathetic inks, however, and the principles on which they are made, ſee the articles CHEMISTRY and COLOUR-MAKING, *paſſim*.

INLAND, a name for any part of a country at a diſtance from the ſea.

INLAND *Navigation*. See CANAL.

INLAND *Trade*, that kind of trade carried on between the different parts of the ſame kingdom, whether over land, or by means of inland navigation.

INN, a place appointed for the entertainment and relief of travellers.

Inns are licenſed and regulated by juſtices of the peace, who oblige the landlord to enter into recognizances for keeping good order. If a perſon who keeps a common inn, refuſes to receive a traveller into his houſe as a gueſt, or to find him victuals and lodging on his tendering a reaſonable price for them, he is liable to an action of damages, and may be indicted and fined at the king's ſuit. The rates of all commodities ſold by inn-keepers, according to our ancient laws, may be aſſeſſed: and inn-keepers not ſelling their hay, oats, beans, &c. and all manner of victuals at reaſonable prices, without taking any thing for litter, may be fined and impriſoned, &c. by 21 Jac. I. c. 21. Where an inn-keeper harbours thieves, perſons of infamous character, or ſuffers any diſorders in his houſe, or ſets up a new inn where there is no need of one, to to the hindrance of ancient and well-governed inns, he is indictable and fineable: and by ſtatute, ſuch inn may be ſuppreſſed. Action upon the caſe lies againſt any inn-keeper, if a theft be committed on his gueſt by a ſervant of the inn, or any other perſon not belonging to the gueſt; though it is otherwiſe where the gueſt is not a traveller, but one of the ſame town or village, for there the inn-keeper is not chargeable; nor is the maſter of a private tavern anſwerable for a robbery committed on his gueſt: it is ſaid, that even tho' the travelling gueſt does not deliver his goods, &c. into the inn-keeper's poſſeſſion, yet if they are ſtolen, he is chargeable. An inn-keeper is not anſwerable for any thing out of his inn, but only for ſuch as are within it; yet, where he of his own accord puts the gueſt's horſe to graſs, and the horſe is ſtolen, he is anſwerable, he not having the gueſt's orders for putting ſuch horſe to graſs. The inn-keeper may juſtify the ſtopping of the horſe, or other thing of his gueſt, for his reckoning, and may detain the ſame till it be paid. Where a perſon brings his horſe to an inn, and leaves him in the ſtable, the inn-keeper may detain him till ſuch time as the owner pays for his keeping;

Blackſt. Comment.

and if the horſe eats out as much as he is worth, after a reaſonable appraiſement made, he may ſell the horſe and pay himſelf: but when a gueſt brings ſeveral horſes to an inn, and afterwards takes them all away except one, this horſe ſo left may not be ſold for payment of the debt for the others; for every horſe is to be ſold, only to make ſatisfaction for what is due for his own meat.

Inns *of Court*, are colleges in London, for the ſtudy of the laws of England, with all conveniencies for the lodging and entertainment of the profeſſors and ſtudents.

In theſe colleges, there are not only ſuch ſtudents as ſtudy the laws of this kingdom, in order to render themſelves capable of practiſing in the courts of law at Weſtminſter; but alſo ſuch other gentlemen of fortune as apply themſelves to this ſtudy, in order to know and vindicate their rights, and to render themſelves more ſerviceable to their country.

Our inns of court, which are numerous, and juſtly famed for the production of men of learning, are governed by maſters, principals, benchers, ſtewards, and other officers; and have public halls for exerciſes, readings, &c. which the ſtudents are obliged to attend and perform for a certain number of years, before they can be admitted to plead at the bar. Theſe ſocieties have not, however, any judicial authority over their members; but inſtead of this, they have certain orders among themſelves, which have, by conſent, the force of laws: for lighter offences, perſons are only *excommoned*, or put out of commons; for greater, they loſe their chambers, and are expelled the college: and when once expelled out of one ſociety, they are never received by any of the others. The gentlemen in theſe ſocieties may be divided into benchers, outer-barriſters, inner-barriſters, and ſtudents.

The four principal inns of court are the Inner-temple, Middle-temple, Lincoln's-inn, and Gray's-inn; the other inns are the two Serjeant's-inns; and the others, which are leſs conſiderable, are Clifford's-inn, Symond's-inn, Clement's-inn, Lion's-inn, Furnival's-inn, Staple's-inn, Thavie's-inn, Barnard's-inn, and New-inn. Theſe are moſtly taken up by attorneys, ſollicitors, &c.; but they belong to the inns of court, who ſend yearly ſome of their barriſters to read to them.

INNATE ideas, thoſe ſuppoſed to be ſtamped on the mind, from the firſt moment of its exiſtence, and which it conſtantly brings into the world with it: a doctrine which Mr Locke has taken great pains to refute.

INNERKEITHING. See Inverkeithing.

INNERLOCHY, or Fort-William, a fortreſs lately erected in the Highlands of Scotland, at the mouth of a large lake in the county of Lochaber, 28 miles S. W. of Lochneſs, and 100 N. W. of Edinburgh. W. Long. 5. 15. N. Lat. 56. 55.

INNISKILLING, a ſtrong town of Ireland, in the county of Fermanagh, and province of Ulſter. The inhabitants diſtinguiſhed themſelves in favour of king William ſoon after the revolution, againſt king James's party. It is ſeated between two lakes, in W. Long. 5. 50. N. Lat. 54. 20.

INNOCENT's day, a feſtival of the Chriſtian church, obſerved on December 28th, in memory of the maſſacre of the innocent children by the command of Herod king of Judæa. See Jesus *Chriſt*; and Jews, nº 24. par. *ult*. The Greek church in their kalendar, and the Abyſſinians of Ethiopia in their offices, commemorate 14,000 infants on this occaſion.

INNOMINATA ossa, in anatomy. See there, nº 38. *a, b*.

INOCULATION, or budding, in gardening, is commonly practiſed upon all ſorts of ſtone-fruit; as nectarines, peaches, apricots, plumbs, cherries, as alſo upon oranges and jaſmines: and indeed this is preferable to any ſort of grafting for moſt ſorts of fruit. The method of performing it is as follows: You muſt be provided with a ſharp pen-knife with a flat haft, which is to raiſe the bark of the ſtock to admit the bud; and ſome ſound baſs-mat, which ſhould be ſoaked in water, to increaſe its ſtrength, and render it more pliable: then having taken off the cuttings from the trees you would propagate, you muſt chooſe a ſmooth part of the ſtock, about five or ſix inches above the ſurface of the ground, if deſigned for dwarfs; but if for ſtandards, they ſhould be budded ſix feet above-ground. Then with your knife make an horizontal cut acroſs the rind of the ſtock, and from the middle of that cut make a ſlit downwards, two inches in length, that it may be in the form of a T; but you muſt be careful not to cut too deep, leſt you wound the ſtock: then having cut off the leaf from the bud, leaving the foot-ſtalk remaining, you ſhould make a croſs cut, about half an inch below the eye, and with your knife ſlit off the bud, with part of the wood to it: this done, you muſt with your knife pull off that part of the wood which was taken with the bud, obſerving whether the eye of the bud be left to it or not; for all thoſe buds which loſe their eyes in ſtripping, are good for nothing: then having gently raiſed the bark of the ſtock with the flat haft of your pen-knife clear to the wood, thruſt the bud therein, obſerving to place it ſmooth between the rind and wood of the ſtock, cutting off any part of the rind belonging to the bud, that may be too long for the ſlit made in the ſtock; and ſo having exactly fitted the bud to the ſtock, tie them cloſely round with baſs-mat, beginning at the under-part of the ſlit, and ſo proceeding to the top, taking care not to bind round the eye of the bud, which ſhould be left open.

When your buds have been innoculated three weeks or a month, thoſe which are freſh and plump you may be ſure are joined; and at this time you ſhould looſen the bandage, which if it be not done in time, will injure if not deſtroy the bud. The March following cut off the ſtock ſloping, about three inches above the bud, and to what is left faſten the ſhoot which proceeds from the bud: but this muſt continue no longer than one year; after which the ſtock muſt be cut off cloſe above the bud. The time for innoculating is from the middle of June to the middle of Auguſt: but the moſt general rule is, when you obſerve the buds formed at the extremity of the ſame year's ſhoot, which is a ſign of their having finiſhed their ſpring growth. The firſt ſort commonly inoculated is the apricot; and the laſt the orange-tree, which ſhould never be done till the latter end of Auguſt. And in doing this work, you ſhould always make choice of cloudy weather; for if it be done in the middle of the day, when the weather is hot, the ſhoots will perſpire ſo faſt, as to leave the buds deſtitute of moiſture.

Inoculation, in medicine, the art of tranſplanting the ſmall-pox from one perſon to another, by impregnating the blood of the ſound perſon with the variolous matter from a puſtule taken from the other. See (the *Index* ſubjoined to) Medicine.

INOSCULATION, in anatomy. See Anastomosis.

INPROMPTU, or Impromptu. See Impromptu.

INQUEST, in Scots law, the ſame with Jury.

INQUISITION, in the church of Rome, a tribunal in ſeveral Roman Catholic countries, erected by the popes for the examination and puniſhment of heretics.

This court was founded in the twelfth century by father Dominic and his followers, who were ſent by pope Innocent III. with orders to excite the Catholic princes and people to extirpate heretics, to ſearch into their number and quality, and to tranſmit a faithful account thereof to Rome. Hence they were called *inquiſitors;* and this gave birth to the formidable tribunal of the inquiſition, which was received in all Italy, and the dominions of Spain, except the kingdom of Naples and the Low Countries.

This diabolical tribunal takes cognizance of hereſy, Judaiſm, Mahometaniſm, Sodomy, and polygamy; and the people ſtand in ſo much fear of it, that parents deliver up their children, huſbands their wives, and maſters their ſervants, to its officers, without daring in the leaſt to murmur. The priſoners are kept for a long time, till they themſelves turn their own accuſers, and declare the cauſe of their impriſonment; for they are neither told their crime, nor confronted with witneſſes. As ſoon as they are impriſoned, their friends go into mourning, and ſpeak of them as dead, not daring to ſolicit their pardon, leſt they ſhould be brought in as accomplices. When there is no ſhadow of proof againſt the pretended criminal, he is diſcharged, after ſuffering the moſt cruel tortures, a tedious and dreadful impriſonment, and the loſs of the greateſt part of his effects. The ſentence againſt the priſoners is pronounced publicly, and with extraordinary ſolemnity. In Portugal, they erect a theatre capable of holding 3000 perſons; in which they place a rich altar, and raiſe ſeats on each ſide in the form of an amphitheatre. There the priſoners are placed; and over-againſt them is a high chair, whither they are called, one by one, to hear their doom, from one of the inquiſitors.

Theſe unhappy people know what they are to ſuffer, by the cloaths they wear that day. Thoſe who appear in their own cloaths, are diſcharged upon payment of a fine: thoſe who have a ſanto benito, or ſtrait yellow coat without ſleeves, charged with St Andrew's croſs, have their lives, but forfeit all their effects: thoſe who have the reſemblance of flames, made of red ſerge, ſewed upon their ſanto benito, without any croſs, are pardoned, but threatened to be burnt if ever they relapſe: but thoſe who, beſides theſe flames, have on their ſanto benito their own picture, ſurrounded with figures of devils, are condemned to expire in the flames. The inquiſitors, who are eccleſiaſtics, do not pronounce the ſentence of death; but form and read an act, in which they ſay, that the criminal being convicted of ſuch a crime, by his own confeſſion, is with much reluctance delivered to the ſecular power to be puniſhed according to his demerits: and this writing they give to the ſeven judges who attend at the right ſide of the altar, who immediately paſs ſentence. For the concluſion of this horrid ſcene, ſee Act *of Faith*.

INSCRIBED, in geometry. A figure is ſaid to be inſcribed in another, when all its angles touch the ſide or planes of the other figure.

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more diſtinct knowledge of it, or to tranſmit ſome important truth to poſterity.

The inſcriptions mentioned by Herodotus and Diodorus Siculus, ſufficiently ſhew that this was the firſt method of conveying inſtruction to mankind, and tranſmitting the knowledge of hiſtory and ſciences to poſterity: thus the ancients engraved upon pillars both the principles of ſciences, and the hiſtory of the world. Piſiſtratus carved precepts of huſbandry on pillars of ſtone; and the treaties of confederacy between the Romans and Jews, were engraved on plates of braſs. Hence, antiquarians have been very curious in examining the inſcriptions on ancient ruins, coins, medals, &c.

Academy of Inscriptions. See Academy.

INSECTS, insecta, in natural hiſtory, a ſmaller ſort of animals, commonly ſuppoſed to be exſanguious; and diſtinguiſhed by certain inciſures, cuttings, or indentings in their bodies. The word is originally Latin, formed of *in*, and *ſeco*, "I cut;" the reaſon of which is, that in ſome of this tribe, as ants, the body ſeems to be cut or divided into two; or becauſe the bodies of many, as worms, caterpillars, &c. are compoſed of divers circles, or rings, which are a ſort of inciſuræ.

By ſome natural hiſtorians, this claſs of animals is conſidered as the moſt imperfect of any, while others prefer them to the larger animals. One mark of their imperfection is ſaid to be, that many of them can live a long time, though deprived of thoſe organs which are neceſſary to life in the higher ranks of nature. Many of them are furniſhed with lungs and an heart, like the nobler animals; yet the caterpillar continues to live, though its heart and lungs, which is often the caſe, are entirely eaten away.—It is not, however, from their conformation alone that inſects are inferior to other animals, but from their inſtincts alſo. It is true, that the ant and the bee preſent us with ſtriking inſtances of aſſiduity; yet even theſe are inferior to the marks of ſagacity diſplayed by the larger animals. A bee taken from the ſwarm is totally helpleſs and inactive, incapable of giving the ſmalleſt variation to its inſtincts. It has but one ſingle method of operating; and if put from that, it can turn to no other. In the purſuits of the hound, there is ſomething like choice; but in the labours of the bee, the whole appears like neceſſity and compulſion.—All other animals are capable of ſome degree of education; their inſtincts may be ſuppreſſed or altered; the dog may be taught to fetch and carry, the bird to whiſtle a tune, and the ſerpent to dance: but the inſect has only one invariable method of operating; no arts can turn it from its inſtincts; and indeed its life is too ſhort for inſtruction, as a ſingle ſeaſon often terminates its exiſtence.—Their amazing number is alſo an imperfection. It is a rule that obtains through all nature, that the nobler animals are ſlowly produced, and that nature acts with a kind of dignified œconomy; but the meaner births are laviſhed in profuſion, and thouſands are brought forth merely to ſupply the neceſſities of the more favourite part of the creation. Of all productions in nature, inſects are by far the moſt numerous. The vegetables which cover the ſurface of the earth bear no proportion to the multitudes of inſects; and though, at firſt ſight, herbs of the field ſeem to be the parts of organized nature produced in the greateſt abundance, yet, upon more minute inſpection, we find every plant ſupporting a mixture of ſcarce perceptible creatures, that fill up the compaſs of youth, vigour, and age, in the ſpace of a few days exiſtence.—In Lapland, and ſome parts of America, the inſects are ſo numerous, that if a candle is lighted they ſwarm about it in ſuch multitudes, that it is inſtantly extinguiſhed by them; and in theſe parts of the world, the miſerable inhabitants are forced to ſmear their bodies and faces with tar, or ſome other unctuous compoſition, to protect them from the ſtings of their minute enemies.

On the other hand, Swammerdam argues for the perfection of inſects in the following manner. "After an attentive examination (ſays he) of the nature and anatomy of the ſmalleſt as well as the largeſt animals, I cannot help allowing the leaſt an equal, or perhaps a ſuperior, degree of dignity. If, while we diſſect with care the larger animals, we are filled with wonder at the elegant diſpoſition of their parts, to what an height is our aſtoniſhment raiſed, when we diſcover all theſe parts arranged, in the leaſt, in the ſame regular manner! Notwithſtanding the ſmallneſs of ants, nothing hinders our preferring them to the largeſt animals, if we conſider either their unwearied diligence, their wonderful ſtrength, or their inimitable propenſity to labour. Their amazing love to their young is ſtill more unparalleled among the larger claſſes. They not only daily carry them to ſuch places as may afford them food; but if by accident they are killed, and even cut into pieces, they will with the utmoſt tenderneſs carry them away piecemeal in their arms. Who can ſhew ſuch an example among the larger animals which are dignified with the title of *perfect?* Who can find an inſtance in any other creature that can come in competition with this?"

On this diſpute it is only neceſſary to obſerve, that the wiſdom of the Creator is ſo conſpicuous in all his works, and ſuch ſurpriſing art is diſcovered in the mechaniſm of the body of every creature, that it is very difficult, if not impoſſible, to ſay where it is moſt, and where it is leaſt, to be obſerved.—The nature and properties of inſects are certainly very wonderful. Many particulars relating to them may be found under different articles of this work; but thoſe who deſire to ſee this ſubject treated in a full and ample manner, muſt have recourſe to the works of Reaumur and Swammerdam.

Of the Kinds of INSECTS, *and where the Collector for the Cabinet may find them.* Inſects in general are known to moſt people, the ſyſtematic diſtinctions but to few; nor have we any Engliſh names for the greateſt part of them. The general denominations of beetles, butterflies, moths, flies, bees, waſps, and a few other common names, are all that our language ſupplies. It would, therefore, be in vain to enumerate the immenſe variety of genera and ſpecies to any perſon unſkilled in the ſcience of entomology: we may, however, give directions under general names where to find each kind.

The claſs of inſects is divided by Linnæus into ſeven orders. See ZOOLOGY.

Plate CLIV.

I. The COLEOPTERA, (from κωλεος, a *ſheath*, and ϖτερον, a *wing*,) are ſuch inſects as have cruſtaceous *elytra* or ſhells, which ſhut together, and form a longitudinal ſuture down the back of the inſect; as the beetle, (*bupreſtris ignita*,) fig. 11. Many of them (as the *ſcarabæus* or chaffer, *dermeſtes* or leather-eater, *hiſter* or mimick-beetle, *ſtaphylinus* or rove-beetle, &c.) are found in and under the dung of animals, eſpecially of cows, horſes, and ſheep. Some (as *lucanus* or ſtag-beetle, *cerambyx* or capricorn beetle, *dermeſtes*, &c.) are found in rotten and half-decayed wood, and under the decayed bark of trees. Others (as *hiſter*, *ſilpha* or carrion-beetle, *ſtaphylinus*, &c.) on the carcaſes of animals that have been dead four or five days; on moiſt bones that have been gnawed by dogs or other animals; on flowers having a fetid ſmell; and on ſeveral kinds of fungous ſubſtances, particularly the rotten and moſt ſtinking. Others (as *byrrhus*, *curculio* or weevil, *bruchus* or ſeed-beetle, &c.) may be found in a morning about the bottoms of perpendicular rocks and ſand-banks, and alſo upon the flowers of trees and herbaceous plants. Many kinds (as *gyrinus* or whirl-beetle, *dytiſcus* or water-beetle, &c.) may be caught in rivers, lakes, and ſtanding pools, by means of a thread-net, with ſmall meſhes, on a round wire-hoop, fixed at the end of a long pole. In the middle of the day, when the ſun ſhines hot, ſome (as the *coccinella* or lady-fly, *bupreſtis* or burn-cow, *chryſomela* or golden honey-beetle, *cantharis* or ſoft-winged-beetle, *elater* or ſpring-beetle, *necydalis* or clipt-winged beetle, &c.) are to be ſeen on plants and flowers, blighted trees and ſhrubs. Others (as *lampyris* or glow-worm, &c.) frequent moiſt meadows, and are beſt diſcovered at night, by the ſhining light which they emit. A great variety ſit cloſe on the leaves of plants, particularly of the burdock, elecampane, coltsfoot, dock, thiſtle, and the like, (as the *caſſida* or tortoiſe-beetle, &c.); or feed on different kinds of tender herbs (as the *meloë* or bliſter-beetle.) Numbers (as the *tenebrio* or ſtinking-beetle,) may be found in houſes, dark cellars, damp pits, caves, and ſubterraneous paſſages; or on umbelliferous flowers, (as the *cerambyx*, *ptinus*, &c.); or on the trunks as well as on the leaves of trees, in timber-yards, and in the holes of decayed wood. Some (as the *leptura* or wood-beetle, *cicindela* or gloſſy-beetle, &c.) inhabit wild commons, the margins of pools, marſhes, and rivulets; and are likewiſe ſeen creeping on flags, reeds, and all kinds of water-plants. Multitudes (as the *carabus* or ground-beetle) live under ſtones, moſs, rubbiſh, and wrecks near the ſhores of lakes and rivers. Theſe are found alſo in bogs, marſhes, moiſt places, pits, holes of the earth, and on ſtems of trees; and in an evening they crawl plentifully along path-ways after a ſhower of rain. Some (as the *forficula* or earwig) may be diſcovered

Lettſome's Naturaliſt's and Trav.'s Companion, p. 2, &c.

in the hollow ſtems of decayed umbelliferous plants, and on many ſorts of flowers and fruits.

II. Hemiptera, (from ημισυ, *half*, and πτερον, a *wing*,) have their upper wings uſually half cruſtaceous and half membranaceous, not divided by a longitudinal ſuture, but incumbent on each other; as the *cimex*, fig. 12. Some of theſe (as the *blatta* or cockroach) are found about bake-houſes, &c.; others (as the *mantis* or camel-cricket, *gryllus* or locuſt, *fulgora*, *cicada*, or flea-locuſt, *cimex* or bug, &c.) on graſs, and all kinds of field-herbage. Some (as *notonecta* or boat-fly, *nepa* or water-ſcorpion, &c.) frequent rivers, lakes, and ſtanding pools.

III. Lepidoptera, (from λεπις, a *ſcale*, and πτερον, a *wing*,) are inſects having four wings, covered with fine ſcales in the form of powder or meal; as in the butterfly, (*papilio antiopa*,) fig. 13. In the day, when the ſun is warm, butterflies are ſeen on many ſorts of trees, ſhrubs, plants, and flowers. Moths may be ſeen in the day-time, ſitting on pales, walls, trunks of trees, in ſhades, out-houſes, dry holes, and crevices; on fine evenings, they fly about the places they inhabit in the day-time: ſome (as the *ſphinx* or hawk-moth,) are ſeen flying in the day-time over the flowers of honey-ſuckles and other plants with tubular flowers. Inſects of this ſpecies ſeldom ſit to feed, but continue vibrating on the wing, while they thruſt the tongue or proboſcis into the flowers.

IV. Neuroptera, (from νευρον, a *nerve*, and πτερον, a *wing*,) have four membranous tranſparent naked wings, generally like network; as in the *panorpa coa*, fig. 14. Of theſe, ſome (as the *myrmeleon*, *hemerobius* or pearl-fly, *raphidia* or camel fly, &c.) are found in woods, hedges, meadows, ſand-banks, walls, pales, fruits, and umbelliferous flowers. Others (as *libellula* or dragon-fly, *ephemera* or may-fly, *phryganea* or ſpring-fly, &c.) fly about lakes and rivers in the day.

V. Hymenoptera, (from υμην, a *membrane*, and πτερον, a *wing*), are inſects with four membranous wings, tail furniſhed with a ſting; as in the *tenthredo*, fig. 15. Theſe, including waſps, bees, &c. frequent hedges, ſhrubs, flowers, and fruits.

VI. Diptera, (from δυω, *two*, and πτερον, a *wing*,) are ſuch as have only two wings, and poiſers; as in the fly, fig. 16. Flies of various kinds conſtitute this claſs; of which ſome (as *œſtras* or gad-fly, *muſca* or fly, *tabanus* or whame,) fly about the tops of trees, little hills, horſes, cows, ſheep, ditches, dunghills, and every offenſive object. Others (as *tipula*, *conops*, *aſilus* or waſp-fly, &c.) are found on all ſorts of flowers, particularly thoſe of a fetid ſmell.

VII. Aptera (from α, *without*, and πτερον, a *wing*, inſects having no wings. This laſt diviſion contains ſcorpions, ſpiders, crabs, lobſters, &c.

Of Catching and Preſerving Insects *for Collections.* In the following directions, we ſhall relate the methods of killing them the moſt readily, and with the leaſt pain, as the purſuit of this part of natural hiſtory hath been often branded with cruelty; and however reaſonably the naturaliſt may exculpate himſelf by pleading the propriety of ſubmitting to an evil which leads to uſeful diſcoveries, yet for wanton cruelty there never can be a juſt pretext:

——The poor beetle that we tread upon,
In corp'ral ſufferance feels a pang as great
As when a giant dies.

1. The firſt claſs, conſiſting of beetles (*coleoptera*), are hard-winged. Many kinds fly about in the day, others in the evening, ſome at night only. They may be caught with a gauze-net, or a pair of forceps covered with gauze. When they are taken, ſtick a pin thro' the middle of one of the hard wings, and paſs it thro' the body. They may be killed inſtantly, by immerſion in hot water, as well as in ſpirit of wine; then ſtick them on a piece of cork, and afterwards carefully place their legs in a creeping poſition, and let them continue expoſed to the air until all the moiſture is evaporated from their bodies. Beetles may alſo be preſerved in ſpirit of wine, brandy, or rum, cloſely corked up.

2. Inſects of the ſecond claſs (*hemiptera*) may be killed in the ſame manner as beetles, and likewiſe by means of a drop of the etherial oil of turpentine applied to the head; or in the manner to be deſcribed under the next claſs for killing moths.

3. The diviſion of butterflies and moths, (*lepidoptera*), as well as all flies within membranaceous wings, ſhould be catched with a gauze net, or a pair of gauze forceps: when taken in the forceps, run a pin through the thorax or ſhoulders, between the fore-wings. After this is done, take the pin by the head, and remove the forceps, and with the other hand pinch the breaſt of the inſect, and it will immediately die: the wings of butterflies ſhould be expanded, and kept ſo by the preſſure of ſmall ſlips of paper for a day or two. Moths expand their wings when at reſt, and they will naturally take that poſition.

The larger kinds of theſe inſects will not ſo readily expire by this method, as by ſticking them upon the bottom of a cork exactly fitted to the mouth of a bottle, into which a little ſulphur had been put, and by gradually heating the bottle, till an exhalation of the ſulphur take place, when the inſect inſtantly dies, without injuring its colours or plumage.

The beſt method of having the moſt perfect butterflies, is to find out, if poſſible, the larva or caterpillar of each, by examining the plants, ſhrubs, or trees, they uſually feed upon, or by beating the ſhrubs and trees with long poles, and thereby ſhaking the caterpillars into a ſheet ſpread underneath to receive them; to put them into boxes covered with thin canvas, gauze, or cat-gut, and to feed them with the freſh leaves of the tree or herb on which they are found; when they are full grown, they will go into the pupa or chryſalis ſtate, and require then no other care till they come out perfect butterflies, at which time they may be killed, as before directed. Sometimes theſe inſects may be found hanging to walls, pales, and branches of trees, in the chryſalis ſtate.

Moths might likewiſe be procured more perfect, by collecting the caterpillars, and breeding them in the ſame manner as butterflies. As the larvæ or caterpillars cannot be preſerved dry, nor very well kept in ſpirit, it would be ſatisfactory if exact drawings could be made of them while they are alive and perfect. It may be neceſſary to obſerve, that in breeding theſe kinds of inſects, ſome earth ſhould be put into the boxes, as likewiſe ſome rotten wood in the corners; becauſe, when the caterpillars change into the pupa or chryſalis ſtate, ſome go into the earth, and continue under ground for many months before they come out into the moth ſtate; and ſome cover themſelves with a hard ſhell, made up of ſmall pieces of rotten wood.

4. The fourth claſs of inſects (*neuroptera*) may be killed with ſpirit of wine, oil of turpentine, or by the fumes of ſulphur.

5. Thoſe of the next claſs (*hymenoptera*) may be killed in the ſame manner. A pin may be run thro' one of their wing-ſhells and body.

6. Inſects of the ſixth claſs (*diptera*) may likewiſe be killed by ſpirit, or by fumes of ſulphur.

7. Thoſe of the laſt diviſion (*aptera*) are in general ſubjects which ſhould be kept in ſpirit.

When in ſearch of inſects, we ſhould have a box ſuitable to carry in the pocket, lined with cork at the bottom and top to ſtick them upon, until they are brought home. If this box be ſtrongly impregnated with camphor, the inſects ſoon become ſtupified, and are thereby prevented from fluttering and injuring their plumage. Beſides a gauze forceps, the collector ſhould have a large muſqueto gauze-net, and alſo a pin-cuſhion with three or four different ſizes of pins, to ſuit the different ſizes of inſects.

In hot climates, inſects of every kind, but particularly the larger, are liable to be eaten by ants and other ſmall inſects; eſpecially before they are perfectly dry: to avoid this, the piece of cork on which our inſects are ſtuck in order to be dried, ſhould be ſuſpended from the cieling of a room, by means of a ſlender ſtring or thread; beſmear this thread with bird-lime, or ſome adheſive ſubſtance, to intercept the rapacious vermin of theſe climes in their paſſage along the thread.

After our inſects are properly dried, they may be placed in the cabinet or boxes where they are to remain: theſe boxes ſhould be kept dry; and alſo made to ſhut very cloſe, to prevent ſmall inſects from deſtroying them; the bottoms of the boxes ſhould be covered with pitch, or green wax, over which paper may be laid; or, which is better, lined with cork, well impregnated with a ſolution of corroſive ſublimate mercury in a ſaturated ſolution of crude ſal-ammoniac in water, an ounce of which will diſſolve 20 ſcruples of the ſublimate.

The fineſt collections have been ruined by ſmall inſects, and it is impoſſible to have our cabinets too ſecure. Such inſects as are thus attacked may be fumigated with ſulphur, in the manner deſcribed for killing moths; if this prove ineffectual, they may be immerſed in ſpirit of wine, without much injuring their fine plumage or colours, and afterwards let them be ſprinkled about their bodies and inſertions of the wings with the ſolution above-mentioned. But baking the inſects in an oven, in the manner deſcribed for BIRDS (under that article), is the moſt effectual method of extirpating theſe enemies; however, the utmoſt caution is requiſite in this proceſs, in regulating the heat of the oven.

N. B. All kinds of inſects having no wings, may be preſerved in ſpirits, brandy, or rum; except crabs, lobſters, and the like, which may conveniently be preſerved dry.

INSECTS *giving root to Plants*. Of this we have an account, by Mr Fourgeroux, in the Memoirs of the Academy of Sciences for 1769. The plants, of which Mr Fougeroux gives an account, are perfectly the reverſe of the worm-plant of China, deſcribed by Mr Reaumur in the year 1726. For, in that caſe, a worm fixes its ſnout into the extremity of the plant, and derives nouriſhment from it. But the plants, of which an account is here given, derive their nouriſhment from the animals.

The greateſt part of the animal-plants which he has ſeen, grow, he tells us, on the chryſalis of a ſpecies of cicada. The plant growing on theſe inſects has got the generic name of *clavaria*, becauſe its ſtalks and branches, when it has any, are terminated by tubercles, which give the appearance of little clubs. The root of this plant, in general, covers the body of the inſect, and ſometimes is even extended over its head. When theſe productions have for ſome time been preſerved in ſpirits, the plant and animal may be ſeparated from each other without hurting either. Small grooves, formed by the rings of the animal, may be obſerved running croſs the roots of the plant: but no veſtige can be found of the root's having any where penetrated the body of the inſect. Theſe plants produce fibres differing in length and number. The fibres are terminated by tubercles, which, before the plant arrives at maturity, are ſolid; but, after that period, they are found punctured, probably by worms which have ſuffered a metamorphoſis upon eſcaping from them.

According to Mr Fourgeroux, plants grow, not only on the chryſalis of the cicada, but upon the cicada itſelf. He ſaw one of this kind upon a cicada brought from Cayenne. The plant, in this caſe, differed from the clavaria already mentioned. It was a ſpecies of fucus, compoſed of long, white, ſilky fibres, covering the body of the inſect, and extending from ſeven to eight lines above and below its belly.

The author has found the clavaria growing upon worms. He has found it chiefly upon worms, which ſuffering a metamorphoſis, become afterwards a ſmall ſpecies of May-bug. This chryſalis, he obſerves. is very different from that of the cicada; and, even in its worm-ſtate, may eaſily be diſtinguiſhed from it.

After deſcribing theſe different ſpecies of animal-plants, the author next proceeds to offer his opinion upon this ſubject. He firſt conſiders what had been ſaid by Dr Watſon, in the Philoſophical Tranſactions, concerning the vegetating-fly of the Caribbee iſlands *. Dr Watſon's account of theſe flies is, that they bury themſelves about the month of May, and begin to be metamorphoſed in June; and that the little plant which grows upon them reſembles a branch of coral, is about three inches in height, and carries ſmall protuberances, where worms are generated, which are again converted into flies. The author imagines, that, in this account, Dr Watſon has been deceived by the worms, which he has already obſerved will eat into the clavaria, and undergo a change in the holes which they have there made. Mr Fourgeroux is rather inclined to adopt the opinion of Dr Hill, founded upon obſervations made at Martinico. There the cicadæ are very frequent; and, during their chryſalis ſtate, bury themſelves among dead leaves, to wait their metamorphoſis. Dr Hill imagines, that the ſeeds of the clavaria are then attached to them, and are afterwards developed, much in the ſame manner as the fungus ex pede equino grows upon the hoofs of dead horſes.

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* See *Vegetable* FLY.

It may appear aſtoniſhing, that the clavaria ſhould attach itſelf ſo conſtantly to the nymphæ of the cicadæ in America, as it is not obſerved to do ſo in other countries. For this Mr Fourgeroux attempts to account, from viewing the clavaria as a paraſite peculiar to this ſpecies of inſect; from the great number of the nymphæ of cicadæ which abound in America; and from the circumſtances of the climate and ſoil, which may render this phenomenon very common there, although it be not obſerved in Europe.

Insects *blown from the Noſe.* Of this we are furniſhed with many accounts in the works of medical authors. The fact is confirmed by Dr Monro *, who has received at different times ſome of theſe inſects from different perſons. They were all of the ſcolopendra kind, though not exactly anſwering to any deſcription of Linnæus. One of theſe he received from Mr Hill ſurgeon in Dumfries. It was an inch and a half long; and lived ſome hours after it was diſcharged, creeping about ſlowly on a table. It was then put into ardent ſpirits, ſoon after which it died.

* Ed. Med. Com. ii. 312.

INSERTION, in anatomy, the cloſe conjunction of the veſſels, tendons, fibres, and membranes of the body with ſome other parts.

INSIPID, an appellation given to things without taſte.

INSOLATION, in chemiſtry, the ſuffering matters to ſtand and digeſt in the heat of the ſun, inſtead of that of a furnace.

INSOLVENT, a term applied to perſons unable to pay their debts.

Trial by INSPECTION, or Examination, is when, for the greater expedition of a cauſe, in ſome point or iſſue, being either the principal queſtion, or ariſing collaterally out of it, but being evidently the object of ſenſe, the judges of the court, upon the teſtimony of their own ſenſes, ſhall decide the point in diſpute. For, where the affirmative or negative of a queſtion is matter of ſuch obvious determination, it is not thought neceſſary to ſummon a jury to decide it; who are properly called in to inform the conſcience of the court of dubious facts: and therefore, when the fact, from its nature, muſt be evident to the court either from ocular demonſtration or other irrefragable proof, there the law departs from its uſual reſort, the verdict of 12 men, and relies on the judgment of the court alone. As in caſe of a ſuit to reverſe a fine for non-age of the cognizor, or to ſet aſide a ſtatute or recognizance entered into by an infant; here, and in other caſes of the like ſort, a writ ſhall iſſue to the ſheriff, commanding him that he conſtrain the ſaid party to appear, that it may be aſcertained by the view of his body by the king's juſtices, whether he be of full age or not: *Ut per aſpectum corporis ſui conſtare poterit juſticiariis noſtris, ſi prædictus an ſit plenæ ætatis necne.* If, however, the court has, upon inſpection, any doubt of the age of the party, (as may frequently be the caſe), it may proceed to take proofs of the fact; and particularly may examine the infant himſelf upon an oath of *voir dire, veritatem dicere;* that is, to make true anſwers to ſuch queſtions as the court ſhall demand of him: or the court may examine his mother, his godfather, or the like.

INSPIRATION, among divines, implies the conveying of certain extraordinary and ſupernatural notices or motions into the ſoul.

Some authors reduce the inſpiration of the ſacred writers to a particular care of providence, which prevented any thing they had ſaid from failing or coming to nought; maintaining, that they never were really inſpired, either with knowledge or expreſſion.

According to M. Simon, inſpiration is no more than a direction of the Holy Spirit, which never permitted the ſacred writers to be miſtaken.

It is a common opinion, that the inſpiration of the Holy Spirit regards only the matter, not the ſtyle or words; which ſeems to fall in with M. Simſon's doctrine of direction.

Among the heathens, the prieſts and prieſteſſes were ſaid to be divinely inſpired when they gave oracles.

The poets, too, laid claim to it; and to this end always invoked Apollo and the muſes at the beginning of any great work.

Inspiration, in phyſic, is underſtood of that action of the breaſt, by which the air is admitted within the lungs; in which ſenſe, inſpiration is a branch of reſpiration, and ſtands oppoſed to Exspiration.

This admiſſion of the air depends immediately on its ſpring or elaſticity, at the time when the cavity of the breaſt is enlarged by the elevation of the thorax and abdomen, and particularly by the motion of the diaphragm downwards: ſo that the air does not enter the lungs, becauſe they are dilated; but thoſe dilate, becauſe the air enters within them. Nor is it the dilatation of the breaſt which draws in the air, as is commonly thought, tho' this is a condition abſolutely neceſſary to inſpiration; but an actual intruſion of the air into the lungs. See Respiration.

INSPISSATING, in pharmacy, an operation whereby a liquor is brought to a thicker conſiſtence, by evaporating the thicker parts.

INSPRUCK, a city of Germany, in the circle of Auſtria, and capital of the county of Tyrol, and formerly the reſidence of the archdukes of Auſtria. It is ſeated in a pleaſant valley, in E. long. 11. 27. N. Lat. 47. 3.

INSTALLATION, the act of giving viſible poſſeſſion of an order, rank, or office, by placing in the proper ſeat. See Installment.

INSTALLMENT, a ſettling or inſtating any perſon in a dignity. The word is derived from the Latin *in,* and *ſtallum,* a term uſed for a ſeat in church, in the choir, or a ſeat or bench in a court of juſtice, &c. Though Voſſius is of opinion the word is of German origin.

Installment is chiefly uſed for the induction of a dean, prebendary, or other eccleſiaſtical dignitary, into the poſſeſſion of his ſtall, or proper ſeat, in the cathedral church to which he belongs. This is ſometimes alſo called *inſtallation.*

Installment is likewiſe uſed for the ceremony, whereby the knights of the garter are placed in their rank, in the chapel of St George at Windſor.

INSTANT, a part of duration in which we perceive no ſucceſſion; or it is that which takes up the time only of one idea in our minds.

INSTAURATION, the re-eſtabliſhment or reſtauration of a religion, a church, or the like, to its former ſtate. The word is by ſome derived from the old Latin *inſtaurum*, which ſignified the "ſtock" of things neceſſary for the tilling and managing of grounds; as cattle, tools, harneſs, &c. But the word *inſtaurum* is only of the middle age: *inſtauratio* is of much greater antiquity, and by ſome derived from *inſtar*, "like;" as importing a thing's being brought to its former likeneſs or appearance. See Restauration.

INSTEP, in the manege, is that part of a horſe's hind leg which reaches from the ham to the paſtern-joint.

INSTINCT, a natural diſpoſition or ſagacity wherewith animals are endued; by virtue whereof they are enabled to provide for themſelves, know what is good for them, and determined to preſerve and propagate their ſpecies.

Instinct bears ſome analogy to reaſon, and ſupplies the defect of it in brutes. See Brute.

INSTITUTES, in literary hiſtory, a book containing the elements of the Roman law.

The inſtitutes are divided into four books; and contain an abridgement of the whole body of the civil law, being deſigned for the uſe of ſtudents. See Law, n° 6,—11. and 43, 44.

Institute, in Scots law. When by diſpoſition or deed of entail a number of perſons are called to the ſucceſſion of an eſtate one after another, the perſon firſt named is called the *inſtitute*, the others *ſubſtitutes*.

INSTITUTION, in general, ſignifies the eſtabliſhing or founding ſomething.—In the canon and common law, it ſignifies the inveſting a clerk with the ſpiritualities of a rectory, &c. which is done by the biſhop, who uſes the following formula: "I inſtitute you rector of ſuch a church with the cure of ſouls, and receive your care and mine."

Institutions, in literary matters, denote a ſyſtem of the elements or rules of any art or ſcience.

Thus phyſical, or medicinal inſtitutions, are ſuch as teach the neceſſary præcognita to the practice of medicine, or the cure of diſeaſes.

INSTRUMENT, in general, whatever is ſubſervient to a cauſe in producing any effect.

Notorial Instrument, in Scots law, any fact certified in writing, under the hand of a notary-public.

INSULAR, any thing belonging to an iſland.—Inſular ſituations are productive of many happy conſequences to the inhabitants, both with reſpect to the climate, ſecurity, and convenience for commerce; for a particular account of which, ſee Island and Coast.

INSULATED, in architecture, an appellation given to ſuch columns as ſtand alone, or free from any contiguous wall, like an iſland in the ſea; whence the name.

Insulated, in electrical experiments. When any body is prevented from communicating with the earth by the interpoſition of an electric body, it is ſaid to be *inſulated*. See Electricity, n° 20.

INSURANCE, in law and commerce, a contract, whereby one party engages to pay the loſſes which the other may ſuſtain, for a ſtipulated premium or conſideration. The moſt common ſorts are, Inſurance againſt the dangers of the ſeas, inſurance againſt fire, inſurance of debts, and inſurance of lives.

I. Insurance *againſt Loſs at Sea*, is a moſt beneficial inſtitution, for promoting the ſecurity of trade, and preventing the ruin of individuals; and is now conducted by a regular ſyſtem of rules, eſtabliſhed by the interpoſition of the legiſlature, the deciſion of the courts of juſtice, and the practice of merchants.

It is carried on to the beſt advantage by public companies, or by a conſiderable number of private perſons, each of whom only engages for a ſmall ſum, on the ſame veſſel. There are two public companies eſtabliſhed by authority of parliament, viz. the London and Royal Exchange Inſurance-Companies. For procuring ſubſcription by private perſons, brokers are generally employed, who extend the policy or contract of inſurance, procure ſubſcriptions, and aſſiſt at ſettling loſſes. They are entitled to an allowance for their trouble, generally 5 per cent. on premiums, and 2 per cent. on loſſes.

The parties who engage to pay the damage are called the *inſurers* or *under-writers*; the parties for whoſe ſecurity they engage are called the *inſured*. The premium is underſtood to be paid when the inſurance is made; but, if it be not paid, the inſurers have a preferable right on the ſubject inſured.

On this ſubject, we ſhall conſider, What is neceſſary to render an inſurance valid:——When the riſk commences, and when it terminates:—What conſtitutes a total or a partial loſs:—What proof of loſs is neceſſary:—and, How the loſs is adjuſted.

Firſt, In order to render an inſurance valid, the inſured muſt have property really at ſtake; the voyage muſt take place under the circumſtances agreed on; the dangers inſured againſt muſt not be contrary to law; and a candid account muſt be given of circumſtances which enhance the danger.

1. The condition of poſſeſſing property was required by 19 Geo. II. c. 37. to prevent ſhips from being fraudulently deſtroyed when inſured above their value; and to diſcourage a practice which had become common, of converting policies to the purpoſe of mere wagers. In tranſactions of this kind, as the inſured had no property, and could claim no indemnification for partial damage; ſo the inſurers, having loſt their wager by the ſhip's being loſt, could claim no abatement, though part was ſaved: accordingly, the policies contained clauſes of intereſt or no intereſt, free from average, and without benefit of ſalvage. All ſuch policies are declared invalid.

This reſtriction does not extend to privateers, nor to ſhips trading to the Spaniſh or Portugueſe plantations.

Inſurances are commonly made as intereſt ſhall appear; and it is incumbent on the inſured to prove the value of his property. The value of the goods may be proved by the invoices; and the cocquet muſt be produced, if required, to inſtruct that the goods were actually ſhipped. It is admitted to value the ſhip at prime coſt and charges, deducting the freights that have been drawn ſince purchaſed, if the proprietors chooſe to ſtand to that rule; but they are not reſtricted to it. Sometimes the value of the ſhip or goods is expreſſed in the policy; and this value muſt be admitted, although it be higher than the true one: but it is incumbent on the inſured to prove that he had property at ſtake; and, if the property be trifling in compariſon of the ſum inſured, the inſurance will be ſet aſide, as an evaſion of the ſtatute.

Expected profits, and bounty on the whale-fiſhery, if ſpecified in the policy, may be inſured.

When the value is leſs than the ſum inſured, the owners may claim a return of premium for the exceſs.

If there be ſeveral policies on the ſame ſubject, of different dates, the earlier one is valid, and the others muſt be vacated. If they be of the ſame date, they muſt be vacated in equal proportions.

When a policy is vacated, in whole, or in part, the under-writers have a right to retain $\frac{1}{2}$ per cent. for their trouble.

In the caſe of a cargo intended for A, but afterwards ſent to B, both expected it, and inſured, and B claimed for the value on its being loſt. The underwriters anſwered, that it was a double inſurance, and they ought only to pay their proportion. Judgment was given, finding them liable for the whole, and reſerving to them any demand competent againſt the underwriters who inſured for A.

Fraudulently to caſt away or deſtroy a ſhip inſured above its value, is felony.

2. If the ſhip does not proceed on the voyage, or if, being warranted to depart with convoy, it departs without convoy, the inſurance muſt be vacated.

If the extent of a trading voyage be uncertain, the longeſt one in contemplation is deſcribed in the policy, and it is agreed that part of the premium ſhall be returned if the voyage be ſhortened. In like manner, in time of war, when inſurance is made without condition of convoy, it is agreed that part of the premium be returned in caſe it ſail with convoy.

When a ſhip is warranted to depart with convoy, it is underſtood from the uſual place of convoy, (*e. g.* the Downs,) and it is inſured till it arrive there.

The common proof of ſailing with convoy is the production of ſailing orders; but, if a ſhip be prevented by the weather from receiving the ſailing orders, other proof may be admitted.

A ſhip was inſured from the Thames to Halifax, warranted to ſail from Portſmouth with convoy. The convoy had ſailed before the ſhip arrived there, and the underwriters declined to inſure it, without convoy, for the reſt of the voyage. They were found liable to return part of the premium, retaining only in proportion to the accuſtomed rate from London to Portſmouth. This deciſion ſeems to eſtabliſh the following principle, that, when the voyage performed is only part of that deſcribed in the policy, and when the riſk can be proportioned, the underwriters are bound to return part of the premium, though there be no agreement for that purpoſe.

But, if a ſhip, inſured only againſt the hazards of the ſea, be taken by the enemy, the inſured have no right to claim a return of premium, though the capture happen ſoon, under pretence that little ſea-hazard was incurred.

If a ſhip deviates from the voyage deſcribed in the policy without neceſſity, it ſets aſide the inſurance. An intention to deviate is not ſufficient to ſet it aſide; there muſt be an actual deviation; and, even in that caſe, the inſurers are liable for damages ſuſtained before deviation.

It is no deviation to go out of the way to the accuſtomed place of convoy, nor to the neareſt place where neceſſary repairs may be had. Deviation, for the purpoſe of ſmuggling, if without the knowledge of the owners, does not ſet aſide the inſurance, nor when the maſter is forced by the crew to return.

In inſurances to the Eaſt-Indies, and home, the inſurers are underſtood to take the riſk of detention in the country, and of country voyages.

3. Inſurance of prohibited goods, againſt the riſk of ſeizure by the government, is unlawful, and invalid. The inſurers, inſured, brokers, and all acceſſories, are liable to the fine of 500l.

4. If the inſured have any information of more than common danger, they muſt reveal every ſuch circumſtance to the inſurers, otherwiſe the policy is ſet aſide.

This rule is eſtabliſhed for the preſervation of good faith; and there are ſeveral ſtrong deciſions in ſupport of it. If a ſhip be ſpoke to leaky at ſea, or if there be a report of its being loſt, theſe circumſtances muſt be communicated to the inſurers. Even the concealment of a falſe report of loſs vitiates the inſurance; and, if the ſhip be afterwards loſt, though in a different manner, the inſured will recover nothing. In a voyage from Carolina to London, another ſhip had ſailed 10 days after that which was inſured, and arrived ſeven days before the inſurance was made; and the concealment of this circumſtance, though the fact was not proved to the ſatisfaction of the jury, was conſidered as ſufficient to ſet it aſide. Alſo, ſince the commencement of the American war, a ſhip being inſured from Portugal, by the month, without condeſcending on the voyage, ſailed for North-America, and was taken by a provincial privateer. The inſurers refuſed to pay, becauſe the hazardous deſtination was concealed; and it was only upon proof of the inſured being equally ignorant of it, that they were found liable.

But the inſured are not obliged to take notice of general perils, which the inſurers are underſtood to have in contemplation; dangerous navigation, Weſt-Indian hurricanes, enterprizes of the enemy, and the like.

Inſurance is not ſet aſide by a miſtake in the name of the ſhip or maſter, or the like.

Inſurance may be made on an uncertain ſhip; on any ſhip that the goods may be loaded on; on any ſhip that A ſhall ſail in from Virginia. In this laſt caſe, the policy is not transferred to a ſhip which A goes on board during the voyage.

Secondly, If a ſhip be inſured at and from a port, the inſurance commences immediately if the ſhip be there, or at its arrival there. If it be damaged when preparing for a voyage, the inſurers are liable; but not if the voyage be laid aſide for ſeveral years, with conſent of the owners. Inſurance from a port commences when the ſhip breaks ground; and, if it ſet ſail, and be driven back and loſt in the port, the inſurers are liable.

Inſurance on goods generally continues till they be landed; but, if they be ſold after the ſhip's arrival, and freight contracted to another port, the inſurance is concluded. Goods ſent on board another ſhip or lighter are not at the riſk of the inſurer; but goods ſent aſhore in the long-boat are.

Inſurance on freight commences when the goods are put on board.

Goods from the Eaſt-Indies, inſured to Gibraltar, and to be re-ſhipped from thence to Britain, were put on board a ſtore-ſhip at Gibraltar, to wait an opportunity of re-ſhipping, and were loſt: The cuſtom of putting goods aboard a ſtore-ſhip being proved, the inſurers were found liable.

Loſs of ſails aſhore, when the ſhip is repairing, is comprehended within the inſurance. What is neceſſarily underſtood, is inſured, as well as what is expreſſed; the eſſential means, and intermediate ſteps, as well as the end. Ships performing quarantine are at the riſk of the inſurer.

Thirdly, The inſurers are liable for a total loſs when the ſubject periſhes through any of the perils inſured againſt. Baratry, though it properly ſignifies running away with the ſhip, extends to any kind of fraud in the maſter or mariners. Inſurance againſt detention of princes does not extend to ſhips that are ſeized for tranſgreſſing the laws of foreign countries.

The inſurers are alſo liable for a total loſs, when damage is ſuſtained, and the remaining property abandoned or veſted in the inſurers.

If a ſhip be ſtranded, or taken, and kept by the enemy, or detained by any foreign power, or ſeized for the ſervice of the government, the proprietors have a right to abandon.

But, if a ſhip be taken by the enemy, and be retaken, or makes its eſcape, before action againſt the inſurers; have the inſured a right to abandon, or muſt they only claim for the damages ſuſtained as an average loſs? There are oppoſite deciſions, according as the circumſtances of the caſe were ſtrong. When the ſhip was long detained, the goods periſhable, the voyage intirely loſt, or ſo diſturbed, that the purſuit of it was not worth the freight, or when the damage exceeds half the value of the thing, they have been found intitled to abandon; (Goſs againſt Withers, 2 Burrow, 683.). But, if the voyage be completed with little trouble or delay, they are not intitled; (Hamilton againſt Mendez, 2 Burrow, 1198.).

The inſured cannot claim, as for a total loſs, on an offer to abandon, when the loſs is, in its nature, only partial; for, if this were permitted, they might devolve the loſs occaſioned by bad markets on the inſurers.

And, in all caſes, the inſured have their option to abandon, or not. They may retain their property if they pleaſe, and claim for an average loſs; and they muſt make their option before they claim.

If the goods be ſo much damaged, that their value is leſs than the freight, the inſurers are accountable as for a total loſs.

The inſurers are liable for general average, when the property is charged with contribution; and for particular average, when the property is damaged, or part of it deſtroyed.

If the damage be ſuſtained through the fault of the ſhip, the owners of the goods may have recourſe, either againſt the maſter or inſurers; and, if the inſurers be charged, they ſtand in the place of the owners, and have recourſe againſt the maſter.

In order to prevent the inſurers from being troubled with frivolous demands for average, it is generally ſtipulated, that none ſhall be charged under 5 *per cent.* or ſome other determined rate; and corn, flax, fruit, fiſh, and like periſhable goods, are warranted free from average, unleſs general, or the ſhip be ſtranded.

In order to encourage every effort to ſave the ſhip, the inſurers are liable for charges laid out with that deſign, although the ſubject periſh. Thus, they may be charged with more than the ſum inſured.

In caſe of goods being damaged, the proportion of the ſum inſured, for which the underwriters are liable, is regulated by the proportion of the prices which the ſound and damaged goods fetch at the port of deſtination. The prime coſt of the goods is not conſidered, nor the neceſſity of immediate ſale, in conſequence of damage. Although the damaged goods ſell above prime coſt, the inſurers are liable.

Fourthly, If a ſhip be loſt, and the crew ſaved, the loſs is proved by the evidence of the crew.

If damage be ſuſtained, the extent is proved by an examination of the ſubject damaged, at the ſhip's arrival; and the cauſe by the evidence of the crew.

If the ſhip be ſtranded, evidence muſt be taken at the place where ſtranded.

Documents of loſs muſt be laid before the underwriters, with all convenient ſpeed; and, if theſe be ſufficiently clear, the loſs ſhould be immediately ſettled. The underwriters generally grant their notes at a month or ſix weeks date for their proportions.

If a ſhip be not heard of for a certain time, it is preſumed loſt; and the underwriters are liable to pay the ſums inſured, the property being abandoned to them in the event of the ſhip's return. Six months are allowed for a voyage to any part of Europe, a year to America, and two years to the Eaſt Indies.

By the ordinance of Hamburgh, if a ſhip be three months beyond the uſual time of performing a voyage, the underwriters may be deſired to pay 92 *per cent.* on an abandon. If they decline it, they are allowed 14 months more, and then they muſt pay the full value.

A ſhip inſured againſt the hazards of the ſea, but not againſt the enemy, if never heard of, is preſumed loſt at ſea.

Fifthly, In order that the manner of ſettling loſſes may be underſtood, we muſt explain what is meant by covering property. We mentioned already, that inſurances for greater ſums than the inſured had really at ſtake, were contrary to law: but ſome latitude is allowed in that reſpect; for if the owner were to inſure no more than the exact value of his property, he would loſe the premium of inſurance, and the abatement, if any was agreed on.

For example, if he has goods on board to the value of 100 l. and inſures the ſame at 5 *per cent.* to abate 2 *per cent.* in caſe of loſs; then, if a total loſs happen, he recovers 98 l. from the inſurers, of which 5 l. being applied to re-place the premium, the nett ſum ſaved is only 93 l.: but, if the value on board be only 93 l. and the ſum inſured 100 l. he would be fully indemnified for the loſs; and his property, in that caſe, is ſaid to be covered.

To find how much ſhould be inſured to cover any ſum, ſubtract the amount of the premium and abatement

ment (if any), from 100 l. As the remainder is to 100 l. ſo is the value, to the ſum which covers it.

In caſe of a total loſs, if the ſum inſured be not greater than that which covers the property, the inſurers muſt pay it all. If greater, they pay what covers the property, and return the premium on the overplus.

Partial loſſes are regulated by this principle, that whereas the owner is not fully indemnified, in caſe of a total loſs, unleſs he covers his property, therefore he ſhould only be indemnified for a partial loſs in the ſame proportion; and, if it be not fully inſured, he is conſidered as inſurer himſelf, for the part not covered, and muſt bear a ſuitable proportion of the loſs. Therefore the value of the property is proved, and the ſum required to cover it computed. If that ſum be all inſured, the underwriters pay the whole damage; if only part be inſured, they pay their ſhare, which is computed by the following rule: As the ſum which covers the property is to the ſum inſured, ſo is the whole damage to the part for which the inſurers are liable.—For example, if the value of the property be 360 l. the ſum inſured 300 l. the premium 8 *per cent.* and abatement 2 *per cent.*; then the ſum which ſhould be inſured to cover the property is 400 l.; and, if damage be ſuſtained to the extent of 200 l. the owners will recover 150 l.

If a voyage is inſured out and home, the premium outward muſt be conſidered as part of the value on the homeward property, and the ſum neceſſary to cover it computed accordingly. For example, to inſure 100 l. out and home, at 5 *per cent.* each voyage, abatement 2 *per cent.* we compute thus:

93 : 100 : : L. 100 : L. 107 : 10 : 6, to be inſured outward, premium on L. 107 : 10 : 6 outwards, at 5 *per cent.* L. 5 : 7 : 6; 93 : 100 : : L. 105 : 7 : 6 : L. 113 : 6 s. to be inſured home; the premium on which is L. 5 : 13 : 6; and, if the ſhip be loſt on the homeward voyage,

From the ſum inſured home				L. 113	6	0
Subtract the diſcount, 2 *per cent.*				- 2	5	3
Sum for which the inſurers are liable				L. 111	—	—
Inſurance out	L. 5	7	6			
Inſurance home	- 5	13	3			
				11	—	9
Covered property				L. 100	—	—

II. Insurance *againſt Fire.* There are ſeveral offices in Britain for this purpoſe, of which the ſun fire-office is the moſt conſiderable. Inſurances are divided into common, hazardous, and doubly hazardous, according to the nature of the ſubject inſured. When the ſum inſured is high, there is a higher premium *per cent.* demanded; and money, papers, jewels, pictures, and gun-powder, are not comprehended. If a ſubject be wrong deſcribed, in order that it may be inſured at a lower premium, the policy is void. The benefit of a policy is transferred, by indorſement, to the repreſentatives of the perſon in whoſe favour it was made; and it may be transferred to other houſes when the inſured changes his habitation. If inſurance be made on the ſame ſubject in different offices, it muſt be ſpecified, by indorſement, on the policy; and, in caſe of loſs, the offices pay proportionally. The inſurers pay all expences in attempting to extinguiſh fire, or ſave goods, though not ſucceſsful. If the value of a ſubject be inſured in part, and damage be ſuſtained, the inſurers pay the whole, if it does not exceed the ſum inſured.

III. Insurance *of Debts.* See Bottomry.

IV. In virtue of Insurances *for Lives*, when the perſon dies, a ſum of money becomes payable to the perſon on whoſe behalf the policy of inſurance was granted. The principal inſurance office of this kind, is that of the amicable ſociety for a perpetual aſſurance, kept in Serjeant's inn, Fleet-ſtreet, London.

In this office, after paying the charges of the policy, and 10 s. entrance-money, each perſon pays 5 l. *per annum*, by quarterly payments; and from theſe payments, the dividends, which uſually amount 100 l. and upwards, are to ariſe. All perſons admitted are to be between the ages of 12 and 45, and in a good ſtate of health. Any perſon is allowed to have two or three inſurances or numbers on the ſame life, whereby ſuch perſon will be intitled to a claim on each number ſo inſured; and every claimant is empowered to put in a new life in the room of one deceaſed, within 12 kalendar months next after the end of the current year. By becoming members of this ſociety, clergymen, phyſicians, lawyers, tradeſmen, and all whoſe income ceaſes at the time of their death, may, in all probability, leave to their families a claim of not leſs than 100 l. for every 5 l. annually paid in.—The value of inſurances upon lives, depends upon the probability of the continuance of any propoſed life or lives, during any propoſed term. Any queſtions of this kind may be determined from Dr Halley's table, and from the principles of the doctrine of chances. But, as far as we can learn of the practice on ſuch occaſions, the premiums paid to inſurers are generally higher than any computation founded on obſervations concerning the probabilities of human life will warrant, Thus it is not unuſual to make a perſon pay 5 *per cent.* for the inſurance of his life for a twelvemonth; that is, in caſe the perſon dies within the year, the inſurer is to pay 100 l. for every 5 l. received. Now it appears from Dr Halley's table, which eſtimates the probability of life low enough, that 5 *per cent.* is an adequate value only for a life of an advanced age, ſuch as 64.

Re-Insurance is a ſecond contract, made by an inſurer, to transfer the riſk he has engaged for to another. It is in general forbidden by 19 Geo. II. c. 37. but is permitted to the repreſentatives of an inſurer, in caſe of his death, or to his aſſignees, in caſe of his bankruptcy; and it muſt be mentioned in the policy that it is a re-inſurance.

INTAGLIOS, precious ſtones on which are engraved the heads of great men, inſcriptions, and the like; ſuch as we frequently ſee ſet in rings, ſeals, &c.

INTEGER, in arithmetic, a whole number, in contradiſtinction to a fraction.

INTEGRAL, or integrant, in philoſophy, appellations given to parts of bodies which are of a ſimilar nature with the whole: thus filings of iron have the ſame nature and properties as bars of iron.

Bodies may be reduced into their integrant parts by triture or grinding, limation or filing, ſolution, amalgation, &c. See Grinding, &c.

INTEGUMENTS, in anatomy, denote the common coverings which inveſt the body; as the cuticula, cutis, &c. See ANATOMY.

INTEGUMENT, is alſo extended to the particular membranes which inveſt certain parts of the body; as the coats or tunics of the eye.

INTENDANT, one who has the conduct, inſpection, and management of any thing. See SUPERINTENDANT.

This is a title frequent among the French: they have *intendants of the marine*, who are officers in the ſea-ports, whoſe buſineſs it is to take care the ordinances and regulations relating to ſea-affairs be obſerved: *intendants of the finances*, who have the direction of the revenues: *intendants of provinces*, who are appointed by the king to take care of the adminiſtration of juſtice, policy, and finances in the provinces: alſo *intendants of buildings*, *of houſes*, &c.

INTENDMENT, in law, is the intention, deſign, or true meaning, of a perſon or thing, which frequently ſupplies what is not fully expreſſed: but tho' the intent of parties in deeds and contracts is much regarded by the law, yet it cannot take place againſt the rules of law.

INTENDMENT *of Crimes;* this, in caſe of treaſon, where the intention is proved by circumſtances, is puniſhable in the ſame manner as if it was put in execution. So, if a perſon enter a houſe in the night-time, with an intent to commit burglary, it is felony; alſo, an aſſault, with an intent to commit a robbery on the highway, is made felony, and puniſhed with tranſportation, 7 Geo. II. c. 21.

INTENT, in the civil law, ſignifies to begin, or commence, an action or proceſs.

INTENTION, in medicine, that judgment, or method of cure, which a phyſician forms to himſelf from a due examination of ſymptoms.

INTENTION, in phyſics, the increaſe of the power, or energy of any quality, as heat, cold, &c. By which it ſtands oppoſed to *remiſſion*, which ſignifies its decreaſe or diminution.

INTENTION, in metaphyſics, denotes an exertion of the intellectual faculties with more than ordinary vigour; when the mind with earneſtneſs fixes its view on any idea, conſiders it on all ſides, and will not be called off by any ſolicitation.

INTERCALARY, an appellation given to the odd day inſerted in leap-year; which was ſo called from *calo, calare,* "to proclaim," it being proclaimed by the prieſts with a loud voice.

INTERCOLUMNIATION, in architecture, denotes the ſpace between two columns, which is always to be proportioned to the height and bulk of the columns.

INTERCOSTAL, in anatomy, an appellation given to ſuch muſcles, nerves, arteries, and veins, as lie between the ribs.

INTERDICT, an eccleſiaſtical cenſure, by which the church of Rome forbids the performance of divine ſervice in a kingdom, province, town, &c. This cenſure has been frequently executed in France, Italy, and Germany; and in the year 1170, pope Alexander III. put all England under an interdict, forbidding the clergy to perform any part of divine ſervice, except baptizing of infants, taking confeſſions, and giving abſolution to dying penitents. But this cenſure being liable to the ill conſequences of promoting libertiniſm and a neglect of religion, the ſucceeding popes have very ſeldom made uſe of it.

There was alſo an interdict of perſons, who were deprived of the benefit of attending on divine ſervice. Particular perſons were alſo anciently interdicted of fire and water, which ſignified a baniſhment for ſome particular offence: by their cenſure no perſon was allowed to receive them, or allow them fire or water; and being thus wholly deprived of the two neceſſary elements of life, they were doubtleſs under a kind of civil death.

INTEREST, is the premium or money paid for the loan or uſe of other money. See ARITHMETIC, n° 20.

Many good and learned men have in former times very much perplexed themſelves and other people by raiſing doubts about the legality of intereſt in *foro conſcientiæ*. It may not be amiſs here to inquire upon what grounds this matter does really ſtand.

The enemies to intereſt in general make no diſtinction between that and uſury, holding any increaſe of money to be indefenſibly uſurious. And this they ground as well on the prohibition of it by the law of Moſes among the Jews, as alſo upon what is laid down by Ariſtotle, That money is naturally barren; and to make it breed money is prepoſterous, and a perverſion of the end of its inſtitution, which was only to ſerve the purpoſes of exchange, and not of increaſe. Hence the ſchool-divines have branded the practice of taking intereſt, as being contrary to the divine law both natural and revealed; and the canon law has preſcribed the taking any the leaſt increaſe for the loan of money as a mortal ſin.

But, in anſwer to this, it may be obſerved, that the Moſaical precept was clearly a political, and not a moral, precept. It only prohibited the Jews from taking uſury from their brethren the Jews; but in expreſs words permitted them to take it of a ſtranger: which proves that the taking of moderate uſury, or a reward for the uſe, for ſo the word ſignifies, is not *malum in ſe*, ſince it was allowed where any but an Iſraelite was concerned. And as to Ariſtotle's reaſon, deduced from the natural barrenneſs of money, the ſame may with equal force be alleged of houſes, which never breed houſes; and twenty other things, which nobody doubts it is lawful to make profit of, by letting them to hire. And though money was originally uſed only for the purpoſes of exchange, yet the laws of any ſtate may be well juſtified in permitting it to be turned to the purpoſes of profit, if the convenience of ſociety (the great end for which money was invented) ſhall require it. And that the allowance of moderate intereſt tends greatly to the benefit of the public, eſpecially in a trading country, will appear from that generally acknowledged principle, that commerce cannot ſubſiſt without mutual and extenſive credit. Unleſs money therefore can be borrowed, trade cannot be carried on: and if no premium were allowed for the hire of money, few perſons would care to lend it; or at leaſt the eaſe of borrowing at a ſhort warning (which is the life of commerce) would be entirely at an end. Thus, in the dark ages of monkiſh ſuperſtition and civil tyranny, when intereſt was laid under a total interdict,

terdict, commerce was alſo at its loweſt ebb, and fell entirely into the hands of the Jews and Lombards: but when mens minds began to be more enlarged, when true religion and real liberty revived, commerce grew again into credit; and again introduced with itſelf its inſeparable companion, the doctrine of loans upon intereſt.

And, really, conſidered abſtractedly from this its uſe, ſince all other conveniences of life may be either bought or hired, but money can only be hired, there ſeems no greater impropriety in taking a recompenſe or price for the hire of this, than of any other convenience. If one borrow 100 l. to employ in a beneficial trade, it is but equitable that the lender ſhould have a proportion of the gains. To demand an exorbitant price is equally contrary to conſcience, for the loan of a horſe, or the loan of a ſum of money: but a reaſonable equivalent for the temporary inconvenience which the owner may feel by the want of it, and for the hazard of his loſing it entirely, is not more immoral in one caſe than it is in the other. And indeed the abſolute prohibition of lending upon any, even moderate intereſt, introduces the very inconvenience which it ſeems meant to remedy. The neceſſity of individuals will make borrowing unavoidable. Without ſome profit by law, there will be but few lenders: and thoſe principally bad men, who will break thro' the law, and take a profit; and then will endeavour to indemnify themſelves from the danger of the penalty, by making that profit exorbitant. Thus, while all degrees of profit were diſcountenanced, we find more complaints of uſury, and more flagrant inſtances of oppreſſion than in modern times when money may be eaſily had at a low intereſt. A capital diſtinction muſt therefore be made between a moderate and exorbitant profit; to the former of which we uſually give the name of *intereſt*, to the latter the truly odious appellation of *uſury*: the former is neceſſary in every civil ſtate; if it were but to exclude the latter, which ought never to be tolerated in any well-regulated ſociety. For, as the whole of this matter is well ſummed up by Grotius, "if the compenſation allowed by law does not exceed the proportion of the hazard run, or the want felt, by the loan, its allowance is neither repugnant to the revealed nor to the natural law: but if it exceeds thoſe bounds, it is then oppreſſive uſury; and tho' the municipal laws may give it impunity, they never can make it juſt."

We ſee, that the exorbitance or moderation of intereſt, for the money lent, depends upon two circumſtances; the inconvenience of parting with it for the preſent, and the hazard of loſing it entirely. The inconvenience to individual lenders can never be eſtimated by laws; the rate therefore of general intereſt muſt depend upon the uſual or general inconvenience. This reſults entirely from the quantity of ſpecie or current money in the kingdom: for, the more ſpecie there is circulating in any nation, the greater ſuperfluity there will be, beyond what is neceſſary to carry on the buſineſs of exchange and the common concerns of life. In every nation, or public community, there is a certain quantity of money thus neceſſary; which a perſon well ſkilled in political arithmetic might perhaps calculate as exactly, as a private banker can the demand for running caſh in his own ſhop: all above this neceſſary quantity may be ſpared, or lent, without much inconvenience to the reſpective lenders; and the greater this national ſuperfluity is, the more numerous will be the lenders, and the lower ought the rate of the national intereſt to be: but where there is not enough, or barely enough, circulating caſh, to anſwer the ordinary uſes of the public, intereſt will be proportionably high; for lenders will be but few, as few can ſubmit to the inconvenience of lending.

So alſo the hazard of an entire loſs has its weight in the regulation of intereſt: hence, the better the ſecurity, the lower will the intereſt be; the rate of intereſt being generally in a compound *ratio*, formed out of the inconvenience, and the hazard. And as, if there were no inconvenience, there ſhould be no intereſt but what is equivalent to the hazard; ſo, if there were no hazard, there ought to be no intereſt, ſave only what ariſes from the mere inconvenience of lending. Thus, if the quantity of ſpecie in a nation be ſuch, that the general inconvenience of lending for a year is computed to amount to three *per cent.* a man that has money by him will perhaps lend it upon good perſonal ſecurity at five *per cent.* allowing two for the hazard run; he will lend it upon landed ſecurity, or mortgage, at four *per cent.* the hazard being proportionably leſs; but he will lend it to the ſtate, on the maintenance of which all his property depends, at three *per cent.* the hazard being none at all.

But ſometimes the hazard may be greater, than the rate of intereſt allowed by law will compenſate. And this gives riſe to the practice, 1. Of bottomry, or *reſpondentia*. 2. Of policies of inſurance. See BOTTOMRY, and INSURANCE.

Upon the two principles of inconvenience and hazard, compared together, different nations have at different times eſtabliſhed different rates of intereſt. The Romans at one time allowed *centeſimæ*, *one per cent.* monthly, or *twelve per cent. per annum*, to be taken for common loans; but Juſtinian reduced it to *trientes*, or one third of the *as* or *centeſimæ*, that is, *four per cent.*; but allowed higher intereſt to be taken of merchants, becauſe there the hazard was greater. So too Grotius informs us, that in Holland the rate of intereſt was then eight *per cent.* in common loans, but twelve to merchants. Our law eſtabliſhes one ſtandard for all alike, where the pledge or ſecurity itſelf is not put in jeopardy; leſt, under the general pretence of vague and indeterminate hazards, a door ſhould be opened to fraud and uſury: leaving ſpecific hazards to be provided againſt by ſpecific inſurances, or by loans upon *reſpondentia*, or bottomry. But as to the rate of legal intereſt, it has varied and decreaſed for 200 years paſt, according as the quantity of ſpecie in the kingdom has increaſed by acceſſions of trade, the introduction of paper-credit, and other circumſtances. The ſtatute 37 Hen. VIII. c. 9. confined intereſt to ten *per cent.* and ſo did the ſtatute 13 Eliz. c. 8. But as, through the encouragements given in her reign to commerce, the nation grew more wealthy; ſo, under her ſucceſſor, the ſtatute 21 Jac. I. c. 17. reduced it to eight *per cent.*; as did the ſtatute 12 Car. II. c. 13. to ſix: and laſtly, by the ſtatute 12 Ann. ſt. 2. c. 16. it was brought down to five *per cent.* yearly, which is now the extremity of legal intereſt that can be taken. But yet, if a contract which carries intereſt be made in a foreign country, our courts will direct the payment of intereſt according to the law of that country in which the contract was made. Thus Iriſh, American, Turkiſh, and Indian intereſt, have been allowed in our courts to the amount of even 12 *per cent.* For the moderation or exorbitance of intereſt depends upon local circumſtances; and the refuſal to enforce ſuch contracts would put a ſtop to all foreign trade. And, by ſtat. 14 Geo. III. c. 79. all mortgages and other ſecurities upon eſtates or other property in Ireland or the plantations, bearing intereſt not exceeding ſix *per cent.* ſhall be legal; though executed in the kingdom of Great Britain: unleſs the money lent ſhall be known at the time to exceed the value of the thing in pledge; in which caſe alſo, to prevent uſurious contracts at home under colour of ſuch foreign ſecurities, the borrower ſhall forfeit treble the ſum ſo borrowed.

INTERJECTION, in grammar, an indeclinable part of ſpeech, ſignifying ſome paſſion or emotion of the mind. See GRAMMAR.

INTERIM, a name given to a formulary, or kind of confeſſion of the articles of faith, obtruded upon the Proteſtants after Luther's death by the emperor Charles V. when he had defeated their forces; ſo called becauſe it was only to take place in the *interim* (mean time) till a general council ſhould have decided all points in diſpute between the Proteſtants and Romaniſts. It retained moſt of the doctrines and ceremonies of the Romaniſts, excepting that of marriage, which was allowed to the clergy, and communion to the laity under both kinds. Moſt of the Proteſtants rejected it. There were two other interims; one of Leipſic, the other of Franconia.

INTERLOCUTOR, in Scots law. The ſentence or judgment of a court of law, is commonly called an *interlocutor* before decree is extracted.

INTERLOPERS, are properly thoſe who, without due authority, hinder the trade of a company or corporation lawfully eſtabliſhed, by dealing in the ſame way.

INTERLUDE, an entertainment exhibited on the theatre between the acts of a play, to amuſe the ſpectators while the actors take breath and ſhift their dreſs, or to give time for changing the ſcenes and decorations.

INTERMITTENT, or INTERMITTING, *Fevers*, ſuch fevers as go off and ſoon return again, in oppoſition to thoſe which are continual. See (the *Index* ſubjoined to) MEDICINE.

INTERPOLATION, among critics, denotes a ſpurious paſſage inſerted into the writings of ſome ancient author.

INTERPOSITION, the ſituation of a body between two others, ſo as to hide them, or prevent their action.

The eclipſe of the ſun is occaſioned by an interpoſition of the moon between the ſun and us; and that of the moon by the interpoſition of the earth between the ſun and moon. See ECLIPSE.

INTERPRETER, a perſon who explains the thoughts, words, or writings, of ſome other, which before were unintelligible.—The word *interpres*, according to Iſidore, is compoſed of the prepoſition *inter*, and *partes*, as ſignifying a perſon in the middle betwixt two parties, to make them mutually underſtand each others thoughts: others derive it from *inter*, and *præs*, i. e. *fidejuſſor*; q. d. a perſon who ſerves as ſecurity between two others who do not underſtand one another.

There have been great debates about interpreting Scripture. The Romaniſts contend, that it belongs abſolutely to the church: adding, that where ſhe is ſilent, reaſon may be conſulted; but where ſhe ſpeaks, reaſon is to be diſregarded. The Proteſtants generally allow reaſon the ſovereign judge, or interpreter; though ſome among them have a ſtrong regard to ſynods, and others to the authority of the primitive fathers. Laſtly, others have recourſe to the Spirit within every perſon to intepret for them; which is what Bochart calls αποδειξις τȣ ϖνευματος.

INTERREGNUM, the time during which the throne is vacant in elective kingdoms; for in ſuch as are hereditary, like ours, there is no ſuch thing as an interregnum.

INTERREX, the magiſtrate who governs during an interregnum.

This magiſtrate was eſtabliſhed in old Rome, and was almoſt as ancient as the city itſelf: after the death of Romulus there was an interregnum of a year, during which the ſenators were each interrex in their turn, five days a-piece.

After the eſtabliſhment of conſuls and a commonwealth, though there were no kings, yet the name and function of *interrex* was ſtill preſerved: for, when the magiſtrates were abſent, or there was any irregularity in their election, or they had abdicated, ſo that the comitia could not be held; provided they were unwilling to create a dictator, they made an interrex, whoſe office and authority was to laſt five days; after which they made another. To the interrex was delegated all the regal and conſular authority, and he performed all their functions. He aſſembled the ſenate, held comitia or courts, and took care that the election of magiſtrates was according to rules. Indeed at firſt it was not the cuſtom of the interrex to hold comitia, at leaſt we have no inſtance of it in the Roman hiſtory. The patricians alone had the right of electing an interrex; but this office fell with the republic, when the emperors made themſelves maſters of every thing.

INTERROGATION, or *Point of* INTERROGATION, in grammar, a character of this form (?) ſerving to denote a queſtion.

INTERVAL, the diſtance or ſpace between two extremes, either in time, or place. The word comes from the Latin *intervallum*, which, according to Iſidore, ſignifies the ſpace *inter foſſam & murum*, "between the ditch and the wall:" others note, that the ſtakes or piles, driven into the ground in the ancient Roman bulwarks, were called *valla*; and the interſtices or vacancy between them, *intervalla*.

INTERVAL, in muſic. The diſtance between any given ſound and another, ſtrictly ſpeaking, is neither meaſured by any common ſtandard of extenſion nor duration; but either by immediate ſenſation, or by computing the difference between the numbers of vibrations produced by two or more ſonorous bodies, in the act of ſounding, during the ſame given time. As the vibrations are ſlower and fewer during the ſame inſtant, for example, the ſound is proportionally lower or graver; on the contrary, as during the ſame period the vibrations

tions increaſe in number and velocity, the ſounds are proportionably higher or more acute. An interval in muſic, therefore, is properly the difference between the number of vibrations produced by one ſonorous body of a certain magnitude and texture and of thoſe produced by another of a different magnitude and texture in the ſame time.

Intervals are divided into conſonant and diſſonant. A conſonant interval is that whoſe extremes, or whoſe higheſt and loweſt ſounds, when ſimultaneouſly heard, coaleſce in the ear, and produce an agreeable ſenſation called by Lord Kaims a *tertium quid*. A diſſonant interval, on the contrary, is that whoſe extremes, ſimultaneouſly heard, far from coaleſcing in the ear, and producing one agreeable ſenſation, are each of them plainly diſtinguiſhed from the other, produce a grating effect upon the ſenſe, and repel each other with an irreconcileable hoſtility. In proportion as the vibrations of different ſonorous bodies, or of the ſame ſonorous body in different modes, more or leſs frequently coincide during the ſame given time, the chords are more or leſs perfect, and conſequently the intervals more or leſs conſonant. When theſe vibrations never coincide at all in the ſame given time, the diſcord is conſummate, and conſequently the interval abſolutely diſſonant.

Intervals are not only divided according to their natures, but alſo with reſpect to their degrees. In this view, they are either enharmonic, chromatic, or diatonic. Of theſe therefore in their order, from the leaſt to the greateſt.

An enharmonic interval is what they call the *eighth part of a tone*, or the difference between a major and minor ſemitone generally diſtinguiſhed by the name of a *comma*. Commas, however, are of three different kinds, as their quantities are more or leſs; but ſince theſe differences cannot be aſcertained without long and intricate computations, it is not neceſſary for us to attempt an inveſtigation, whoſe purſuit is ſo unpleaſant, and whoſe reſult attended with ſo little utility. It has by muſicians been generally called the *eighth part of a tone;* but they ought to have conſidered, that a comma is by no means the object of auricular perception, and that its eſtimate can only be formed by calculation. For a more minute diſquiſition of this matter, our readers may conſult the article COMMA in the Muſical Dictionary, or the article MUSIC in this Work, Notes *n* and *s*. A chromatic interval conſiſts properly of a minor ſemitone, but may alſo admit the major. A diatonic interval conſiſts of a ſemitone-major at leaſt, but may conſiſt of any number of tones within the octave. When an octave higher or lower is aſſumed, it is obvious that we enter into another ſcale which is either higher or lower, but ſtill a repetition of the former degrees of ſound.

Intervals again are either ſimple or compound. All the intervals within any one octave are ſimple; ſuch as the ſecond major or minor, the third, the fourth, the fifth, the ſixth, the ſeventh, &c. of theſe afterwards. All intervals whoſe extremes are contained in different octaves, ſuch as the ninth, the tenth, the eleventh, the twelfth, the thirteenth, the fourteenth, the fifteenth, &c. may be termed *compound intervals*.

The ſemitone either exactly or nearly divides the tone into two equal parts. In the theory of harmonical computation three kinds of ſemitones are recogniſed, *viz.* the greateſt, the intermediate, and the ſmalleſt ſemitone. But in practice, to which theſe explications are chiefly adapted, the ſemitone is only diſtinguiſhed into major and minor. The ſemitone major is the difference between the third major and the fourth, as EF. Its ratio is as 15 to 16, and it forms the leaſt of all diatonic intervals.

The ſemitone minor conſiſts of the difference between the third major and minor: it may be marked in the ſame degree by a ſharp or a flat, and it only forms a chromatic interval; its ratio is as 24 to 25.

Though ſome diſtinction is made between theſe ſemitones by the manner of marking them, yet on the organ and harpſichord no diſtinction can be made; nor is there any thing more common for us than to ſay, that D ſharp in riſing is E flat in deſcending, and ſo through the whole diapaſon above or below; beſides, the ſemitone is ſometimes major and ſometimes minor, ſometimes diatonick and ſometimes chromatic, according to the different modes in which we compoſe or practiſe; yet in practice theſe are called *ſemitones* minor, which are marked by ſharps or flats, without changing the degree; and ſemitones major are thoſe which form the interval of a ſecond.

With reſpect to the three ſemitones recogniſed in theory, the greateſt ſemitone is the difference between a tone major and a ſemitone minor; and its ratio is as 25 to 27. The intermediate ſemitone is the difference between a ſemitone major and a tone major; and its ratio is as 128 to 135. In a word, the ſmall ſemitone conſiſts of the difference between the greateſt and the intermediate ſemitone; and its ratio is as 125 to 128.

Of all theſe intervals, there is only the ſemitone major, which is ſometimes admitted as a ſecond in harmony.

The interval of a tone which characteriſes the diatonic ſpecies of compoſition, is either major or minor. The former conſiſts of the difference between the fourth and fifth; and its ratio is as 8 to 9: and the latter, whoſe ratio is as 9 to 10, reſults from the difference between the third minor and the fourth.

Seconds are diſtinguiſhed into four kinds; two of which are not in practice ſufficiently momentous to be mentioned. The ſecond major is ſynonimous with the interval of a tone; but as that tone may be either major or minor, its ratio may be either as 8 to 9, or as 9 to 10.

The ſecond minor conſiſts of the diſtance from B to C, or from EF; and its ratio is as 15 to 16.

The third is ſo called, becauſe it conſiſts of two gradations, or three diatonic ſounds, as from G to B aſcending, or from A to C, incluſive of the extremes; of which the firſt is a third major, compoſed of two full tones, and its ratio as 4 to 5; the ſecond, a third minor conſiſting of a tone and a ſemitone major, and its ratio as 5 to 6.

The fourth has by ſome been reckoned an imperfect, but more juſtly by others a perfect, chord. It conſiſts of three diatonic degrees, but takes its name from the four different ſounds of which it is formed; or, in other words, the number by which it is denominated includes the extremes. It is compoſed of a tone major, a tone minor, and a ſemitone major, as from C to F aſcending; its ratio as 3 to 4.

The fifth next to the octave, is perhaps the moſt perfect interval, as leaſt ſuſceptible of alteration. The number from whence it aſſumes its name likewiſe includes its extremes. It conſiſts of two tones major, one minor, and a ſemitone major, as from A to E aſcending; its ratio is as 2 to 3.

The ſixth is not found among the natural order of conſonances, but only admitted by combination. It is not here neceſſary to mention its various diſtinctions and uſes, as we only give an account of intervals in general.

The ſixth major conſiſts of four tones and a ſemitone major, as from G to E aſcending; its ratio is as 3 to 5. The ſixth minor contains three tones and two ſemitones major, as from E to C aſcending; its ratio is as 5 to 8.

The ſeventh, as a reduplication of the ſecond, is a diſſonance. When major, it conſiſts diatonically of five tones, three major, and two minor, and a major ſemitone, as from C to B aſcending; its ratio is as 8 to 15.

When minor, it conſiſts of four tones, three major and one minor, and two major ſemitones, as from E to D aſcending; its ratio is as 5 to 9.

The octave is the moſt perfect of all chords, and in many caſes hardly to be diſtinguiſhed by the ear from an uniſon; that is to ſay, from that coincidence of ſound produced by two muſical ſtrings, whoſe matter, lengths, diameters, and tenſions, are the ſame. As the vibrations of two ſtrings in uniſon during any given time, are preciſely coincident; ſo whilſt the loweſt extreme of the octave vibrates once, the higheſt vibrates twice; and conſequently its ratio is as 1 to 2, as from c to C aſcending. It conſiſts of ſix full tones and two ſemitones major. Its name is derived from the Latin *octo*, "eight;" becauſe that number likewiſe includes its extremes. It may likewiſe be divided into twelve ſemitones. It contains the whole diatonic ſcale; and every ſeries above or below conſiſts only of the ſame returning ſounds. From whence the natures, diſtances, and powers, of every interval greater than the octave, as the ninth, the tenth, the eleventh, the twelfth, the thirteenth, the fourteenth, the fifteenth, the triple octave, &c. may eaſily be computed.

During our paſt obſervations upon the term *interval*, we have either wholly neglected our faithful aſſociate M. Rouſſeau, or only maintained a diſtant and momentary intercourſe with him. We now propoſe to pay him a more permanent and familiar viſit; but as he is engaged in the diſpute between the Pythagoreans and Ariſtoxenians, we think it more advantageous to decline the controverſy, and to follow him, after having eſcaped the fray, like a gentleman and a ſcholar. Having put the partizans of Ariſtoxenus to ſilence, let us, with him, forſake the liſts of combat, nor ſtain his triumph by inſulting the falling champions.

" We divide, (ſays he), as did the ancients, intervals into conſonant and diſſonant. The conſonances are perfect or imperfect *; diſſonances are either ſuch by nature, or become ſuch by accident. There are only two intervals naturally diſſonant, viz. the ſecond and ſeventh, including their octaves or replications; nay, ſtill theſe two may be reduced to one alone, as the ſeventh is properly no more than a replication of the ſecond; for B, the ſeventh above the loweſt C, where we have generally begun the ſcale, is really an octave above B, the note immediately below that C; and conſequently the interval between theſe lower ſounds is no more than that of a ſecond major, to which all diſſonances may therefore be ultimately reduced, whether conſidered as major or minor; but even all the conſonances may become diſſonant by accident. See DISCORD.

" Beſides, every interval is either ſimple or reduplicated. Simple intervals are ſuch as the limits of a ſingle octave comprehend. Every interval which ſurpaſſes this extent is reduplicated; that is to ſay, compounded of one or more octaves, and of the ſimple interval whoſe replication it is.

" Simple intervals are likewiſe divided into direct and inverted. Take any ſimple interval whatever for a direct one; the quantity which, added to itſelf, is required to complete the octave, will be found an inverted interval; and the ſame obſervation holds reciprocally true of ſuch as are inverted

" There are only ſix kinds of ſimple intervals; of which three contain ſuch quantities, as, added to the other three, are required to complete the octave; and of conſequence likewiſe the one muſt be inverſions of the other. If you take at firſt the ſmalleſt intervals, you will have, in the order of direct intervals, the ſecond, the third, and fourth; for inverted, the ſeventh, the ſixth, and fifth. Suppoſe theſe to be direct, the others will be inverted; every thing here is reciprocal.

" To find the name of any interval whatever, it is only neceſſary to add the denomination of unity to the degree which it contains. Thus the interval of one degree ſhall give a ſecond; of two, a third; of three, a fourth; of ſeven, an octave; of nine, a tenth, &c. But this is not ſufficient to determine an interval with accuracy; for under the ſame name it may be either major or minor, true or falſe, diminiſhed or redundant.

" The conſonances which are imperfect, and the two natural diſſonances, may be major or minor; which, without changing their degree, occaſions in the interval the difference of a ſemitone: ſo that if, from a minor interval, we ſtill deduce a ſemitone, it becomes an interval diminiſhed; if, by a ſemitone, we increaſe a major interval, it becomes an interval redundant.

" The perfect conſonances are by their nature invariable. When their intervals are ſuch as they ought to be, we call them *juſt*, or *true*: and if we dilate or contract this interval by a ſemitone, the conſonance is termed *falſe*, and becomes a diſſonance; *redundant*, if the ſemitone be added; *diminiſhed*, if it be abſtracted. We improperly give the name of a *falſe fifth* to the fifth diminiſhed; this is taking the genus for the ſpecies: the fifth redundant is every jot as falſe as the diminiſhed, it is even more ſo in every reſpect."

In the Muſical Dictionary, plate C, fig. 2. may be ſeen a table of all the ſimple intervals practicable in Muſic, with their names, their degrees, their values and their ratios.

Having aſcertained the diſtinction between major and minor intervals, it is only neceſſary to add, that theſe

* See *Conſonance*

theſe may be natural or artificial. Of the natural we have already given ſome account, by aſcertaining the diſtances and ratios of ſuch as have been mentioned. Of the artificial, we may obſerve, that they are ſuch as change their poſition from what it naturally is in the diatonick ſcale, to what the conveniency of compoſition or tranſpoſition requires it to be. A note thus artificially heightened by a ſemitone, together with the character which expreſſes that elevation, is called a *ſharp*; on the contrary, a note artificially depreſſed by a ſemitone, together with the character by which that depreſſion is ſignified, is called a *flat*. The character which reſtores a note thus depreſſed or raiſed to its primary ſtate, is called a *natural*. Major or minor intervals, as they prevail, characteriſe the major or minor mode. See Mode.

This ſubject is ſufficiently explained in the article Music, Chap. IV.

INTESTATE, in law, a perſon that dies without making a will.

INTESTINES, in anatomy. See there, n° 354.

INTESTINAL, ſomething belonging to or ſeated in the inteſtines.

INTONATION, in muſic, the action of ſounding the notes in the ſcale with the voice, or any other given order of muſical tones. Intonation may be either true or falſe, either too high or too low, either too ſharp or too flat; and then this word *intonation*, attended with an epithet, muſt be underſtood concerning the manner of performing the notes.

In executing an air, to form the ſounds, and preſerve the intervals as they are marked with juſtneſs and accuracy, is no inconſiderable difficulty, and ſcarcely practicable, but by the aſſiſtance of one common idea, to which, as to their ultimate teſt, theſe ſounds and intervals muſt be referred. theſe common ideas are thoſe of the key, and the mode in which the performer is engaged; and from the word *tone*, which is ſometimes uſed in a ſenſe almoſt identical with that of the key, the word *intonation* may perhaps be derived. It may alſo be deduced from the word *diatonic*, as in that ſcale it is moſt frequently converſant; a ſcale which appears moſt convenient and moſt natural to the voice. We feel more difficulty in our intonation of ſuch intervals as are greater or leſſer than thoſe of the diatonick order; becauſe, in the firſt caſe, the glottis and vocal organs are modified by gradations too large; or too complex, in the ſecond.

INTRENCHMENT, in the military art, any work that fortifies a poſt againſt an enemy who attacks. It is generally taken for a ditch or trench with a parapet. Intrenchments are ſometimes made of faſcines with earth thrown over them, of gabions, hogſheads, or bags filled with earth, to cover the men from the enemy's fire.

INTRIGUE, an aſſemblage of events or circumſtances, occurring in an affair, and perplexing the perſons concerned in it. In this ſenſe, it is uſed to ſignify the nodus or plot of a play or romance; or that point wherein the principal characters are moſt embarraſſed through the artifice and oppoſition of certain perſons, or the unfortunate falling out of certain accidents and circumſtances.

In tragedy, comedy, or an epic poem, there are always two deſigns. The firſt and principal is that of the hero of the piece: the ſecond contains the deſigns of all thoſe who oppoſe him. Theſe oppoſite cauſes produce oppoſite effects, to wit, the efforts of the hero for the execution of his deſign, and the efforts of thoſe who thwart it. As thoſe cauſes and deſigns are the beginning of the action, ſo theſe efforts are the middle, and there form a knot or difficulty which we call the *intrigue*, that makes the greateſt part of the poem. It laſts as long as the mind of the reader or hearer is ſuſpended about the event of thoſe oppoſite efforts: the ſolution or cataſtrophe commences when the knot begins to unravel and the difficulties and doubts begin to clear up.

The intrigue of the Iliad is twofold. The firſt comprehends three days fighting in Achilles's abſence, and conſiſts on the one ſide in the reſiſtance of Agamemnon and the Greeks, and on the other in the inexorable temper of Achilles. The death of Patroclus unravels this intrigue, and makes the beginning of a ſecond. Achilles reſolves to be revenged, but Hector oppoſes his deſign; and this forms the ſecond intrigue, which is the laſt day's battle.

In the Æneid there are alſo two intrigues. The firſt is taken up in the voyage and landing of Æneas in Italy; the ſecond is his eſtabliſhment there: the oppoſition he met with from Juno in both theſe undertakings, forms the intrigue.

As to the choice of the intrigue, and the manner of unravelling it, it is certain they ought both to ſpring naturally from the ground and ſubject of the poem. Boſſu gives us three manners of forming the intrigue of a poem: the firſt is that already mentioned; the ſecond is taken from the fable and deſign of the poet; in the third the intrigue is ſo laid, as that the ſolution follows from it of courſe.

INTRINSIC, a term applied to the real and genuine values and properties, &c. of any thing, in oppoſition to their *extrinſic* or *apparent* values.

INTRODUCTION, in general, ſignifies any thing which tends to make another in ſome meaſure known before we have leiſure to examine it thoroughly; and hence it is uſed on a great variety of occaſions. Thus we ſpeak of the introduction of one perſon to another; the introduction to a book, &c.—It is alſo uſed to ſignify the actual motion of any body out of one place into another, when that motion has been occaſioned by ſome other body.

Introduction, in oratory. See Oratory, n° 26.

INTUITION, among logicians, the act whereby the mind perceives the agreement or diſagreement of two ideas, immediately by themſelves, without the intervention of any other; in which caſe the mind perceives the truth as the eye does the light, only by being directed towards it. See Logic, n° 25. 27.

INVECTED, in heraldry, denotes a thing fluted or furrowed. See Heraldry, Plate CXLIV. fig. 1. (A.)

INVECTIVE, in rhetoric, differs from reproof, as the latter proceeds from a friend, and is intended for the good of the perſon reproved; whereas the invective is the work of an enemy, and entirely deſigned to vex and give uneaſineſs to the perſon againſt whom it is directed.

INVEGES (Auguſtin), a learned Sicilian Jeſuit, wrote in Italian an Hiſtory of the city of Palermo, and other works, which are eſteemed. He died in 1677, aged 82.

INVERARY, a parliament town of Scotland, in Argyleſhire, ſeated on Loch-fin in W. Long. 5. 0. N. Lat. 47. 3.—Here is a caſtle, the principal ſeat of the dukes of Argyle, chief of the Campbells. It was built by duke Archibald; is quadrangular, with a round tower at each corner; and in the middle riſes a ſquare one glazed on every ſide to give light to the ſtaircaſe and galleries, which has from without a moſt diſagreeable effect. This caſtle is built of a coarſe *lapis ollaris* brought from the other ſide of Loch-fin; and is of the ſame kind with that found in Norway, of which the king of Denmark's palace is built. The founder of the caſtle deſigned to have built a new town on the weſt ſide of the little bay on which the houſe ſtands: he finiſhed a few houſes, a cuſtom-houſe, and an excellent inn; but his death put a ſtop to the concluſion of the plan; which, when brought to perfection, will give the place a very different appearance from what it now bears; the old town being compoſed of the moſt wretched hovels that can be imagined.

INVERKEITHING, a parliament-town of Scotland, in the county of Fife, ſituated on the northern ſhore of the Frith of Forth, in W. Long. 3. 15. N. Lat. 56. 5. It was much favoured by William, who granted its firſt charter. He extended its liberties conſiderably, and in the time of David I. it became a royal reſidence. The Moubrays had large poſſeſſions here, which were forfeited in the reign of Robert II. The Franciſcans had a convent in this town; and, according to Sir Robert Sibbald, the Dominicans had another.

INVERLOCHY, or FORT WILLIAM, a fortreſs erected in the Highlands of Scotland in king William's time. Even prior to that, however, there had been a ſmall fortreſs erected by general Monk. The preſent fort is a triangle, has two baſtions, and is capable of admitting a garriſon of 800 men. It was well defended in 1746 againſt the rebels, who raiſed the ſiege with much diſgrace. It was alſo attempted by thoſe of 1715, but without ſucceſs. The fort lies on a narrow arm of the ſea called *Lochiel*, which extends ſome miles higher up the country, making a bend to the north; and extends likewiſe weſtward towards the iſle of Mull, or near 24 Scotch miles.

This fort on the weſt, Fort Auguſtus in the centre, and Fort George on the eaſt, form what is called the *chain* from ſea to ſea. This ſpace is called *glen-more*, or the *great glen*, which, including water and land, is almoſt a level of 70 miles. There is in fact little land, but what is divided by a frith, loch, or river; except two miles which lie between Loch-oich and Loch-lochy, called *Lagan-achadrom*. By means of Fort-George all entrance up the Frith towards Inverneſs is prevented. Fort-Auguſtus curbs the inhabitants midway, and Fort-William is a check to any attempts in the weſt. Detachments are made from all theſe garriſons to Inverneſs, Bernera barracks oppoſite to the Iſle of Skie, and caſtle Duart in the Iſle of Mull. Other ſmall parties are alſo ſcattered in huts throughout the country, to prevent the ſtealing of cattle.—Fort-William is ſurrounded by vaſt mountains, which occaſions almoſt perpetual rain. Beneviſh ſoars above the reſt, and ends in a point ſaid to be 1450 yards above the level of the ſea. The fort ſtands in W. Long. 5. 15. N. Lat. 56. 55.

INVERNESS, a town of Scotland, and capital of a county of the ſame name, finely ſeated on the river Neſs, over which there is a ſtone bridge of ſeven arches, in W. Long. 4°. N. Lat. 57. 36. It is large, well built, and very populous, being the laſt town of any note in Britain. As there are always regular troops in its neighbourhood, there is a great air of politeneſs, a plentiful market, and more money and buſineſs ſtirring than could have been expected in ſuch a remote part of the iſland. The country in the neighbourhood is remarkably well cultivated; and its produce clearly ſhews, that the ſoil and climate are not deſpicable. There is a profitable ſalmon-fiſhery; which, however, might be improved in many reſpects. They have alſo ſome branches both of the woollen and linen manufacture; and, in conſequence of their excellent military roads, a great proportion of inland trade. But, beſides all this, Inverneſs is a port with 20 creeks dependent upon it, part on the Murray Frith to the eaſt, and part on the north of the town, reaching even the ſouth border of the county of Caithneſs; yet the foreign commerce here is far from being extenſive. There are indeed ſome few merchants in the town, and ſome few ſhips belonging to it; but they are ſmall in ſize, as well as few in number. The harbour too is none of the beſt, which induced the inhabitants to apply to the legiſlature upwards of 40 years ago, when they obtained a grant for 19 years; which, by another law, was continued for the ſpace of 21 years farther; and, in conſequence of this, they have made, and are ſtill making, very conſiderable improvements.

INVERNESS-*Shire*, a county of Scotland, adjoining to Roſs and Cromartie on the north; to Murray-land on the eaſt, of which it includes a part; to Lorn, Braidalbin, and Athol, on the ſouth; and on the weſt is waſhed by the Atlantic ocean. It extends 60 miles in length from eaſt to weſt, and 55 where broadeſt, from ſouth to north. It produces plenty of iron ore, has large woods of fir and oak, plenty of paſturage, and ſome corn. Here alſo is plenty of deer, hares, partridges, growſe, and all ſorts of game, whether fowls or quadrupeds. The hills and mountains feed numerous flocks of black cattle: the rivers and lakes, of which there is a great number, afford abundance of ſalmon, eels, and trout; and for ſea-fiſh, there is hardly a diſtrict in Scotland ſo well provided.

INVERSE, is applied to a manner of working the rule of three. See ARITHMETIC, n° 13.

INVERSE, in muſic. See INVERTED.

INVERTED, in muſic, is derived from the Latin prepoſition *in*, and *vertere*, "to turn any thing a contrary way." The analogy of this term, and its uſe in muſic, will appear more obvious from the ſequel.

It ſignifies a change in the order of the notes which form a chord, or in the parts which compoſe harmony: which happens by ſubſtituting in the baſs, thoſe ſounds which ought to have been in the upper part: an operation not only rendered practicable, but greatly facilitated, by the reſemblance which one note has to another in different octaves; whence we derive the power of exchanging one octave for another with ſo much propriety and ſucceſs, or by ſubſtituting in the extremes thoſe which ought to have occupied the middle ſtation; and *vice verſa*.

It is certain, that in every chord there muſt be a fundamental and natural order, which is the ſame with that of its generation: but the circumſtances of ſucceſſion, taſte, expreſſion, the beauty of melody, and variety, the approximation of harmony, frequently oblige the compoſer to change that order by inverting the chords, and of conſequence the diſpoſition of the parts.

As three things may be arranged in ſix different orders, and four things in twenty-four; it would ſeem at firſt, that a perfect chord ſhould be ſuſceptible of ſix inverſions, and a diſſonant chord of twenty-four; ſince one is compoſed of four and the other of three ſounds, and ſince inverſion conſiſts only in a tranſpoſition of octaves. But it muſt be obſerved, that in harmony all the different diſpoſitions of acuter ſounds are not reckoned as inverſions, whilſt the ſame ſounds remain in the lower parts. Thus, theſe two orders of the perfect chord *ut mi ſol*, or C E G, and *ut ſol mi*, or C G E, are only taken for the ſame inverſion, and only bear the ſame name; this reduces the whole of inverſions of which a perfect chord is ſuſceptible to three; that is to ſay, to as many inverſions as the chord contains different ſounds: for the replications of the ſame ſound are here reckoned as nothing.

Every time, therefore, when the fundamental baſs is heard in the loweſt parts, or if the fundamental baſs be retrenched, every time when the natural order is preſerved in the chords, the harmony is direct. As ſoon as that order is changed, or as ſoon as the fundamental ſounds, without being in the lower parts, are heard in ſome of the others, the harmony is *inverted*. It is an inverſion of the chord, when the fundamental ſound is tranſpoſed; it is likewiſe an inverſion of the harmony, when the treble or any other part moves as the baſs ought to have done.

Every where, where a direct chord can be well placed, its inverſions will likewiſe be ſo with reſpect to the harmony; for it is ſtill the ſame fundamental ſucceſſion. Thus, at every note of the fundamental baſs, it is in the power of the compoſer to arrange the chord at his pleaſure, and of conſequence every moment to produce different inverſions; provided that he does not change the regular and foundamental ſucceſſion; provided alſo, that the diſſonances may always be prepared and reſolved in the ſame parts where they are firſt heard, that the ſenſible note may always aſcend, and that ſuch falſe relations may be avoided as would be too harſh upon the ear in the ſame part. This is the key of theſe myſterious diſtinctions which compoſers have made between thoſe chords where the treble is ſyncopated, and thoſe in which the baſs ought to be ſyncopated; as, for inſtance, between the ninth and the ſecond: it is thus that in the firſt the chord is direct, and the diſſonance in the treble; in the others, the chord is reverſed, and the diſſonance in the baſs.

With reſpect to chords by ſuppoſition, greater precaution is neceſſary in inverting them. As the ſound which they add to the baſs is abſolutely foreign to the harmony; it is often only tolerable there, on account of its vaſt diſtance from the other ſounds, which renders the diſſonance leſs harſh. But if theſe added ſounds ſhould happen to be tranſpoſed in the higher parts, as it ſometimes does; if this tranſpoſition be not performed with much art, it may produce a very bad effect; and never can this be happily practiſed without taking away ſome other ſound from the chord. See, at the article ACCORD in the Muſical Dictionary, the caſes when *inverſion* may be practiſed, and the choice of ſuch as are proper.

The perfect knowledge of *inverſion* depends on art and ſtudy alone: the choice is a different matter; to this an ear and a taſte are neceſſary; experience of the different effects are likewiſe indiſpenſable; and though the choice of inverſions be indifferent with reſpect to the foundation of the harmony, it is by no means ſuch in regard of the effect and expreſſion. It is certain, that the fundamental baſs is formed to ſupport the harmony, and to prevail beneath. Every time therefore when the order is changed and the harmony inverted, there ought to be good reaſons for it: without which, the compoſer will fall into the vice of our more recent muſic, where the melody of the treble is often like what the baſs ſhould be, and the baſs always like that of the treble, where every thing is confounded, reverſed, diſordered, without any other reaſon than to ſubvert the eſtabliſhed order, and to ſpoil the harmony.

INVESTIGATION, properly denotes the ſearching or finding out any thing by the tracts or prints of the feet; whence mathematicians, ſchoolmen, and grammarians, come to uſe the term in their reſpective reſearches.

INVESTING *a* PLACE, is when a general, having an intention to beſiege it, detaches a body of horſe to poſſeſs all the avenues; blocking up the garriſon, and preventing relief from getting into the place, till the army and artillery are got up to form the ſiege.

INVESTITURE, in law, a giving livery of ſeiſin or poſſeſſion. There was anciently a great variety of ceremonies uſed upon inveſtitures; as at firſt they were made by a certain form of words, and afterwards by ſuch things as had the greateſt reſemblance to the thing to be transferred: thus, where lands were intended to paſs, a turf, &c. was delivered by the granter to the grantee. In the church, it was cuſtomary for princes to make inveſtiture of eccleſiaſtical benefices, by delivering to the perſons they had choſen, a paſtoral ſtaff and a ring.

INULA, ELECAMPANE; a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. There are 22 ſpecies, of which the helenium, or common elecampane, is the moſt remarkable. It is a native of Britain; but is cultivated in gardens for the ſake of the root, which is uſed in medicine. The root is perennial, thick, branching, and of a ſtrong odour. The lower leaves are eight or nine inches long, and four broad in the middle, rough on their upper ſide, but downy on the under ſide. The ſtalks riſe about four feet high, and divide toward the top into ſeveral ſmaller branches, garniſhed with oblong oval leaves indented on their edges, ending in acute points. Each branch is crowned with one large yellow radiated flower, ſucceeded by narrow four-cornered ſeeds, covered with down. It may be propagated in autumn by ſeeds or offſets.

Medicinal Uſes, &c. The root of elecampane, eſpeſpecially when dry, has an agreeable aromatic ſmell; its taſte, on chewing, is glutinous, and as it were ſomewhat rancid; in a little time it diſcovers an aromatic bitterneſs, which by degrees becomes conſiderably acrid and pungent. It poſſeſſes the general virtues of alexipharmacs; and is principally recommended for promoting expectoration in humoral aſthmas and coughs. Liberally taken, it is ſaid to excite urine, and to looſen the belly. In ſome parts of Germany, large quantities of this root are candied, and uſed as a ſtomachic for ſtrengthening the tone of the viſcera in general, and for attenuating tenacious juices. Spirituous liquors extract its virtues in greater perfection than watery ones. The former ſcarce elevate any thing in diſtillation: with the latter an eſſential oil ariſes, which concretes into white flakes; this poſſeſſes at firſt the flavour of the elecampane, but is very apt to loſe it in keeping. Outwardly applied, a decoction of it is ſaid to cure the itch. The root bruiſed and macerated in urine with balls of aſhes and whortleberries, dyes a blue colour.

INUNDATÆ, the name of the 15th order in Linnæus's fragments of a natural method; conſiſting of plants which grow in the water. See BOTANY, p. 1307.

INVOCATION, in theology, the act of adoring God, and eſpecially of addreſſing him in prayer for his aſſiſtance and protection. See the articles ADORATION and PRAYER.

The difference between the invocation of God and of the ſaints, as practiſed by the Papiſts, is thus explained in the catechiſm of the council of Trent. "We beg of God, (ſays the catechiſm,) to give us good things, and to deliver us from evil; but we pray to the ſaints, to intercede with God and obtain thoſe things which we ſtand in need of. Hence we uſe different forms in praying to God, and to the ſaints: to the former we ſay, *hear us, have mercy on us;* to the latter we only ſay, *pray for us.*" The council of Trent expreſsly teaches, that the ſaints who reign with Jeſus Chriſt offer up their prayers to God for men; and condemn thoſe who maintain the contrary doctrine. The Proteſtants reject and cenſure this practice as contrary to ſcripture, deny the truth of the fact, and think it highly unreaſonable to ſuppoſe that a limited finite being ſhould be in a manner omnipreſent, and at one and the ſame time hear and attend to the prayers that are offered to him in England, China, and Peru; and from thence infer, that if the ſaints cannot hear their requeſts, it is inconſiſtent with common ſenſe to addreſs any kind of prayer to them.

INVOCATION, in poetry, an addreſs at the beginning of a poem, wherein the poet calls for the aſſiſtance of ſome divinity, particularly of his muſe, or the deity of poetry.

INUNDATION, a ſudden overflowing of the dry land by the waters of the *ocean, rivers, lakes, ſprings,* or *rains.* See all theſe articles.

INVOICE, an account in writing of the particulars of merchandiſe, with their value, cuſtom, charges, &c. tranſmitted by one merchant to another in a diſtant country.

INVOLUCRUM, among botaniſts. See BOTANY, p. 1293.

INVOLUTION, in algebra. See ALGEBRA, n° 9.

JOAB, general of the army of king David, defeated the Syrians and the other enemies of David, and took the fort of Zion from the Jebuſites, who, thinking it impregnable, committed it to the care of the lame and blind, whom they placed on the walls. He ſignalized himſelf in all David's wars, but was guilty of baſely murdering Abner and Amaſa. He procured a reconciliation between Abſalom and David; and afterwards ſlew Abſalom, contrary to the expreſs orders of the king. He at length joined Adonijah's party; and was put to death by the order of Solomon, 1014 B.C.

JOACHIMITES, in church-hiſtory, the diſciples of Joachim a Ciſtertian monk, who was an abbot of Flora in Calabria, and a great pretender to inſpiration.

The Joachimites were particularly fond of certain ternaries: The Father, they ſaid, operated from the beginning till the coming of the Son; the Son, from that time to theirs, which was the year 1260; and from that time the Holy Spirit was to operate in his turn. They alſo divided every thing relating to men, to doctrine, and the manner of living, into three claſſes, according to the three perſons in the Trinity: The firſt tenary was that of men; of whom the firſt claſs was that of married men, which had laſted during the whole period of the Father; the ſecond was that of clerks, which had laſted during the time of the Son; and the laſt was that of the monks, in which there was to be an uncommon effuſion of grace by the Holy Spirit: The ſecond ternary was that of doctrine, viz. the Old Teſtament, the New, and the everlaſting Goſpel; the firſt they aſcribed to the Father, the ſecond to the Son, and the third to the Holy Spirit: A third ternary conſiſted in the manner of living, viz. under the Father, men lived according to the fleſh; under the Son, they lived according to the fleſh and the ſpirit; and under the Holy Ghoſt, they were to live according to the ſpirit only.

JOAN (Pope), called by Platina *John VIII.* is ſaid to have held the holy ſee between Leo IV. who died in 855, and Benedict III. who died in 858. Marianus Scotus ſays, ſhe ſat two years five months and four days. Numberleſs have been the controverſies, fables, and conjectures, relating to this pope. It is ſaid that a German girl, pretending to be a man, went to Athens, where ſhe made great progreſs in the ſciences; and afterward came to Rome in the ſame habit. As ſhe had a quick genius, and ſpoke with a good grace in the public diſputations and lectures, her great learning was admired, and every one loved her extremely; ſo that after the death of Leo, ſhe was choſen pope, and performed all offices as ſuch. Whilſt ſhe was in poſſeſſion of this high dignity, ſhe was got with child; and as ſhe was going in a ſolemn proceſſion to the Lateran church, ſhe was delivered of that child, between the Coliſeum and St Clement's church, in a moſt public ſtreet, before a crowd of people, and died on the ſpot, in 857. By way of embelliſhing this ſtory, may be added the precaution reported to have been afterward taken to avoid ſuch another accident. After the election of a pope, he was placed on a chair with an open ſeat, called the *groping chair,* when a deacon came moſt devoutly behind and ſatiſfied himſelf of the pontiff's ſex by feeling. This precaution, however, has been long deemed unneceſſary, becauſe the cardinals now always get baſtards enough to eſtabliſh their virility before they arrive at the pontificate.

JOAN *d'Arc*, or the Maid of Orleans, whoſe heroic behaviour in reanimating the expiring valour of the French nation, though by the moſt ſuperſtitious means, (pretending to be inſpired), deſerved a better fate. She was burnt by the Engliſh as a ſorcereſs, in 1421, aged 24. See FRANCE, n° 60.

JOANNA (St), one of the Comora iſlands in the Indian ocean, E. Long. 44. 25. S. Lat. 12. 0. The north ſide ſhoots out into two points, 26 miles aſunder, between which there is a great bay. This iſland is a proper place of refreſhment for the Eaſt India ſhips, whoſe crews, when ill of the ſcurvy, ſoon recover by the uſe of limes, lemons, and oranges, and from the air of the land. The iſland abounds with horned cattle, goats, fowls, rice, pepper, cocoa-nuts, plantains, bananas, oranges, lemons, limes, pine-apples, guavas, plums, yams, and potatoes. They have likewiſe honey and ſugar-canes; and the ſoil is ſo rich, that it ſeems proper for any other vegetables: all theſe, except the cocoa-nuts, may be gathered at pleaſure. The proſpect of the country is exceeding beautiful, and may be called without exaggeration a *terreſtrial paradiſe*; every valley being a delightful grove, and the hills covered with variety of evergreen trees, combined with water-falls and caſcades, render it impoſſible that they ſhould receive any addition from art. The town where the king reſides is at the eaſt ſide of the iſland; and though it is three quarters of a mile in length, it does not contain above 200 houſes. However, the villages are thick, and there are cottages almoſt every where. Their principal houſes are built with ſtone, with a quadrangle in the middle, and are only one ſtory high. All the other houſes, or rather huts, are ſlightly compoſed of plaſtered reeds; and yet the moſques are tolerable ſtructures, very neat and clean in the inſide. The horned cattle are a kind of buffaloes, having a large hump on their ſhoulders, which is very delicious eating. They have neither horſes nor aſſes, nor beaſts of prey; but they have monkies of ſeveral ſorts, and bats as large as a weaſel; they have alſo various ſorts of birds not yet diſtinguiſhed by any particular name.

JOB, or *Book of* JOB, a canonical book of the Old Teſtament, containing a narrative of a ſeries of miſfortunes which happened to a man whoſe name was *Job*, as a trial of his virtue and patience; together with the conferences he had with his cruel friends on the ſubject of his miſfortunes, and the manner in which he was reſtored to eaſe and happineſs. This book is filled with thoſe noble, bold, and figurative expreſſions, which conſtitute the very ſoul of poetry.

Many of the Jewiſh rabbins pretend that this relation is altogether a fiction: others think it a ſimple narrative of a matter of fact, juſt as it happened: while a third ſort of critics acknowledge, that the groundwork of the ſtory is true, but that it is wrote in a poetical ſtrain, and decorated with peculiar circumſtances, to render the narration more profitable and entertaining.

The time is not ſet down in which Job lived. Some have thought that he was much ancienter than Moſes, becauſe the law is never cited by Job or his friends, and becauſe it is related that Job himſelf offered ſacrifices. Some imagine that this book was wrote by himſelf; others ſay, that Job wrote it originally in Syriac or Arabic, and that Moſes tranſlated it into Hebrew: but the rabbins generally pronounce Moſes to be the author of it, and many Chriſtian writers are of the ſame opinion.

JOBBER, in law, a perſon that buys and ſells cattle for others. Hence ſtock-jobbers are perſons who buy and ſell ſtocks for other perſons.

JOBERT (Lewis), a pious and learned jeſuit, born at Paris in 1647. He diſtinguiſhed himſelf as a preacher; and beſides ſeveral other tracts wrote a treatiſe entitled *La Science des Medailles*, which is in good eſteem. He died in 1719; and the beſt edition of this work is that of Paris in 1739, 2 vols 12mo.

JODELLE (Stephen), lord of Limodin, was born at Paris in 1532; and diſtinguiſhed himſelf ſo greatly by his poetical talents, that he was reckoned one of the Pleiades celebrated by Ronſard. He is ſaid to be the firſt Frenchman who wrote plays in his own language according to the ancient form. He was remarkably ready at compoſition, writing without ſtudy or labour; and was well ſkilled in polite arts and genteel exerciſes. In his younger years he embraced the reformed religion, and wrote a ſatire on the maſs in 100 Latin verſes; yet all of a ſudden returned to that maſs again. He died in 1579, very poor.

JOEL, the ſon of Phatuel, and the ſecond of the leſſer prophets, 800 B. C. foretold the captivity of Babylon, the deſcent of the Holy Ghoſt on the apoſtles, and the laſt judgment. His prophecy is in Hebrew, and contains only three chapters. The ſtyle is ſtrong, expreſſive, and figurative.

JOHN (St), the BAPTIST, the fore-runner of Jeſus Chriſt, was the ſon of Zacharias and Elizabeth. He retired into a deſart, where he lived on locuſts and wild honey; and about the year 29 began to preach repentance, and to declare the coming of the Meſſiah. He baptized his diſciples, and the following year Chriſt himſelf was baptized by him, in the river Jordan. Some time after, having reproved Herod Antipas, who had a criminal correſpondence with Herodias his brother Philip's wife, he was caſt into priſon, where he was beheaded. His head was brought to Herodias, who, according to St Jerome, pierced his tongue with the bodkin ſhe uſed to faſten up her hair, to revenge herſelf after his death for the freedom of his reproofs.

JOHN (St), the apoſtle, or the evangeliſt, was the brother of St James the Great, and the ſon of Zebedee. He quitted the buſineſs of fiſhing to follow Jeſus, and was his beloved diſciple. He was witneſs to the actions and miracles of his Maſter; was preſent at his tranſfiguration on mount Tabor; and was with him in the garden of Olives. He was the only apoſtle who followed him to the croſs; and to him Jeſus left the care of his mother. He was alſo the firſt apoſtle who knew him again after his reſurrection. He preached the faith in Aſia; and principally reſided at Epheſus, where he maintained the mother of our Lord. He is ſaid to have founded the churches of Smyrna, Pergamus, Thyatira, Sardis, Philadelphia, and Laodicea. He is alſo ſaid to have preached the goſpel amongſt the Parthians, and to have addreſſed his firſt epiſtle to that people. It is related, that, when at Rome, the emperor Domitian cauſed him to be thrown into a caldron of boiling oil, when he came out unhurt; on which he was baniſhed to the iſle of Patmos, where he wrote his Apocalypſe. After the death of Domitian, he returned to Epheſus, where he compoſed his Goſpel, about the year 96; and died there, in the reign of Trajan, about the year 100, aged 94.

Goſpel of St JOHN, a canonical book of the New Teſtament, containing a recital of the life, actions, doctrine, and death, of our Saviour Jeſus Chriſt, written by St John the apoſtle and evangeliſt.

St John wrote his Goſpel at Epheſus, after his return from the iſle of Patmos, at the deſire of the Chriſtians of Aſia. St Jerome ſays, he would not undertake it, but on condition that they ſhould appoint a public faſt to implore the aſſiſtance of God; and that, the faſt being ended, St John, filled with the Holy Ghoſt, broke out into theſe words, "In the beginning was the Word," &c. The ancients aſſign two reaſons for this undertaking: the firſt is, becauſe, in the other three Goſpels, there was wanting the hiſtory of the beginning of Jeſus Chriſt's preaching, till the impriſonment of John the Baptiſt, which therefore he applied himſelf particularly to relate. The ſecond reaſon was, in order to remove the errors of the Corinthians, Ebionites, and other ſects.

Revelation of St JOHN. See APOCALYPSE.

JOHN *of Saliſbury*, biſhop of Chartres in France, was born at Saliſbury in Wiltſhire, in the beginning of the 12th century. Where he imbibed the rudiments of his education, is unknown; but we learn, that in the year 1136, being then a youth, he was ſent to Paris, where he ſtudied under ſeveral eminent profeſſors, and acquired conſiderable fame for his application and proficiency in rhetoric, poetry, divinity, and particularly in the learned languages. Thence he travelled to Italy: and, during his reſidence at Rome, was in high favour with pope Eugenio III. and his ſucceſſor Adrian IV. After his return to England, he became the intimate friend and companion of the famous Thomas BECKET, archbiſhop of Canterbury, whom he attended in his exile, and is ſaid to have been preſent when that haughty prelate was murdered in his cathedral. What preferment he had in the church during this time, does not appear; but in 1176 he was promoted by king Henry II. to the biſhopric of Chartres in France, where he died in 1182.

This John of Saliſbury was really a phænomenon. He was one of the firſt reſtorers of the Greek and Latin languages in Europe; a claſſical ſcholar, a philoſopher, a learned divine, and an elegant Latin poet. He wrote ſeveral books; the principal of which are, his Life of St Thomas of Canterbury, a collection of letters, and Polycraticon.

Pope JOHN XXII. a native of Cahors, before called *James d'Euſe*, was well ſkilled in the civil and canon law; and was elected pope after the death of Clement V. on the 7th of Auguſt 1316. He publiſhed the conſtitutions called *Clementines*, which were made by his predeceſſor; and drew up the other conſtitutions called *Extravagantes*. Lewis of Bavaria being elected emperor, John XXII. oppoſed him in favour of his competitor; which made much noiſe, and was attended with fatal conſequences. That prince, in 1329, cauſed the antipope Peter de Corbiera, a cordelier, to be elected, who took the name of Nicholas V. and was ſupported by Michael de Ceſenne, general of his order; but that antipope was the following year taken and carried to Avignon, where he begged pardon of the pope with a rope about his neck, and died in priſon two or three years after. Under this pope aroſe the famous queſtion among the cordeliers, called *the bread of the cordeliers*; which was, Whether thoſe monks had the property of the things given them, at the time they were making uſe of them? for example, Whether the bread belonged to them when they were eating it, or to the pope, or to the Roman church? This frivolous queſtion gave great employment to the pope; as well as thoſe which turned upon the colour, form, and ſtuff of their habits, whether they ought to be white, grey, or black; whether the cowl ought to be pointed or round, large or ſmall; whether their robes ought to be full, ſhort, or long; of cloth, or of ſerge, &c. The diſputes on all theſe minute trifles were carried ſo far between the minor brothers, that ſome of them were burned upon the occaſion. He died at Avignon in 1334, aged 90.

JOHN, king of England. See ENGLAND, n° 133, 144.

JOHN *of Gaunt*, duke of Lancaſter, a renowned general, father of Henry IV. king of England, died in 1438.

JOHN *of Leyden*, otherwiſe called *Buccold*. See ANABAPTISTS.

JOHN *Sobieſki* of Poland, one of the greateſt warriors in the 17th century, was, in 1665, made grand-marſhal of the crown; and, in 1667, grand-general of the kingdom. His victories obtained over the Tartars and the Turks procured him the crown, to which he was elected in 1674. He was an encourager of arts and ſciences, and the protector of learned men. He died in 1696, aged 72.

St JOHN'*s Day*, the name of two Chriſtian feſtivals; one obſerved on June 24th, kept in commemoration of the wonderful circumſtances attending the birth of John the Baptiſt; and the other on December 27th, in honour of St John the evangeliſt.

St JOHN'*s Wort*. See HYPERICUM.

JOHN'S *(St)*, an iſland of the Eaſt-Indies, in Aſia, and one of the Philippines, eaſt of Mindanayo, from which it is ſeparated by a narrow ſtrait. E. Long. 125. 25. N. Lat. 7. 0.

JOHN'S *(St)*, an iſland of North-America, in the bay of St Lawrence, having New-Scotland on the ſouth and weſt, and Cape Breton on the eaſt. The Engliſh got poſſeſſion of it when Louiſbourg was ſurrendered to them, on July 26, 1758.

JOHNSON (BEN), one of the moſt conſiderable dramatic poets of the laſt age, whether we conſider the number or the merit of his productions. He was born at Weſtminſter in 1574, and was educated at the public ſchool there under the great Camden. He was deſcended from a Scots family; and his father, who loſt his eſtate under Queen Mary, dying before our poet was born, and his mother marrying a bricklayer for her ſecond huſband, Ben was taken from ſchool to work at his father-in-law's trade. Not being captivated with this employment, he went into the Low Countries, and diſtinguiſhed himſelf in a military capacity.

On his return to England, he entered himſelf at St John's college, Cambridge; and having killed a perſon in a duel, was condemned, and narrowly eſcaped execution. After this he turned actor; and Shakeſpeare is ſaid to have firſt introduced him to the world, by recommending a play of his to the ſtage, after it had been rejected. His Alchymiſt gained him ſuch reputation, that in 1619 he was, at the death of Mr Daniel, made poet-laureat to King James I. and maſter of arts at Oxford.

As we do not find Johnſon's œconomical virtues any where recorded, it is the leſs to be wondered at, that after this we find him petitioning king Charles, on his acceſſion, to enlarge his father's allowance of 100 merks into pounds; and quickly after we learn, that he was very poor and ſick, lodging in an obſcure alley: on which occaſion it was, that Charles, being prevailed on in his favour, ſent him ten guineas; which Ben receiving, ſaid, "His majeſty has ſent me ten guineas, becauſe I am poor, and live in an alley; go and tell him, that his ſoul lives in an alley."

He died in Auguſt 1637, aged 63 years, and was buried in Weſtminſter-Abbey. — The moſt complete edition of his works was printed in 1756, in 7 vols. 8vo.

Johnson (Samuel), an Engliſh divine, remarkable for his learning, and ſteadineſs in ſuffering for the principles of the revolution in 1688. He was born in 1649; and, entering into orders, obtained in 1670 the rectory of Corringham in the hundreds of Eſſex, worth no more than L. 80 a-year; which was the only church-preferment he ever had. The air of this place not agreeing with him, he was obliged to place a curate on the ſpot, at the expence of half his income, while he ſettled at London; a ſituation much more to his liking, as he had a ſtrong propenſity to politics. The times were turbulent: the duke of York declaring himſelf a Papiſt, his ſucceſſion to the crown began to be warmly oppoſed; and Mr Johnſon, who was naturally of no ſubmiſſive temper, being made chaplain to lord William Ruſſel, engaged the eccleſiaſtical champion for paſſive obedience Dr Hicks, in a treatiſe intitled *Julian the apoſtate, &c.* publiſhed in 1682. He was anſwered by Dr Hicks in a piece intitled *Jovian, &c.* To which he drew up, and printed, a reply, under the title of *Julian's arts to undermine and extirpate Chriſtianity, &c.*; but by the advice of his friends ſuppreſſed the publication. For this unpubliſhed work he was committed to priſon; but not being able to procure a copy, the court proſecuted him for writing the firſt tract, condemned him to a fine of 500 merks, and to lie in priſon until it was paid. By the aſſiſtance of Mr Hambden, who was his fellow-priſoner, he was enabled to run into farther troubles; for on the encampment of the army on Hounſlow-heath, in 1686, he printed and diſperſed, *An humble and hearty addreſs to all the Proteſtants in the preſent army*; for this he was ſentenced to a ſecond fine of 500 merks, to be degraded from the prieſthood, to ſtand twice in the pillory, and to be whipped from Newgate to Tyburn. It happened luckily, that, in the degradation, they omitted to ſtrip him of his caſſock; which circumſtance, ſlight as it may appear, rendered his degradation imperfect, and afterwards preſerved his living to him. Interceſſion was made to get the whipping omitted; but James replied, "That ſince Mr Johnſon had the ſpirit of martyrdom, it was fit he ſhould ſuffer:" and he bore it with firmeſs, and even with alacrity. On the Revolution, the parliament reſolved the proceedings againſt him to be null and illegal; and recommended him to the king, who offered him the rich deanery of Durham: but this he refuſed, as inadequate to his ſervices and ſufferings, which he thought to merit a biſhopric. The truth was, he was paſſionate, ſelf-opiniated, and turbulent; and though, through Dr Tillotſon's means, he obtained a penſion of 300 l. a-year, with other gratifications, he remained diſcontented; pouring forth all his uneaſineſs againſt a ſtanding army, and the great favours ſhewn to the Dutch. He died in 1703, and his works were afterwards collected in one volume folio.

Johnson (John), a learned divine, born in 1662. He was zealous for the Revolution, and preached a noted ſermon at Feverſham on the occaſion, from the words, "Remember Lot's wife;" wherein he ſet forth the great danger of looking back, and vindicated the liturgy againſt Mr Baxter and others. He publiſhed *The Clergyman's Vade Mecum*, and *A Collection of Eccleſiaſtical Laws* as a continuation of it; but catching the infection ſpread by Dr Sacheverel, he, on the acceſſion of Geo. I. to the amazement of all his old friends, entertained unfavourable thoughts of the Proteſtant ſucceſſion, and refuſed to read the uſual prayers for the king. Being proſecuted, however, he thought proper to ſubmit; and died vicar of Cranbrook in Kent, in 1725.

JOIGNY, a town of France, in Champagne, and in the dioceſe of Sens, with a very handſome caſtle. It conſiſts of three pariſhes, and is pleaſantly ſituated on the river Yonne, in E. Long. 3. 25. N. Lat. 47. 56.

JOINERY, the art of working in wood, or of fitting various pieces of timber together. It is called by the French *menuiſerie*, "ſmall work," to diſtinguiſh it from carpentery, which is employed about large and leſs curious works.

JOINT, in general, denotes the juncture of two or more things. The joints of the human body are called by anatomiſts *articulations*. See Anatomy, n° 2. *b, c, d, e, f.*

The ſuppleneſs to which the joints may be brought by long practice from the time of infancy, is very ſurpriſing. Every common poſture-maſter ſhews us a great deal of this; but one of the moſt wonderful inſtances we ever had of it, was in a perſon of the name of *Clark*, and famous for it in London, where he was commonly known by the name of *Clark the poſture-maſter*. This man had found the way, by long practice, to diſtort many of the bones, of which nobody before had ever thought it poſſible to alter the poſition. He had ſuch an abſolute command of his muſcles and joints, that he could almoſt disjoint his whole body; ſo that he once impoſed on the famous Mullens by his diſtortions, in ſuch a manner, that he refuſed to undertake his cure: but, to the amazement of the phyſician, no ſooner had he given over his patient, than he ſaw him reſtore himſelf to the figure and condition of a proper man, with no diſtortion about him.

JOINTURE, in law, generally ſignifies a ſettlement of lands and tenements, made on a woman in conſideration of marriage.

JOINVILLE (John Sire de), an eminent French ſtateſman of the 13th century, who was ſeneſchel or high-ſteward of Champagne, and one of the principal lords in the court of Lewis IX. He attended that monarch in all his expeditions; and had ſo much confidence placed in him, that all matters of juſtice in the palace were referred to his deciſion, and the king undertook nothing of conſequence without conſulting him. He wrote the hiſtory of St Lewis in French, which is a very curious and intereſting piece; and died about the year 1318. The beſt edition of this work is that of Du Cange, in folio, with learned remarks.

JOINVILLE, an ancient and conſiderable town of France, in Champagne, with the title of a principality, and a large magnificent caſtle. It is ſituated on the river Marne, in E. Long. 5. 10. N. Lat. 48. 20.

JOISTS, or JOYSTS, in architecture, thoſe pieces of timber framed into the girders and ſummers, on which the boards of the floor are laid.

IOLAUS, in fabulous hiſtory, the ſon of Iphicles, aſſiſted Hercules in overcoming the hydra, by procuring and lighting firebrands, as faſt as Hercules cut off its heads. As a reward for this piece of ſervice, Hercules prevailed on Hebe to reſtore him to youth, when decrepid with age.

JOLI, or JOLY, (Claudius), a worthy pariſh-prieſt, and an excellent ſcholar, deſcended from a family eminent for learning and piety; was born at Paris in 1607. He applied himſelf firſt to the law, and pleaded for ſome time at the bar: but inclining afterwards to the church, he entered into orders, and in 1631 obtained a canonry in the cathedral church of Notre Dame at Paris; the duties of which office he diſcharged with an exactneſs beyond all example as long as he lived. Diſcovering at the ſame time occaſionally a capacity for ſtate-affairs, the duke de Longueville, the French plenipotentiary for negociating a general peace, took Joly with him to Munſter, where he proved a good aſſiſtant. On his return, he reſumed his former employments with his uſual zeal. In 1671 he was made precentor in his church; and ſeveral times official of Paris, without his ſeeking; always behaving, as an eccleſiaſtical magiſtrate, with perfect integrity, and teſtifying a ſincere love for juſtice. He died in 1700, and left many works; in which, as in as many mirrors, his true character fully appears.

JOLI (Guy), king's counſellor to the Chatelet, and ſyndic of the revenues of the Hotel de Ville at Paris, attached himſelf for a long time to cardinal de Retz in the capacity of ſecretary. Beſide other tracts, he wrote *Memoirs* from 1648 to 1665, including thoſe of Cardinal de Retz; a tranſlation of which into Engliſh was publiſhed in 1755.

JONA, or IONA, the moſt celebrated of all the Hebrides, called alſo *St Columb-kill*, from St Columba *, who came hither from Ireland, and here lies buried. The iſland ſtretches two miles in length from ſouth to north in the neighbourhood of Mull, and is about a mile broad from eaſt to weſt. One end of it is rocky and barren; the other, plain, arable, and fruitful. Columba having converted the northern Picts by his preaching, their king is ſaid to have beſtowed upon him this iſland, where he erected two churches and two monaſteries, and inſtituted a ſeminary that ſoon became famous for learning and ſanctity. Theſe foundations were richly endowed by the kings of Scotland and lords of the iſles: Jona became the cathedral of the biſhop of the iſles; and, on account of its ſuppoſed ſanctity, was choſen as a burying-place for kings, heroes, and churchmen. St Mary's church in this iſland is built in form of a croſs, in the Gothic manner; on each ſide of the choir are two chapels, having, at the entrance, large pillars carved in baſſo-relievo: the ſteeple, doors, and windows, are adorned with curious fret-work; the altar is large, magnificent, and compoſed of fine poliſhed marble. Within the church ſeveral abbots are interred, and among theſe M‘Ilikenich, whoſe ſtatue of black marble appears as big as the life, in an epiſcopal habit, with the mitre and croſier; the reſt are repreſented in the ſame manner, and ſome diſtinguiſhed by Latin inſcriptions. Behind the church are the ruins of a cloiſter, library, and hall; in which laſt there uſed to be public diſputations. At the weſt end of the church, in a little cell, we find the tomb of Columba, but undiſtinguiſhed by any inſcription. Hard by ſtands the croſs of St Martin, an entire porphyry ſtone, eight feet high above the ground, ſtanding on a pedeſtal, and exhibiting on the eaſt ſide the figure of a tree, and on the weſt a large crucifix. At a little diſtance from hence we ſee the ruins of Dun-ni Manich, or Monks Fort, built of ſtone and lime; which ſeems to have been a kind of raiſed baſtion, on which the monks enjoyed the cool air, and a proſpect of the whole country. A little farther weſtward lie the black ſtones, ſo called, not for their colour, which is grey, but on account of the dreadful vengeance which was ſaid to overtake all thoſe who ſwore an oath on theſe ſtones and were afterwards guilty of perjury. Kneeling on theſe ſtones with uplifted hands, Macdonald, lord of the iſles, confirmed the grants of lands to his adherents and vaſſals, ſolemnly ſwearing before witneſſes, that he would never revoke the rights and privileges he then beſtowed.

The other church in Jona is called *St Ouran's*, from the patron to which it is dedicated. The ſtatelieſt tomb in this church belongs to the laird of M‘Kinnon. On the wall above appears a crucifix, engraved with the family-arms underneath. On the tomb-ſtone lies a ſtatue as big as the life in armour, a ſhip under ſail, a lion at the head, and another at the feet, with this inſcription, *Hic eſt abbas Lachlan Much-fingone, et ejus filius, Abbates de I. Ætatis in Dno. Mo. CCCC. ann.* But the moſt remarkable ſpot is the cœmetery on the ſouth ſide, in which the king and chieftains lie buried under ſhrines. Each particular vault was diſtinguiſhed ed by an inſcription; but theſe are now not legible. In that on the right hand, four kings of Ireland were interred; on the left, eight kings of Norway lie buried; and in the middlemoſt, eight and forty kings of Scotland. Here are likewiſe the tombs of Macdonald of Ila, Gilbred, and Paul Sporran, ancient tribes of the ſame name; the Macleans of Duart, Lochbuy, and Coll, Macaliſter, likewiſe a branch of the Macdonalds, Mac-ouvrey of Ulvay, and ſeveral dignified clergymen; one of which exhibits this inſcription, *Hic jacet Johannes Turnbull, quondam epiſcopus Canterburienſis*. All theſe monuments are of laymen, adorned with ſtatues in armour, and armorial enſigns engraven in ſtone.

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* See *Hebrides*, and *Columba*.

About a quarter of a mile farther ſouth, is the church of Ronad, the burying-place of ſeveral abbeſſes; one of whom is thus inſcribed: *Hic jacet Dna. Anna Terleti, filia quondam prioreſſa de Jona, quæ obijt anno Mo. Chriſti, animam Abrahamo commendamus*. If this inſcription be true, the prioreſſes in thoſe days did not live a life of celibacy; though indeed a little alteration in the punctuation and orthography will deſtroy this ſuppoſition; for example, *Hic jacet Dna. Anna, Tarleti filia, quondam prioreſſe de Jona, &c.* In the middle of a long pavement belonging to the adjoining nunnery, ſtands another-ſtone croſs, called *Maclean's croſs*, like that which we have already deſcribed. On the ſhore is a ſmall dock dug to preſerve the curich or boat, made of timber covered with hides, in which Columba is ſaid to have tranſported himſelf and eighteen eccleſiaſtics from Ireland. One copy of this apoſtle's life, written in the Iriſh character, which by the by is no other than the old Saxon, was in the poſſeſſion of John Macneil in the iſle of Barray; and another in the hands of Macdonald of Benbecula. The monaſtery of Jona furniſhed divers biſhops to the dioceſes of Scotland and England; among others, the famous Aidanus, biſhop of Lindiſfairn, now Holy Iſland.

JONAH, or *Prophecy of* JONAH, a canonical book of the Old Teſtament; in which it is related, that Jonah (about 771 B. C.) was ordered to go and prophecy the deſtruction of the Ninevites, on account of their wickedneſs. But the prophet, inſtead of obeying the divine command, embarked for Tarſhiſh; when, a tempeſt ariſing, the mariners threw him into the ſea: he was ſwallowed by a great fiſh; and after being three days and nights in its belly, was caſt upon the land. Hereupon being ſenſible of his paſt danger and ſurpriſing deliverance, he betook himſelf to the journey and embaſſy to which he was appointed; and arriving at Nineveh the metropolis of Aſſyria, he, according to his commiſſion, boldly laid open their ſins and miſcarriages, and proclaimed their ſudden overthrow: upon which the whole city, by prayer and faſting, and a ſpeedy repentance, happily averted the divine vengeance, and eſcaped the threatened ruin. Jonah upon this, fearing to paſs for a falſe prophet, retired to a hill at ſome diſtance from the city; where God, by a miracle, condeſcended to ſhew him the unreaſonableneſs of his diſcontent.

JONAS (Juſtus), a Proteſtant divine, born at North Hauſen, in Thuringia, in 1493. He was one of Luther's moſt zealous diſciples. He contracted a ſtrict friendſhip with Melancthon; became principal of the college of Wittemburg, and afterwards dean of the univerſity of that city. He wrote a treatiſe in favour of the marriage of prieſts, and other works; and died in 1555.

JONAS (Arnagrimus), a learned Icelander, acquired great reputation by his ſkill in the ſciences, and particularly in aſtronomy. He was coadjutor to Gundebran de Thorlac, biſhop of Hola, in Iceland. He refuſed that biſhopric, after the death of Gundebran; and died in 1649. He wrote ſeveral works; the principal of which are, *Idea veræ Magiſtratûs*, and his hiſtory and deſcription of Iceland.

JONATHAN, the ſon of Saul, celebrated in Sacred hiſtory for his valour, and his friendſhip for David againſt the intereſt of his own houſe. Slain in battle, 1055 B. C.

JONATHAN *Maccabæus*, brother of Judas, a renowned general of the Jews. He forced Bacchides the Syrian general, who made war with the Jews, to accept a peace; conquered Demetrius Soter, and afterwards Apollonius, that prince's general; but, being enſnared by Tryphon, was put to death, 144 B. C.

JONES (Inigo), a celebrated Engliſh architect, was the ſon of a cloth-worker of London, and was born in 1572. He was at firſt put apprentice to a joiner; but early diſtinguiſhed himſelf by his inclination to drawing or deſigning, and was particularly taken notice of for his ſkill in landſcape-painting. This afterwards recommended him to the favour of William earl of Pembroke, who ſent him abroad with a handſome allowance in order to perfect himſelf in that branch. He was no ſooner at Rome, than he found himſelf in his proper ſphere: he felt that nature had not formed him to decorate cabinets, but to deſign palaces. He dropt the pencil, and conceived Whitehall. In the ſtate of Venice he ſaw the works of Palladio, and learned how beautiful taſte may be exerted on a leſs theatre than the capital of an empire. How his abilities diſtinguiſhed themſelves in a ſpot where they certainly had no opportunity to act, we are not told, though it would not be the leaſt curious part of his hiſtory; certain it is, that, on the ſtrength of his reputation at Venice, Chriſtian IV. invited him to Denmark, and appointed him his architect; but on what buildings he was employed in that country, we are yet to learn. James I. found him at Copenhagen, and queen Anne took him in the quality of her architect to Scotland. He ſerved prince Henry in the ſame capacity, and the place of ſurveyor-general of the works was granted to him in reverſion. On the death of that prince, with whom at leaſt all his lamented qualities did not die, Jones travelled once more into Italy, and, aſſiſted by ripeneſs of judgment, perfected his taſte. To the interval between theſe voyages Mr Walpole is inclined to aſſign thoſe buildings of Inigo, which are leſs pure, and border too much upon the baſtard ſtyle, which one may call *king James's gothic*. Inigo's deſigns of that period are not gothic; but have a littleneſs of parts, and a weight of ornaments, with which the revival of the Grecian taſte was encumbered, and which he ſhook off in his grander deſigns. The ſurveyor's place fell, and he returned to England; and, as if architecture was not all he had learned at Rome, with an air of Roman diſintereſtedneſs he gave up the profits of his office, which he found extremely in debt; and prevailed upon the comptroller and paymaſter to imitate his example, till the whole arrears were cleared.

In 1620, he was employed in a manner very unworthy of his genius: king James ſet him upon diſcovering, that is, gueſſing, who were the founders of Stonehenge. His ideas were all Romanized; conſequently, his partiality to his favourite people, which ought rather to have prevented him from charging them with that maſs of barbarous clumſineſs, made him conclude it a Roman temple.

In the ſame year Jones was appointed one of the commiſſioners for the repair of St Paul's; but which was not commenced till the year 1633, when Laud, then biſhop of London, laid the firſt ſtone, and Inigo the fourth. In the reſtoration of that cathedral, he made two capital faults. He firſt renewed the ſides with very bad Gothic; and then added a Roman portico, magnificent and beautiful indeed, but which had no affinity with the ancient parts that remained, and made his own Gothic appear ten times heavier. He committed the ſame error at Wincheſter, thruſting a ſcreen in the Roman or Grecian taſte into the middle of that cathedral. Jones indeed was by no means ſucceſsful when he attempted Gothic. The chapel of Lincoln's-Inn has none of the characteriſtics of that architecture. The cloyſter beneath ſeems oppreſſed by the weight of the building above.

The authors of the life of Jones place the erecting of the Banqueting-houſe in the reign of king Charles; but it appears, from the accounts of Nicholas Stone, that it was begun in 1619, and finiſhed in two years—a ſmall part of the pile deſigned for the place of our kings; but ſo complete in itſelf, that it ſtands a model of the moſt pure and beautiful taſte. Several plates of the intended palace at Whitehall have been given; but Mr Walpole thinks, from no finiſhed deſign. The four great ſheets are evidently made up from general hints; nor could ſuch a ſource of invention and taſte as the mind of Inigo, ever produce ſo much ſameneſs. The whole fabric, however, was ſo glorious an idea, that one forgets for a moment (ſays Mr Walpole), in the regret for its not being executed, the confirmation of our liberties, obtained by a melancholy ſcene that paſſed before the windows of that very Banqueting-houſe.

In 1623 he was employed at Somerſet-houſe, where a chapel was to be fitted up for the Infanta, the intended bride of the prince. The chapel is ſtill in being. The front to the river, part only of what was deſigned, and the water-gate, were erected afterwards on the deſigns of Inigo, as was the gate at York-ſtairs.

On the acceſſion of Charles, Jones was continued in his poſts under both king and queen. His fee as ſurveyor, was eight ſhillings and four-pence a-day, with an allowance of 46 l. a-year for houſe-rent, beſides a clerk, and incidental expences. What greater rewards he had, are not upon record.

During the proſperous ſtate of the king's affairs, the pleaſures of the court were carried on with much taſte and magnificence. Poetry, painting, muſic, and architecture, were all called in to make them rational amuſements. Mr Walpole is of opinion, that the celebrated feſtivals of Louis XIV. were copied from the ſhews exhibited at Whitehall, in his time the moſt polite court in Europe. Ben Johnſon was the laureat; Inigo Jones the inventor of the decorations; Laniere and Feraboſco compoſed the ſymphonies; the king, the queen, and the young nobility, danced in the interludes. We have accounts of many of thoſe entertainments, called *maſques;* they had been introduced by Anne of Denmark.

Lord Burlington had a folio of the deſigns for theſe ſolemnities, by Inigo's own hand, conſiſting of habits, maſks, ſcenes, &c. The harmony of theſe maſks was a little interrupted by a war that broke out between the compoſers, Inigo and Ben; in which, whoever was the aggreſſor, the turbulent temper of Johnſon took care to be moſt in the wrong. Nothing exceeds the groſſneſs of the language that he poured out, except the badneſs of the verſes that were the vehicle. There he fully exerted all the brutal abuſe which his contemporaries were willing to think wit, becauſe they were afraid of it; and which only ſeems to ſhew the arrogance of the man, who preſumed to ſatirize Jones and rival Shakeſpear.

The works of Inigo Jones are not ſcarce; Surgeon's-hall is one of his beſt works. One of the moſt admired is the Arcade of Covent-garden, and the Church: "Two ſtructures, (ſays Mr Walpole), of which I want taſte to ſee the beauties. In the arcade there is nothing remarkable; the pilaſters are as arrant and homely ſtripes as any plaſterer would make. The barn-roof over the portico of the church ſtrikes my eyes with as little idea of dignity or beauty, as it could do if it covered nothing but a barn. It muſt be owned, that the defect is not in the architect, but in the order.—Who ever ſaw a beautiful Tuſcan building? Would the Romans have choſen that order for a temple?" The expence of building that church was 4500 l.

Ambreſbury in Wiltſhire was deſigned by Jones, but executed by his ſcholar Webb. Jones was one of the firſt that obſerved the ſame diminution of pilaſters as in pillars. Lindſay-houſe in Lincoln's-Inn Fields, which he built, owes its chief grace to this ſingularity. In 1618 a ſpecial commiſſion was iſſued to the lord chancellor, the earls of Worceſter, Pembroke, Arundel, and others, to plant, and reduce to uniformity, Lincolns-Inn Fields, as it ſhall be drawn by way of map, or ground-plot, by Inigo Jones, ſurveyor-general of the works. That ſquare is laid out with a regard to ſo trifling a ſingularity, as to be of the exact dimenſions of one of the pyramids: this would have been admired in thoſe ages when the Keep at Kenelworth Caſtle was erected in the form of an horſe-fetter, and the Eſcurial in the ſhape of St Laurence's gridiron.

Coleſhill in Berkſhire, the ſeat of Sir Matthew Pleydell, built in 1650, and Cobham-hall in Kent, were Jones's. He was employed to rebuild Caſtle Aſhby, and finiſhed one front: but the civil war interrupted his progreſs there and at Stoke-park in Northamptonſhire. Shaftſbury-houſe, now the London Lying-in hoſpital, on the eaſt ſide of Alderſgate-ſtreet, is a beautiful front. The Grange, the ſeat of the lord chancellor Henley in Hampſhire, is entirely of this maſter. It is not a large houſe, but by far one of the beſt proofs of his taſte. The hall, which opens to a ſmall veſtibule with a cupola, and the ſtaircaſe adjoining, are beautiful models of the pureſt and moſt claſſic antiquity. The gate of Beaufort-garden at Chelſea, deſigned by Jones, was purchaſed by lord Burlington, and tranſported to Chiſwick. He drew a plan for a palace at Newmarket; but not that wretched hovel that ſtands there at preſent. One of the moſt beautiful of his works is the Queen's houſe at Greenwich. The firſt idea of the hoſpital is ſaid to have been taken by his ſcholar Webb, from his papers.

Inigo taſted early the misfortunes of his maſter. He was not only a favourite, but a Roman catholic: in 1646, he paid 545 l. for his delinquency and ſequeſtration. Whether it was before or after this fine, it is uncertain, that he and Stone the maſon buried their joint ſtock in Scotland-yard; but an order being publiſhed to encourage the informers of ſuch concealments, and four perſons being privy to the ſpot where the money was hid, it was taken up, and reburied in Lambeth-marſh.

Grief, misfortunes, and age, put an end to his life at Somerſet-houſe, July 21. 1651.

Several of his deſigns have been publiſhed by Mr Kent, Mr Colin Campbell, and Mr Iſaac Ware. He left in MS. ſome curious notes on Palladio's architecture, which are inſerted in an edition of Palladio publiſhed in 1714.

IONIA (anc. geog.), a diſtrict of the Hither Aſia, a great colony of Greeks, led thither after that of Æolia. It conſiſted of twelve cities, ten of which were on the continent, and two on the iſlands of Samos and Chios; extending from Phocœa to Miletus, incluſive from north to ſouth, according to Herodotus, Strabo, and Mela: Though Ptolemy confines it between the Hermus to the north, and the Meander to the ſouth. *Jones* or *Jaones* the people, (Homer) taking name from *Javan* their progenitor: A ſoft and luxurious nation. Plato baniſhes from his republic the Ionian muſic, as too effeminate. The *Attagen Ionicus*, (Horace, Martial), was a bird in eſteem for its flavour with perſons who loved good eating.—The *Ionian* ſea was that part of the Mediterranean extending between Epirus and Peloponneſus to the eaſt, and Magna Græcia and part of Sicily to the weſt.

IONIC ORDER. See ARCHITECTURE, p. 352.

IONIC *Dialect*, in grammar, a manner of ſpeaking peculiar to the people of Ionia.

IONIC *Sect* was the firſt of the ancient ſects of philoſophers; the others were the Italic and Eleatic. The founder of this ſect was Thales, who, being a native of Miletus in Ionia, occaſioned his followers to aſſume the appellation of *Ionic*: Thales was ſucceeded by Anaximander, and he by Anaximenes, both of Miletus; Anaxagoras Clazomenius ſucceeded them, and removed his ſchool from Aſia to Athens, where Socrates was his ſcholar. It was the diſtinguiſhing tenet of this ſect, that water was the principle of all natural things.

JONK, or JONQUE, in naval affairs, is a kind of ſmall ſhip, very common in the Eaſt Indies. Theſe veſſels are about the bigneſs of our fly-boats; and differ in the form of their building, according to the different methods of naval architecture uſed by the nations to which they belong. Their ſails are frequently made of mats, and their anchors are made of wood.

JONSTON (John), a learned Poliſh naturaliſt and phyſician, born in 1603. He travelled all over Europe, and procured eſteem every-where by his knowledge; afterward he bought the eſtate of Ziebendorf in the duchy of Lignitz in Sileſia, where he ſpent the remainder of his days. He wrote a natural hiſtory of birds, fiſh, quadrupeds, inſects, ſerpents, and dragons, in folio; a piece upon the Hebrew and Greek feſtivals, a thaumatography, and ſome poems. He died in 1675.

JOPPE (anc. geogr.), a town of Samaria, on the Mediterranean, ſituate in a plain (1 Macc. x.), in the tribe of Ephraim (Joſh. xvi.). Here Andromeda is fabled to have been bound and expoſed to the ſea-monſter, and delivered by Perſeus. Now *Jaffa*, a port-town of Paleſtine. E. Long. 36. 0. N. Lat. 32. 20.

JORDANO (Luca), an eminent Italian painter, was born at Naples in 1632. He became very early a diſciple of Joſeph Ribera; but going afterwards to Rome, he attached himſelf to the manner of Pietro da Cortona, whom he aſſiſted in his great works. Some of his pictures being ſeen by Charles II. king of Spain, he engaged him in painting the Eſcurial; in which taſk he acquitted himſelf as a great painter. The king ſhewed him a picture of Baſſani, expreſſing his concern that he had not a companion: Luca painted one ſo exactly in Baſſani's manner, that it was taken for a performance of that maſter; and for this ſervice he was knighted, and gratified with ſeveral honourable and valuable employments. The great works he executed in Spain, gave him ſtill greater reputation when he returned to Naples; ſo that though he was a very quick workman, he could not ſupply the eager demands of the citizens. No one, not even Tintoret, ever painted ſo much as Jordano; and his generoſity carried him ſo far as to preſent altar-pieces to churches that were not able to purchaſe them. His labours were rewarded with great riches; which he left to his family, when he died, in 1705.

JORDANS (James), one of the moſt eminent painters of the Flemiſh ſchool, was born at Antwerp in 1593. He learned the principles of his art from Adam Van Ort, whoſe daughter he married; which connexion hindered him from gratifying his inclination of viſiting Italy. He improved moſt under Rubens; for whom he worked, and from whom he drew his beſt principles: his taſte directed him to large pieces; and his manner was ſtrong, true, and ſweet. A great number of altar-pieces painted by him are preſerved in the churches in the Netherlands, which maintain the reputation of this artiſt. He died in 1678.

JORTIN (John), a very learned and ingenious Engliſh clergyman, was born in Huntingdonſhire, about the year 1701. Having ſome private fortune of his own, and being of a peculiar diſpoſition that could not ſolicit promotion, he remained long without preferment. In 1738, lord Wincheſter gave him the living of Eaſtwell in Kent; but the place not agreeing with his health, he ſoon reſigned it. Archbiſhop Herring, who had a great value for him, about the year 1751 preſented him to the living of St Dunſtan's in the Eaſt; and biſhop Oſbaldiſton in 1762 gave him that of Kenſington, with a prebend in St Paul's cathedral, and made him archdeacon of London. His temper, as well as his aſpect, was rather moroſe and ſaturnine; but in company that he liked, he was at all times facetious, yet ſtill with a mixture of *ſal cenſura ſuperiorum*. His ſermons were ſenſible and argumentative; and would have made more impreſſion on his hearers, had he been more attentive to the advantages flowing from a good delivery: but he appeared to greater advantage as a writer. His remarks on eccleſiaſtical hiſtory, his ſix diſſertations, his life of Eraſmus, and his ſermons, were extremely well received by the public. He died in the year 1770.

JOSEPH, the ſon of Jacob; memorable for his chaſtity, and the honours conferred on him at the court of Egypt, &c. He died in 1635 B. C. aged 110.

JOSEPHUS, the celebrated hiſtorian of the Jews, was of noble birth, by his father Mattathias deſcended from the high-prieſts, and by his mother of the blood-royal of the Maccabees; he was born A. D. 37, under Caligula, and lived under Domitian. At 16 years of age he betook himſelf to the ſect of the Eſſenes, and then to the Phariſees; and having been ſucceſsful in a journey to Rome, upon his return to Judæa he was made captain-general of the Galilæans. Being taken priſoner by Veſpaſian, he foretold his coming to the empire, and his own deliverance by his means. He accompanied Titus at the ſiege of Jeruſalem, and writ his "Wars of the Jews," which Titus ordered to be put in the public library. He afterwards lived at Rome, where he enjoyed the privileges of a Roman citizen, and where the emperors loaded him with favours, and granted him large penſions. Beſides the above work, he wrote, 1. Twenty books of Jewiſh antiquities, which he finiſhed under Domitian. 2. Two books againſt Appian. 3. An elegant diſcourſe on the martyrdom of the Maccabees. 4. His own life. Theſe works are excellently written in Greek.

JOSHUA, the renowned general of the Jews, who conducted them through the wilderneſs, &c. died in 1424 B. C. aged 110.

JOSHUA, a canonical book of the Old Teſtament, containing a hiſtory of the wars and tranſactions of the perſon whoſe name it bears. This book may be divided into three parts: the firſt of which is a hiſtory of the conqueſt of the land of Canaan; the ſecond, which begins at the 12th chapter, is a deſcription of that country, and the diviſion of it among the tribes; and the third, compriſed in the two laſt chapters, contains the renewal of the covenant he cauſed the Iſraelites to make, and the death of their victorious leader and governor. The whole comprehends a term of 17, or, according to others, of 27 years.

JOSIAH, king of Judah; the deſtroyer of idolatry, and the reſtorer of the true worſhip, an excellent magiſtrate, and a valiant general, was ſlain in battle, 609 B. C.

JOTAPATA (anc. geogr.), a town of the Lower Galilee, diſtant 40 ſtadia from Gabara: a very ſtrong place, ſituate on a rock, walled round, and encompaſſed on all hands with mountains, ſo as not to be ſeen but by thoſe who came very near. It was with great difficulty taken by Veſpaſian, being defended by Joſephus, who commanded in it; when taken, it was ordered to be razed.

JOUBERT (Lawrence), counſellor and phyſician to the king of France, chancellor and judge of the univerſity of Montpelier, was born at Valence in Dauphiny in 1530. He became the diſciple of Rondelet at Montpelier; and at his death ſucceeded to the regius profeſſorſhip of that univerſity, where he had given abundant proofs of his merit, and ſtrengthened his reputation by the lectures he read in that capacity, as well as by the works he publiſhed. Henry III. who paſſionately wiſhed to have children, ſent for him to Paris, in hopes by his aſſiſtance to render his marriage fruitful; but he was diſappointed, without any loſs of repute to Joubert. Much offence was indeed taken at a piece he publiſhed under the title of *Vulgar errors*, in which he treated of virginity and generation more plainly than had ever before been done in the French language. But, though he had promiſed ſomething more on the ſame ſubject, he was ſo piqued at the clamour raiſed againſt it, that the public ſaw no more, of ſix parts promiſed, than the firſt, and part of the ſecond, though they were greatly called for. He died in 1582; and his ſon Iſaac tranſlated ſome of his Latin paradoxes into French.

JOVIAN, the Roman emperor, elected by the army, after the death of Julian the apoſtate, in 363. He at firſt refuſed, ſaying he would not command idolatrous ſoldiers; but, upon an aſſurance that they would embrace Chriſtianity, he accepted the throne, and immediately ſhut all the Pagan temples, and forbid their ſacrifices. But he did not long enjoy the dignity to which his merit had raiſed him; being ſuffocated in his bed by the fumes of a fire that had been made to dry the chamber, in 364, the 33d of his age, and the eighth month of his reign. See CONSTANTINOPLE, n° 71—73.

JOVIUS (Paul), in Italian *Giovio*, a celebrated hiſtorian, was born at Como in Italy, in the year 1483. As his father died in his infancy, he was educated by his eldeſt brother Benedict Jovius, under whom he became well ſkilled in claſſical learning; and then went to Rome, for the ſake of enjoying the benefit of the Vatican library. He there wrote his firſt piece, *De piſcibus Romanis*, which he dedicated to cardinal Lewis of Bourbon. He received a penſion of 500 crowns for many years from Francis I. king of France, whoſe favour he ſecured by his flatteries. But, in the following reign, having diſguſted the conſtable Montmorency, his name was ſtruck out of the liſt of penſioners. Jovius did not ſuffer his ſpirits to ſink under this miſfortune: he had obtained a high reputation in the learned world by his writings; and having always ſhewed great reſpect to the houſe of Medicis, on whoſe praiſes he had expatiated in his works, he applied to Clement VII. and obtained the biſhoprick of Nocera. His principal piece is his hiſtory, which is that of his own time throughout the world, beginning with 1494, and extending to the year 1544. This was the chief buſineſs of his life. For he formed the plan of it in the year 1515; and continued upon it till his death, which happened at Florence in 1552. It is printed in three volumes folio. He is allowed to have been a man of wit as well as learning; he was maſter of a bright and poliſhed ſtyle, and has many curious obſervations: but being a venal writer, his hiſtories are not much credited.

JOURNAL, or DAY-BOOK. See BOOK-KEEPING.

JOURNAL, in navigation, a ſort of diary, or daily regiſter of the ſhip's courſe, winds, and weather; together with a general account of whatever is material to be remarked in the period of a ſea-voyage.

In all ſea-journals, the day, or what is called the 24 *hours*, terminates at noon, becauſe the errors of the dead-reckoning are at that period generally corrected by a ſolar obſervation. The daily compact uſually contains the ſtate of the weather; the variation, increaſe, or diminution of the wind; and the ſuitable ſhifting, reducing, or enlarging the quantity of ſail extended; as alſo the moſt material incidents of the voyage, and the condition of the ſhip and her crew; together with the diſcovery of other ſhips or fleets, land, ſhoals, breakers, ſoundings, &c *.

JOURNAL, is alſo a name common for weekly eſſays, news-papers, &c. as the Grays-Inn journal, the Weſtminſter journal, &c.

JOURNAL, is alſo uſed for the titles of ſeveral books which come out at ſtated times, and give abſtracts, accounts, &c. of the new books that are publiſhed, and the new improvements daily made in arts and ſciences; as the *Journal de Sçavans*, &c.

JOURNEY, a tract of ground paſſed over in travelling by land; properly as much as may be paſſed over in one day.

Management of a Horſe on a JOURNEY. See HORSE.

JOURNEYMAN, properly one who works by the day only; but the word is now uſed for any one who works under a maſter, either by the day, the year, or the piece.

JOUVENET (John), a celebrated French painter, was born at Rouen in 1644; where his father, who was a painter, bred him up to the ſame profeſſion: but his greateſt improvement was confeſſedly derived from the inſtructions of Nicholas Pouſſin, and ſtudying the works of that maſter. He acquired ſo good a knowledge of deſign, as qualified him for employment in ſeveral grand works in the palaces at Paris and Trianon; in many of the churches and convents; and in the hoſpital of invalids, where he painted the twelve apoſtles, each figure being 14 feet high. He was eſteemed to have a ready invention, to be correct in his deſigns, and to have a taſte for grandeur in his compoſitions: it is obſerved of this artiſt, that being deprived of the uſe of his right hand by a paralytic diſorder, he nevertheleſs continued to paint with his left. He died in the year 1717.

JOY, that affection of the mind conſequent on being put in poſſeſſion of what we have deſired. For the effects of joy in the animal œconomy, ſee (the *Index* ſubjoined to) MEDICINE.

IPECACUANHA, in the materia medica, a Weſt-Indian root, of which there are two kinds, diſtinguiſhed by their colour, and brought from different places; but both poſſeſſing the ſame virtues, tho' in a different degree. The one is grey, and brought from Peru; the other is brown, and is brought from the Braſils: and theſe are indifferently ſent into Europe under the general name of *ipecacuanha*.

Theſe two ſorts have been by ſome ſuppoſed to be the roots of two different plants: but this is a miſtake; the only difference is, that one grows in a different place, and in a richer and moiſter ſoil, and is better ſupplied with juices than the other.

Ipecacuanha is an excellent, mild, and ſafe emetic; it is alſo a noble reſtringent; and, given in doſes too ſmall to vomit, is the greateſt of all remedies for a dyſentery. Small doſes are alſo an excellent remedy in diarrhœas of a more ſimple kind; and in the fluor albus we hardly know a better medicine.

IPICRATES, general of the Athenians, had that command conferred upon him at 20 years of age, and became famous for the exactneſs of his military diſcipline. He made war on the Thracians; reſtored Seuthes, who was an ally of the Athenians; attacked the Lacedæmonians; and, on many other occaſions, gave ſignal proofs of his conduct and courage. Many ingenious repartees have been mentioned of this general: a man of good family with no other merit than his nobility, reproaching him one day for the meanneſs of his birth, he replied, "I ſhall be the firſt of my race, and thou the laſt of thine." He died 380 B. C.

IPOMEA, QUAMOILIT, or *Scarlet Convolvulus*; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ſeveral ſpecies; but not more than one, (the coccinea), cultivated in our gardens. This hath long, ſlender, twining ſtalks, riſing upon ſupport ſix or ſeven feet high. The leaves are heart-ſhaped, pointed, and angulated at the baſe, and from the ſides of the ſtalks and branches ariſe many ſlender footſtalks; each ſupporting ſeveral large and beautiful funnel-ſhaped and ſcarlet flowers. There is a variety with orange-coloured flowers. Both of them are annual, riſing from ſeed in ſpring, flowering in July and Auguſt, ripening their ſeeds in September and October, and totally periſhing in a ſhort time after. They are tender, and muſt be brought up in a hot-bed till the latter end of May or beginning of June, when they may be planted out to adorn the borders, or ſome may be planted in pots to move occaſionally to adorn any particular place; but in either caſe, there muſt be ſticks for them to twine upon.

IPSWICH, the capital of the county of Suffolk in England, ſeated in E. Long. 1. 6. N. Lat. 52. 12. The name comes from the Saxon *Gypeſwick*, that is, a town ſituated upon the Gyppen, now called *Orwell*. It had once 21 churches, but now has only 12. It was plundered by the Danes in 991, and afterwards beſieged by king Stephen. It had charters and a mint in the reign of king John, but its laſt charter was from Charles II. The remains of a wall and ſix or ſeven religious houſes are ſtill to be ſeen. Though it is not in ſo flouriſhing a ſtate as formerly when the harbour was more commodious, yet it is ſtill a large well-built town. Beſides the churches already mentioned, it has ſeveral meeting-houſes, two chapels, a town-hall, council-chamber, a large market-place with a croſs in the middle of it, a ſhire-hall for the county-ſeſſions, a library, ſeveral hoſpitals, a free-ſchool, a handſome ſtone bridge over the river, ſtately ſhambles in the market-place built by cardinal Wolſey, who was a native of the town and a butcher's ſon, and who alſo began to build a college here on the ruins of a ſmall college of black canons, which ſtill bears its name, though it was never finiſhed. Here are alſo ſeveral alms-houſes, three charity-ſchools, and a convenient key and cuſtom-houſe. By virtue of Charles II.'s charter, the town is governed by two bailiffs, a recorder, 12 portmen, of whom the bailiffs are two, a town-clerk, two coroners, and 24 common-council. The bailiffs and 24 of the portmen are juſtices of the peace. The town enjoys a great many privileges, as paſſing fines and recoveries, trying criminal, and even crown and capital cauſes among themſelves, ſettling the aſſize of bread, wine, and beer. No freeman is obliged to ſerve on juries out of the town, or bear any office for the king, except that of the ſheriff, or to pay tolls or duties in any other part of the kingdom. They have an admiralty juriſdiction beyond Harwich on the Eſſex coaſt, and on both ſides the Suffolk coaſt, by which they are intitled to all goods caſt on ſhore. The bailiffs even hold an admiralty-court beyond Landguard-fort. By a trial in king Edward III.'s time, is appears that the town had a right to the cuſtom-duties for all goods coming into Harwich-haven. They claim a right alſo to all waifes and ſtrays, &c. The manufactures of the town are chiefly woollen and linen cloth. It has ſtill a conſiderable foreign trade. The tide riſes pretty high, and brings great ſhips within a ſmall diſtance of the town. They export a great deal of corn to London, and ſometimes to Holland. Formerly, they had a great trade in ſhip-building; but that having declined, they now ſend great quantities of timber to the king's yard at Chatham. It has ſeveral great fairs for cattle, cheeſe, and butter; and is admirably ſituated for the trade to Greenland, becauſe the ſame wind that carries them out of the river will carry them to Greenland. It is worth remarking, that it is one of the beſt places in England for perſons in narrow circumſtances, houſe-rent being eaſy, proviſions cheap and plentiful, the paſſage by land or water to London, &c. convenient, and the company of the place good. It gives title of viſcount, as well as Thetford, to the duke of Grafton.

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* See *Navigation.*

IRELAND, one of the Britannic iſlands, ſituated between the 5th and 10th degrees of weſt longitude, and between the 51ſt and 56th of north latitude, extending in length about 300 miles, and about 150 in breadth.

1
Origin of the Iriſh, according to their own hiſtorians.

The ancient hiſtory of this iſland is involved in ſo much obſcurity, that it has been the object of contention among the antiquarians for upwards of a century and an half. The Iriſh hiſtorians pretend to very great antiquity. According to them, the iſland was firſt inhabited about 322 years after the flood. At that time Partholanus the ſon of Scara landed in Munſter on the 14th of May with 1000 ſoldiers, and ſome women, from Greece. This voyage he had undertaken on account of his having killed his father and mother in his native country. The ſame hiſtorians inform us, that a great number of lakes broke out in Ireland during the reign of Partholanus, which had no exiſtence when he came into the iſland, with many other particulars not worth mentioning; but the moſt ſurpriſing circumſtance is, that about 300 years after the arrival of this Grecian colony, all of them periſhed by a plague, not a ſingle perſon remaining to tell the fate of the reſt; in which caſe, it is wonderful how the cataſtrophe ſhould have been known.

After the extinction of this firſt colony, Ireland remained a perfect wilderneſs for 30 years; when another colony arrived from the eaſt, under the direction of one Nemedius. He ſet ſail from the Euxine ſea with 30 tranſports, each manned with 40 heroes; and at laſt arrived on the coaſts of Ireland, after a very tedious and ſtrange navigation. During his reign alſo many lakes were formed in the country, which had no exiſtence before; the moſt material circumſtance, however, was an unſucceſsful war in which he was engaged with ſome African pirates, who in the end enſlaved his people. The victors proved ſuch inſupportable tyrants, that the Iriſh found themſelves under a neceſſity of quitting the iſland altogether. They embarked on board a fleet of 1130 ſhips, under the command of three grandſons of Nemedius, viz. Simon Breac, To Chath, and Briatan Maol. The firſt returned to Greece, the ſecond ſailed to the northern parts of Europe, and the third landed in the north of Scotland, and from him the iſland of Britain is ſaid to have taken its name, and the Welſh their origin.

About 216 years after the death of Nemedius, the deſcendants of Simon Breac returned from Greece into Ireland. They were conducted by five princes of great reputation, who divided the iſland into five kingdoms, nearly equal in ſize. Theſe kingdoms were called *Munſter*, *Leinſter*, *Connaught*, *Meath*, and *Ulſter*; and the ſubjects of theſe kings are called by the Iriſh hiſtorians, *Firbolgs*.

The Firbolgs were in proceſs of time expelled or totally ſubdued, after the loſs of 100,000 men in one battle, by the *Tuath de Dannans*, a nation of necromancers who came from Attica, Bœotia, and Achaia, into Denmark; from Denmark to Scotland; and from Scotland to Ireland. Theſe necromancers were ſo completely ſkilled in their art, that they could even reſtore the dead to life, and bring again into the field thoſe warriors who had been ſlain the day before. They had alſo ſome curioſities which poſſeſſed a wonderful virtue. Theſe were a ſword, a ſpear, a cauldron, and a marble chair; on which laſt were crowned firſt the kings of Ireland, and afterwards thoſe of Scotland. But neither the powerful virtues of theſe Daniſh curioſities, nor the more powerful ſpells of the magic art, were able to preſerve the *Tuath de Dannans* from being ſubdued by the Gadelians when they invaded Ireland.

The Gadelians were deſcended from one Gathelus, from whom they derived their name. He was a man of great conſequence in Egypt, and intimately acquainted with Moſes the Jewiſh legiſlator. His mother was Scota, the daughter of Pharaoh, by Niul the ſon of a Scythian monarch cotemporary with Nimrod. The Gadelians, called alſo *Scots*, from Scota abovementioned, conquered Ireland about 1300 B. C. under Heber and Heremon, two ſons of Mileſius king of Spain, from whom were deſcended all the kings of Ireland down to the Engliſh conqueſt, and who are therefore ſtyled by the Iriſh hiſtorians, princes of the *Mileſian race*.

From this period the Iriſh hiſtorians trace a gradual refinement of their countrymen from a ſtate of the groſſeſt barbarity, until a monarch, named *Ollam Fodla*, eſtabliſhed a regular form of government, erected a grand ſeminary of learning, and inſtituted the *Fes*, or triennial convention of provincial kings, prieſts, and poets, at Feamor or Tarah in Meath, for the eſtabliſhment

ment of laws and regulation of government. But whatever were the inſtitutions of this monarch, it is acknowledged that they proved inſufficient to withſtand the wildneſs and diſorder of the times. To Kimbath, one of his ſucceſſors, the annaliſts give the honour of reviving them, beſides that of regulating Ulſter, his family-province, and adorning it with a ſtately palace at Eamannia near Armagh. His immediate ſucceſſor, called *Hugony*, is ſtill more celebrated for advancing the work of reformation. It ſeems, that, from the earlieſt origin of the Iriſh nation, the iſland had been divided into the five provincial kingdoms abovementioned, and four of theſe had been ſubject to the fifth, who was nominal monarch of the whole iſland. Theſe four, however, proved ſuch obſtinate diſturbers of the peace, that Hugony, to break their power, parcelled out the country into 25 dynaſties, binding them by oath to accept no other monarch but one of his own family. This precaution proved ineffectual. Hugony himſelf died a violent death, and all his ſucceſſors for a ſeries of ages were aſſaſſinated, ſcarcely with one exception.

About 100 B. C. the pentarchal government was reſtored, and is ſaid to have been ſucceeded by a conſiderable revolution in politics. The Iriſh bards had for many ages diſpenſed the laws, and the whole nation ſubmitted to their deciſions; but as their laws were exceedingly obſcure, and could be interpreted only by themſelves, they took occaſion from thence to oppreſs the people, until at laſt they were in danger of being totally exterminated by a general inſurrection. In this emergency they fled to Convocar-Mac-Neſſa, the reigning monarch, who promiſed them his protection in caſe they reformed; but at the ſame time, in order to quiet the juſt complaints of his people, he employed the moſt eminent among them to compile an intelligible, equitable, and diſtinct, body of laws, which were received with the greateſt joy, and dignified with the name of *celeſtial deciſions*. Theſe deciſions ſeem to have produced but very little reformation among the people in general. We are now preſented with a new ſeries of barbarities, murders, factions, and anarchy; and in this diſordered ſituation of affairs it was, according to the Iriſh hiſtorians, that the chieftain mentioned by Tacitus addreſſed himſelf to Agricola, and encouraged him to make a deſcent on Ireland. This ſcheme happened not to ſuit the views of the Roman general at that time, and therefore was not adopted; and ſo confident are theſe hiſtorians of the ſtrength of their country even in its then diſtracted ſtate, that they treat the notion of its being ſubdued by a Roman legion and ſome auxiliaries (the force propoſed to Agricola), as utterly extravagant; acquainting us at the ſame time, that the Iriſh were ſo far from dreading a Roman invaſion, that they ſailed to the aſſiſtance of the Picts, and having made a ſucceſsful incurſion into South Britain, returned home with a conſiderable booty.

In the ſame ſtate of barbarity and confuſion the kingdom of Ireland continued till the introduction of Chriſtianity by St Patrick, about the middle of the fifth century. This miſſionary, according to the adverſaries of the Iriſh antiquity, firſt introduced letters into Ireland, and thus laid the foundations of a future civilization. On the other hand, the advocates for that antiquity maintain, that the Iriſh had the knowledge of letters, and had made conſiderable progreſs in the arts, before the time of St Patrick; tho' they allow, that he introduced the Roman character, in which his copies of the Scripture and liturgies were written. To enter into this diſpute would be contrary to our plan. It is ſufficient to obſerve, that, excepting by ſome of the Iriſh themſelves, the hiſtory already given is generally reckoned entirely fabulous, and thought to have been invented after the introduction of Chriſtianity. An origin of the Iriſh nation hath been found out much nearer than Aſia, Greece, or Egypt; namely, the iſland of Britain, from whence it is now thought that Ireland was firſt peopled. A diſpute hath ariſen concerning the place from whence the firſt emigrants from Britain ſet ſail for Ireland. The honour of being the mother-country of the Iriſh hath been diſputed between the North and South Britons. Mr Macpherſon has argued ſtrenuouſly for the former, and Mr Whitaker for the latter. For an account of their diſpute, however, we muſt refer to the works of theſe gentlemen. Mr Whitaker claims the victory, and challenges to himſelf the honour of being the firſt who clearly and truly demonſtrated the origin of the Iriſh.

2
Early hiſtory of Ireland by Mr Whitaker.

The name of Ireland, according to Mr Whitaker, is obviouſly derived from the word *Jar*, or *Eir*, which in the Celtic language ſignifies "weſt." This word was ſometimes pronounced *Iver*, and *Hiver*; whence the names of *Iris*, *Ierna*, *Juverna*, *Iverna*, *Hibernia*, and *Ireland*; by all of which it hath at ſome time or other been known.

About 350 B. C. according to the ſame author, the Belgæ croſſed the channel, invaded Britain, and ſeized the whole extended line of the ſouthern coaſt, from Kent to Devonſhire. Numbers of the former inhabitants, who had gradually retired before the enemy, were obliged at laſt to take ſhipping on the weſtern coaſt of England, and paſſed over into the uninhabited iſle of Ireland. Theſe were afterwards joined by a another body of Britons driven out by the Belgæ under Divitiacus, about 100 B. C. For two centuries and a half afterwards, theſe colonies were continually reinforced with freſh ſwarms from Britain; as the populouſneſs of this iſland, and the vicinity of that invited them to ſettle in the one, or the bloody and ſucceſſive wars in Britain during this period naturally induced them to relinquiſh the other: and the whole circuit of Ireland appears to have been completely peopled about 150 years after Chriſt; and as the inhabitants had all fled equally from the dominion of the Belgæ, or for ſome other cauſe left their native country, they were diſtinguiſhed among the Britons by one general and very appoſite name, *viz.* that of *Scuites*, or *Scots*, "the wanderers, or refugees."

3
Names and ſituation of the tribes by which it was inhabited.

Mr Whitaker alſo informs us, "that in the times of the Romans Ireland was inhabited by 18 tribes; by one upon the northern and three on the ſouthern ſhore, ſeven upon the weſtern, ſix on the eaſtern, and one in the centre.

"Along the eaſtern coaſt, and the Vergivian or internal ocean, were ranged the Damnii, the Voluntii, and the Eblani, the Caucii, the Menapii, and the Coriondii. The firſt inhabited a part of the two counties of Antrim and Down, extending from Fair-head, the moſt north-eaſterly extremity of the iſland, to Iſamnum

Promontorium, or the point of Ardglaſs haven in the county of Down; and having the Logia or Lagan, which falls into Carrickfergus Bay, within their poſſeſſions, and Dunum or Down-patrick for their capital. The Voluntii poſſeſſed the coaſt from the point of that haven to the river Buvinda or Boyne, the remainder of Down, the breadth of Ardmagh, and all Louth; having the Vinderus or Carlingford river in their dominions, and the town of Laberos near the river Deva (Atherdee in the county of Louth) for their metropolis. And the Eblani reached from the Boyne to the Læbius, Læv-ui, or Liffy; reſiding in Eaſt-Meath, and in the large portion of Dublin county which is to the north of this river; and acknowledging Mediolanum, Eblana, or Dublin, for their principal town. The Caucii ſpread from the Liffy to the Letrim, the Oboca of the ancients; had the reſt of Dublin county, and ſuch parts of Wicklow as lie to the north of the latter; and owned Dunum or Rath-Downe for their chief city. The Menapii occupied the coaſt betwixt the Letrim and Cancarne-point, all the reſt of Wicklow, and all Wexford to the point; their chief town, Menapia, being placed upon and to the eaſt of Modona, Slanus, or Slane. And the Coriondii inhabited at the back of the Caucii and Menapii, to the weſt of the Slane and Lify, and in all Kildare and all Catherlogh; being limited by the Boyne and Barrow on the weſt, the Eblani on the north, and the Brigantes on the ſouth.

" Upon the ſouthern ſhore and along the verge of the Cantabrian ocean, lay the Brigantes, the Vodiæ, and the Ibernii. The firſt owned the reſt of Wexford and all Waterford: extending to the Blackwater, Aven-More, or Dabrona, on the ſouth-weſt; having the great mouth of the Barrow with their territories, and Brigantia, Waterford, or ſome town near it, for their firſt city; and giving name of *Brigas* to the Suir or Swire, their limitary ſtream on the north, and the appellation of *Bergie* to their own part of the county of Wexford. The Vodiæ poſſeſſed the ſhire of Corke from the Blackwater to the Ban, the river of Kinſale, and the Dobona or Dubana of the ancients; and affixed the name of *Vodium Promontorium* to the point of Balycotton iſland. And the Ibernii inhabited the remainder of Corke, and all that part of Kerry which lies to the ſouth-eaſt of Dingle-ſound; having Rufina or Ibaune for their capital, the Promontorium Auſtrinum or Miſſen-Head about the middle of their dominions, and the river Ibernus or Dingle-ſound for their northern barrier; and leaving their names to the three diviſions of Ibaune, Beare, and Iveragh.

" Upon the weſtern ſhore of the iſland and along the Great Britannic or Atlantic ocean, were the Lucanii or Lucenii, the Velaborii, and the Cangani, the Auterii, the Nagnatæ, the Hardinii, and Venicnii. The Lucenii inhabited the peninſula of land that lies along the river Ibernus or Dingle-ſound, and perhaps ſome adjoining parts of Kerry. The Velaborii ranged along the ſmall remainder of the latter, and over the whole of Limerick to the Senus or Shannon; having the Durius or Caſheen flowing through their dominions, and Regia, Limeric, or ſome town near it, for their metropolis. And the latter was probably that city near Limerick, the ſite of which is ſtill famous, and retains the appellation of *Cathair*, or the fortreſs; and where the remains of ſtreets, and other marks of a town, may yet be traced. The Cangani lived in the county of Clare: Macolicum near the Shannon, perhaps Feakle or Melic, being their principal town; a headland in the Bay of Galway, near Glaniny, being denominated *Beniſamnum Promontorium;* and the adjoining iſles of Arran, called *Inſulæ Canganæ*. The Auterii were ſettled in the county of Galway; winding along the deep receſs of the Sinus Auſoba or Bay of Galway; ſtretching towards the north as far the Libnius, or the river that bounds the ſhire in that part; and poſſeſſing the ſmall portion of Mayo, which lies to the ſouth of it. And theſe were ſubject to Auterium, anciently Aterith, and now Athenree; and have left their name to the diviſion of Athenree. The Nagnatæ occupied the reſt of the large county of Mayo, all Sligo and all Roſcommon, all Letrim as far as Logh Allin on the ſouth-eaſt, and all Fermanagh to Balyſhannon and Logh Erne; being bounded by the Rhebius or river of Balyſhannon, and the Lake Rhebius or Logh Erne; having a deep bay, called *Magnus Sinus*, that curves along Mayo, Sligo, and Letrim counties; and acknowledging Nagnat, Necmaht, or Alnecmaht, the town of the Nagnatæ, for their capital. And the Hardinii and Venicnii were confederated together under the title of the *Venicnian Nations*, extended from Balyſhannon to the North-Cape, and poſſeſſed all Donnegalle, except the two whole diviſions of Raphoe and Enis-Owen, and the eaſtern part of Killmacrenen. The Venicnii lay along the immediate margin of the ſhore, giving name to the Promontorium Venicnium or Cape Horn, and to the Inſula Venicnia or North-Arran Iſland. And their metropolis Rheba was ſeated upon the lake Rhebius, and in the country of the Hardinii on the ſouth-eaſt.

" Upon the northern ſhore and along the margin of the Deucaledonian ocean, were only the Robogdii; inhabiting the reſt of Donnegalle, all Derry, and all Antrim to the Fair-Head, and the Damnii; and giving their own name to the former and the diviſion of Raphoe. And they had the rivers Vidua or Ship-harbour, Argita or Logh Swilly, Darabouna or Logh Foile, and Banna or Ban, in their territories; and acknowledged Robogdium, Robogh, or Raphoe, for their chief city.

" The central regions of the iſland, all Tyrone, the remainder of Fermanagh and Letrim, all Monaghan, and the reſt of Ardmagh; all Cavan, all Longford, and all Weſt-Meath; all the King's and Queen's county, all Kilkenny, and all Tipperary; were planted by the Scoti. The Shannon, Logh Allin, and Logh Erne, were their great boundaries on the weſt; the Barrow, Boyne, and Logh Neagh, on the eaſt; the Swire and Blackwater on the ſouth; and a chain of mountains on the north. And the two greateſt of their towns were Rheba, a city ſeated, liked the Rheba of the Venicnians, upon the lake and river Rhebius, but on a different part of them, and ſomewhere in the north of Cavan; and Ibernia, a town placed a little to the eaſt of the Shannon, and ſomewhere in the county of Tipperary."

But whether we are to receive as truth the accounts given by Mr Whitaker, thoſe of the Iriſh annaliſts, or any other, it is certain, that, till little more than a century ago, Ireland was a ſcene of confuſion and

ſlaughter

4
Invaſion of the Danes.

ſlaughter. The Iriſh hiſtorians acknowledge this, as we have already ſeen. Very few of their monarchs eſcaped a violent death. The hiſtories of their kings indeed amount to no more than this, viz. that they began to reign in ſuch a year, reigned a certain number of years, and were ſlain in battle by the valiant prince who ſucceeded to the throne. The introduction of Chriſtianity ſeems to have mended the matter very little, or rather not at all. The ſame wars between the chiefs continued; and the ſame murders and treacheries took place among the inhabitants, till they were invaded by the Danes or Normans, about the end of the eighth century. At this time, we are told, that the monarchical power was weak, by reaſon of the factious and aſſuming diſpoſition of the inferior dynaſtics; but that the evils of the political conſtitution had conſiderably ſubſided by the reſpect paid to religion and learning. The firſt invaſions of the Danes were made in ſmall parties for the ſake of plunder, and were repelled by the chieftain whoſe dominions were invaded. Other parties appeared in different parts of the iſland, and terrified the inhabitants by the havoc they committed. Theſe were in like manner put to flight, but never failed to return in a ſhort time; and in this manner was Ireland harraſſed for the ſpace of 20 years, before the inhabitants thought of putting an end to their inteſtine conteſts, and uniting againſt the common enemy. The northern pirates, either by force or treaty, gradually obtained ſome ſmall ſettlements on the iſland; till at length Turges, or Turgeſius, a warlike Norwegian, landed with a powerful armament in the year 815. He divided his fleet and army, in order to ſtrike terror in different quarters. His followers plundered, burned, and maſſacred, without mercy, and perſecuted the clergy in a dreadful manner on account of their religion. The Danes already ſettled in Ireland, flocked to the ſtandard of Turgeſius, who thus was enabled to ſeat himſelf in Armagh, from which he expelled the clergy, and ſeized their lands. The Iriſh, in the mean time, were infatuated by their private quarrels; till at laſt, after ſome ill-conducted and unſucceſsful efforts, they ſunk into a ſtate of abject ſubmiſſion, and Turgeſius was proclaimed monarch of the whole iſland, in 845.

The new king proved ſuch a tyrant, that he ſoon became intolerable. A conſpiracy was formed againſt him; and he was ſeized by Melachline prince of Meath, in a time of apparent peace. An univerſal inſurrection enſued; the Danes were maſſacred or diſperſed; their leader condemned to death for his cruelties, and drowned in a lake. The foreigners, however, were not exterminated, but the remains of them were allowed to continue on the iſland as ſubjects or tributaries to ſome particular chieftains. A new colony ſoon arrived, but under pretence of peaceable intentions, and a deſign of enriching the country by commerce. The Iriſh, through an infatuated policy, ſuffered them to become maſters of Dublin, Limeric, Waterford, and other maritime places, which they enlarged and fortified with ſuch works as had till then been unknown in Ireland. The Danes did not fail to make uſe of every opportunity of enlarging their territories, and new wars quickly enſued. The Iriſh were ſometimes victorious, and ſometimes not; but were never able to drive out their enemies, ſo that they continued to be a very diſtinguiſhed and powerful *ſept*, or tribe, in Ireland. The wars with the Danes were no ſooner at an end, than the natives, as uſual, turned their arms againſt each other. The country was haraſſed by the competitions of the chiefs; laws and religion loſt their influence, and the moſt horrid licentiouſneſs and immorality prevailed. Thus the whole iſland ſeemed ready to become a prey to the firſt invader, when an attempt was made upon it by Magnus king of Norway. This attempt miſcarried, through his own raſhneſs; for, having landed without oppoſition, he advanced into the country without the leaſt apprehenſion. The conſequence of this was, that he was ſurrounded and cut in pieces with all his followers. His death, however, proved of little benefit to Ireland; the ſame diſorders which had gradually reduced the kingdom to a ſtate of extreme weakneſs, ſtill continued to operate, and to facilitate the ſucceſs of the Engliſh invaſion, which happened in the reign of Henry II.

5
Henry II. of England meditates an invaſion of Ireland.

The firſt motives which induced this monarch to think of an expedition againſt Ireland are not well known. It was ſuppoſed that he had been provoked by ſome aſſiſtance which the Iriſh princes had given to the French; but, whatever might be in this, it is certain that the deſign was conceived ſoon after he aſcended the throne; and his flatterers ſoon furniſhed him with ſufficient reaſons for conſidering the Iriſh as his ſubjects. It was affirmed, that they had originally poſſeſſed themſelves of their country by permiſſion of Gurguntius a Britiſh king; and that, as deſcendents of the Britons, they were the natural and rightful ſubjects of the Engliſh monarch. It was alſo ſuggeſted, that the renowned king Arthur, Egfred the Northumbrian prince, and Edgar one of the Saxon kings of England, had all led their armies into Ireland, and there made valuable acquiſitions, which their ſucceſſor was in honour bound to recover and maintain. All theſe ſuggeſtions, however, or whatever elſe had occurred to himſelf, ſeemed yet inſufficient to Henry; and therefore he took the moſt effectual method to enſure his reputation, namely, by an application to the pope. To him he repreſented, that the inhabitants of Ireland were ſunk into the moſt wretched ſtate of corruption, both with regard to morals and religion; that Henry, zealous for the honour and enlargement of God's kingdom, had conceived the pious deſign of erecting it in this unhappy country; was ready to devote himſelf and all his powers to this meritorious ſervice; implored the benediction of the pontiff; and requeſted his permiſſion and authority to enter Ireland, to reduce the diſobedient and corrupt, to eradicate all ſin and wickedneſs, to inſtruct the ignorant, and ſpread the bleſſed influence of the goſpel in all its purity and perfection; promiſing at the ſame time to pay a yearly tribute to St Peter from the land thus to be reduced to his obedience, and to the holy ſee. Adrian, the reigning pope, rejoiced at this application which tended ſo much to the advancement of his own power. A bull was therefore immediately formed, conformable to the moſt ſanguine wiſhes of Henry, which was ſent to England without delay, together with a ring, the token of his inveſtiture as rightful ſovereign of Ireland. But whatever inclination the king of England or the pope might at this time (A. D. 1156) have

6
Is inveſted with the ſovereignty by the Pope.

Ipſwich, Ireland.

charter, the town is governed by two bailiffs, a recorder, 12 portmen, of whom the bailiffs are two, a town-clerk, two coroners, and 24 common-council. The bailiffs and 24 of the portmen are juſtices of the peace. The town enjoys a great many privileges, as paſſing fines and recoveries, trying criminal, and even crown and capital cauſes among themſelves, ſettling the aſſize of bread, wine, and beer. No freeman is obliged to ſerve on juries out of the town, or bear any office for the king, except that of the ſheriff, or to pay tolls or duties in any other part of the kingdom. They have an admiralty juriſdiction beyond Harwich on the Eſſex coaſt, and on both ſides the Suffolk coaſt, by which they are intitled to all goods caſt on ſhore. The bailiffs even hold an admiralty-court beyond Landguard-fort. By a trial in king Edward III.'s time, is appears that the town had a right to the cuſtom-duties for all goods coming into Harwich-haven. They claim a right alſo to all waifes and ſtrays, &c. The manufactures of the town are chiefly woollen and linen cloth. It has ſtill a conſiderable foreign trade. The tide riſes pretty high, and brings great ſhips within a ſmall diſtance of the town. They export a great deal of corn to London, and ſometimes to Holland. Formerly, they had a great trade in ſhip-building; but that having declined, they now ſend great quantities of timber to the king's yard at Chatham. It has ſeveral great fairs for cattle, cheeſe, and butter; and is admirably ſituated for the trade to Greenland, becauſe the ſame wind that carries them out of the river will carry them to Greenland. It is worth remarking, that it is one of the beſt places in England for perſons in narrow circumſtances, houſe-rent being eaſy, proviſions cheap and plentiful, the paſſage by land or water to London, &c. convenient, and the company of the place good. It gives title of viſcount, as well as Thetford, to the duke of Grafton.

IRELAND, one of the Britannic iſlands, ſituated between the 5th and 10th degrees of weſt longitude, and between the 51ſt and 56th of north latitude, extending in length about 300 miles, and about 150 in breadth.

The ancient hiſtory of this iſland is involved in ſo much obſcurity, that it has been the object of contention among the antiquarians for upwards of a century and an half. The Iriſh hiſtorians pretend to very great antiquity. According to them, the iſland was firſt inhabited about 322 years after the flood. At that time Partholanus the ſon of Scara landed in Munſter on the 14th of May with 1000 ſoldiers, and ſome women, from Greece. This voyage he had undertaken on account of his having killed his father and mother in his native country. The ſame hiſtorians inform us, that a great number of lakes broke out in Ireland during the reign of Partholanus, which had no exiſtence when he came into the iſland, with many other particulars not worth mentioning; but the moſt ſurpriſing circumſtance is, that about 300 years after the arrival of this Grecian colony, all of them periſhed by a plague, not a ſingle perſon remaining to tell the fate of the reſt; in which caſe, it is wonderful how the cataſtrophe ſhould have been known.

1
Origin of the Iriſh, according to their own hiſtorians.

After the extinction of this firſt colony, Ireland remained a perfect wilderneſs for 30 years; when another colony arrived from the eaſt, under the direction of one Nemedius. He ſet ſail from the Euxine ſea with 30 tranſports, each manned with 40 heroes; and at laſt arrived on the coaſts of Ireland, after a very tedious and ſtrange navigation. During his reign alſo many lakes were formed in the country, which had no exiſtence before; the moſt material circumſtance, however, was an unſucceſsful war in which he was engaged with ſome African pirates, who in the end enſlaved his people. The victors proved ſuch inſupportable tyrants, that the Iriſh found themſelves under a neceſſity of quitting the iſland altogether. They embarked on board a fleet of 1130 ſhips, under the command of three grandſons of Nemedius, viz. Simon Breac, To Chath, and Briatan Maol. The firſt returned to Greece, the ſecond ſailed to the northern parts of Europe, and the third landed in the north of Scotland, and from him the iſland of Britain is ſaid to have taken its name, and the Welſh their origin.

Ireland.

About 216 years after the death of Nemedius, the deſcendants of Simon Breac returned from Greece into Ireland. They were conducted by five princes of great reputation, who divided the iſland into five kingdoms, nearly equal in ſize. Theſe kingdoms were called *Munſter*, *Leinſter*, *Connaught*, *Meath*, and *Ulſter*; and the ſubjects of theſe kings are called by the Iriſh hiſtorians, *Firbolgs*.

The Firbolgs were in proceſs of time expelled or totally ſubdued, after the loſs of 100,000 men in one battle, by the *Tuath de Dannans*, a nation of necromancers who came from Attica, Bœotia, and Achaia, into Denmark; from Denmark to Scotland; and from Scotland to Ireland. Theſe necromancers were ſo completely ſkilled in their art, that they could even reſtore the dead to life, and bring again into the field thoſe warriors who had been ſlain the day before. They had alſo ſome curioſities which poſſeſſed a wonderful virtue. Theſe were a ſword, a ſpear, a cauldron, and a marble chair; on which laſt were crowned firſt the kings of Ireland, and afterwards thoſe of Scotland. But neither the powerful virtues of theſe Daniſh curioſities, nor the more powerful ſpells of the magic art, were able to preſerve the *Tuath de Dannans* from being ſubdued by the Gadelians when they invaded Ireland.

The Gadelians were deſcended from one Gathelus, from whom they derived their name. He was a man of great conſequence in Egypt, and intimately acquainted with Moſes the Jewiſh legiſlator. His mother was Scota, the daughter of Pharaoh, by Niul the ſon of a Scythian monarch cotemporary with Nimrod. The Gadelians, called alſo *Scots*, from Scota abovementioned, conquered Ireland about 1300 B. C. under Heber and Heremon, two ſons of Mileſius king of Spain, from whom were deſcended all the kings of Ireland down to the Engliſh conqueſt, and who are therefore ſtyled by the Iriſh hiſtorians, princes of the *Mileſian race*.

From this period the Iriſh hiſtorians trace a gradual refinement of their countrymen from a ſtate of the groſſeſt barbarity, until a monarch, named *Ollam Fodla*, eſtabliſhed a regular form of government, erected a grand ſeminary of learning, and inſtituted the *Fes*, or triennial convention of provincial kings, prieſts, and poets, at Feamor or Tarah in Meath, for the eſtabliſhment

ment of laws and regulation of government. But whatever were the inſtitutions of this monarch, it is acknowledged that they proved inſufficient to withſtand the wildneſs and diſorder of the times. To Kimbath, one of his ſucceſſors, the annaliſts give the honour of reviving them, beſides that of regulating Ulſter, his family-province, and adorning it with a ſtately palace at Eamannia near Armagh. His immediate ſucceſſor, called *Hugony*, is ſtill more celebrated for advancing the work of reformation. It ſeems, that, from the earlieſt origin of the Iriſh nation, the iſland had been divided into the five provincial kingdoms abovementioned, and four of theſe had been ſubject to the fifth, who was nominal monarch of the whole iſland. Theſe four, however, proved ſuch obſtinate diſturbers of the peace, that Hugony, to break their power, parcelled out the country into 25 dynaſties, binding them by oath to accept no other monarch but one of his own family. This precaution proved ineffectual. Hugony himſelf died a violent death, and all his ſucceſſors for a ſeries of ages were aſſaſſinated, ſcarcely with one exception.

About 100 B. C. the pentarchal government was reſtored, and is ſaid to have been ſucceeded by a conſiderable revolution in politics. The Iriſh bards had for many ages diſpenſed the laws, and the whole nation ſubmitted to their deciſions; but as their laws were exceedingly obſcure, and could be interpreted only by themſelves, they took occaſion from thence to oppreſs the people, until at laſt they were in danger of being totally exterminated by a general inſurrection. In this emergency they fled to Convocar-Mac-Neſſa, the reigning monarch, who promiſed them his protection in caſe they reformed; but at the ſame time, in order to quiet the juſt complaints of his people, he employed the moſt eminent among them to compile an intelligible, equitable, and diſtinct, body of laws, which were received with the greateſt joy, and dignified with the name of *celeſtial deciſions*. Theſe deciſions ſeem to have produced but very little reformation among the people in general. We are now preſented with a new ſeries of barbarities, murders, factions, and anarchy; and in this diſordered ſituation of affairs it was, according to the Iriſh hiſtorians, that the chieftain mentioned by Tacitus addreſſed himſelf to Agricola, and encouraged him to make a deſcent on Ireland. This ſcheme happened not to ſuit the views of the Roman general at that time, and therefore was not adopted; and ſo confident are theſe hiſtorians of the ſtrength of their country even in its then diſtracted ſtate, that they treat the notion of its being ſubdued by a Roman legion and ſome auxiliaries (the force propoſed to Agricola), as utterly extravagant; acquainting us at the ſame time, that the Iriſh were ſo far from dreading a Roman invaſion, that they ſailed to the aſſiſtance of the Picts, and having made a ſucceſsful incurſion into South Britain, returned home with a conſiderable booty.

In the ſame ſtate of barbarity and confuſion the kingdom of Ireland continued till the introduction of Chriſtianity by St Patrick, about the middle of the fifth century. This miſſionary, according to the adverſaries of the Iriſh antiquity, firſt introduced letters into Ireland, and thus laid the foundations of a future civilization. On the other hand, the advocates for that antiquity maintain, that the Iriſh had the knowledge of letters, and had made conſiderable progreſs in the arts, before the time of St Patrick; tho' they allow, that he introduced the Roman character, in which his copies of the Scripture and liturgies were written. To enter into this diſpute would be contrary to our plan. It is ſufficient to obſerve, that, excepting by ſome of the Iriſh themſelves, the hiſtory already given is generally reckoned entirely fabulous, and thought to have been invented after the introduction of Chriſtianity. An origin of the Iriſh nation hath been found out much nearer than Aſia, Greece, or Egypt; namely, the iſland of Britain, from whence it is now thought that Ireland was firſt peopled. A diſpute hath ariſen concerning the place from whence the firſt emigrants from Britain ſet ſail for Ireland. The honour of being the mother-country of the Iriſh hath been diſputed between the North and South Britons. Mr Macpherſon has argued ſtrenuouſly for the former, and Mr Whitaker for the latter. For an account of their diſpute, however, we muſt refer to the works of theſe gentlemen. Mr Whitaker claims the victory, and challenges to himſelf the honour of being the firſt who clearly and truly demonſtrated the origin of the Iriſh.

2
Early hiſtory of Ireland by Mr Whitaker.

The name of Ireland, according to Mr Whitaker, is obviouſly derived from the word *Jar*, or *Eir*, which in the Celtic language ſignifies "weſt." This word was ſometimes pronounced *Iver*, and *Hiver*; whence the names of *Iris*, *Ierna*, *Juverna*, *Iverna*, *Hibernia*, and *Ireland*; by all of which it hath at ſome time or other been known.

About 350 B. C. according to the ſame author, the Belgæ croſſed the channel, invaded Britain, and ſeized the whole extended line of the ſouthern coaſt, from Kent to Devonſhire. Numbers of the former inhabitants, who had gradually retired before the enemy, were obliged at laſt to take ſhipping on the weſtern coaſt of England, and paſſed over into the uninhabited iſle of Ireland. Theſe were afterwards joined by a another body of Britons driven out by the Belgæ under Divitiacus, about 100 B. C. For two centuries and a half afterwards, theſe colonies were continually reinforced with freſh ſwarms from Britain; as the populouſneſs of this iſland, and the vicinity of that invited them to ſettle in the one, or the bloody and ſucceſſive wars in Britain during this period naturally induced them to relinquiſh the other: and the whole circuit of Ireland appears to have been completely peopled about 150 years after Chriſt; and as the inhabitants had all fled equally from the dominion of the Belgæ, or for ſome other cauſe left their native country, they were diſtinguiſhed among the Britons by one general and very appoſite name, *viz.* that of *Scuites*, or *Scots*, "the wanderers, or refugees."

3
Names and ſituation of the tribes by which it was inhabited.

Mr Whitaker alſo informs us, "that in the times of the Romans Ireland was inhabited by 18 tribes; by one upon the northern and three on the ſouthern ſhore, ſeven upon the weſtern, ſix on the eaſtern, and one in the centre.

"Along the eaſtern coaſt, and the Vergivian or internal ocean, were ranged the Damnii, the Voluntii, and the Eblani, the Caucii, the Menapii, and the Coriondii. The firſt inhabited a part of the two counties of Antrim and Down, extending from Fair-head, the moſt north-eaſterly extremity of the iſland, to Iſamnum

Promontorium, or the point of Ardglaſs haven in the county of Down; and having the Logia or Lagan, which falls into Carrickfergus Bay, within their poſſeſſions, and Dunum or Down-patrick for their capital. The Voluntii poſſeſſed the coaſt from the point of that haven to the river Buvinda or Boyne, the remainder of Down, the breadth of Ardmagh, and all Louth; having the Vinderus or Carlingford river in their dominions, and the town of Laberus near the river Deva (Atherdee in the county of Louth) for their metropolis. And the Eblani reached from the Boyne to the Læbius, Læv-ui, or Liffy; reſiding in Eaſt-Meath, and in the large portion of Dublin county which is to the north of this river; and acknowledging Mediolanum, Eblana, or Dublin, for their principal town. The Caucii ſpread from the Liffy to the Letrim, the Oboca of the ancients; had the reſt of Dublin county, and ſuch parts of Wicklow as lie to the north of the latter; and owned Dunum or Rath-Downe for their chief city. The Menapii occupied the coaſt betwixt the Letrim and Cancarne-point, all the reſt of Wicklow, and all Wexford to the point; their chief town, Menapia, being placed upon and to the eaſt of Modona, Slanus, or Slane. And the Coriondii inhabited at the back of the Caucii and Menapii, to the weſt of the Slane and Lify, and in all Kildare and all Catherlogh; being limited by the Boyne and Barrow on the weſt, the Eblani on the north, and the Brigantes on the ſouth.

"Upon the ſouthern ſhore and along the verge of the Cantabrian ocean, lay the Brigantes, the Vodiæ, and the Ibernii. The firſt owned the reſt of Wexford and all Waterford: extending to the Blackwater, Aven-More, or Dabrona, on the ſouth-weſt; having the great mouth of the Barrow with their territories, and Brigantia, Waterford, or ſome town near it, for their firſt city; and giving name of *Brigas* to the Suir or Swire, their limitary ſtream on the north, and the appellation of *Bergie* to their own part of the county of Wexford. The Vodiæ poſſeſſed the ſhire of Corke from the Blackwater to the Ban, the river of Kinſale, and the Dobona or Dubana of the ancients; and affixed the name of *Vodium Promontorium* to the point of Balycotton iſland. And the Ibernii inhabited the remainder of Corke, and all that part of Kerry which lies to the ſouth-eaſt of Dingle-ſound; having Rufina or Ibaune for their capital, the Promontorium Auſtrinum or Miſſen-Head about the middle of their dominions, and the river Ibernus or Dingle-ſound for their northern barrier; and leaving their names to the three diviſions of Ibaune, Beare, and Iveragh.

"Upon the weſtern ſhore of the iſland and along the Great Britannic or Atlantic ocean, were the Lucanii or Lucenii, the Velaborii, and the Cangani, the Auterii, the Nagnatæ, the Hardinii, and Venicnii. The Lucenii inhabited the peninſula of land that lies along the river Ibernus or Dingle-ſound, and perhaps ſome adjoining parts of Kerry. The Velaborii ranged along the ſmall remainder of the latter, and over the whole of Limerick to the Senus or Shannon; having the Durius or Caſheen flowing through their dominions, and Regia, Limeric, or ſome town near it, for their metropolis. And the latter was probably that city near Limerick, the ſite of which is ſtill famous, and retains the appellation of *Cathair*, or the fortreſs; and where the remains of ſtreets, and other marks of a town, may yet be traced. The Cangani lived in the county of Clare: Macolicum near the Shannon, perhaps Feakle or Melic, being their principal town; a headland in the Bay of Galway, near Glaniny, being denominated *Beniſamnum Promontorium;* and the adjoining iſles of Arran, called *Inſulæ Canganæ*. The Auterii were ſettled in the county of Galway; winding along the deep receſs of the Sinus Auſoba or Bay of Galway; ſtretching towards the north as far the Libnius, or the river that bounds the ſhire in that part; and poſſeſſing the ſmall portion of Mayo, which lies to the ſouth of it. And theſe were ſubject to Auterium, anciently Aterith, and now Athenree; and have left their name to the diviſion of Athenree. The Nagnatæ occupied the reſt of the large county of Mayo, all Sligo and all Roſcommon, all Letrim as far as Logh Allin on the ſouth-eaſt, and all Fermanagh to Balyſhannon and Logh Erne; being bounded by the Rhebius or river of Balyſhannon, and the Lake Rhebius or Logh Erne; having a deep bay, called *Magnus Sinus*, that curves along Mayo, Sligo, and Letrim counties; and acknowledging Nagnat, Necmaht, or Alnecmaht, the town of the Nagnatæ, for their capital. And the Hardinii and Venicnii were confederated together under the title of the *Venicnian Nations*, extended from Balyſhannon to the North-Cape, and poſſeſſed all Donnegalle, except the two whole diviſions of Raphoe and Enis-Owen, and the eaſtern part of Killmacrenen. The Venicnii lay along the immediate margin of the ſhore, giving name to the Promontorium Venicnium or Cape Horn, and to the Inſula Venicnia or North-Arran Iſland. And their metropolis Rheba was ſeated upon the lake Rhebius, and in the country of the Hardinii on the ſouth-eaſt.

"Upon the northern ſhore and along the margin of the Deucaledonian ocean, were only the Robogdii; inhabiting the reſt of Donnegalle, all Derry, and all Antrim to the Fair-Head, and the Damnii; and giving their own name to the former and the diviſion of Raphoe. And they had the rivers Vidua or Ship-harbour, Argita or Logh Swilly, Darabouna or Logh Foile, and Banna or Ban, in their territories; and acknowledged Robogdium, Robogh, or Raphoe, for their chief city.

"The central regions of the iſland, all Tyrone, the remainder of Fermanagh and Letrim, all Monaghan, and the reſt of Ardmagh; all Cavan, all Longford, and all Weſt-Meath; all the King's and Queen's county, all Kilkenny, and all Tipperary; were planted by the Scoti. The Shannon, Logh Allin, and Logh Erne, were their great boundaries on the weſt; the Barrow, Boyne, and Logh Neagh, on the eaſt; the Swire and Blackwater on the ſouth; and a chain of mountains on the north. And the two greateſt of their towns were Rheba, a city ſeated, liked the Rheba of the Venicnians, upon the lake and river Rhebius, but on a different part of them, and ſomewhere in the north of Cavan; and Ibernia, a town placed a little to the eaſt of the Shannon, and ſomewhere in the county of Tipperary."

But whether we are to receive as truth the accounts given by Mr Whitaker, thoſe of the Iriſh annaliſts, or any other, it is certain, that, till little more than a century ago, Ireland was a ſcene of confuſion and ſlaughter. The Iriſh hiſtorians acknowledge this, as we have already ſeen. Very few of their monarchs eſcaped a violent death. The hiſtories of their kings indeed amount to no more than this, viz. that they began to reign in ſuch a year, reigned a certain number of years, and were ſlain in battle by the valiant prince who ſucceeded to the throne. The introduction of Chriſtianity ſeems to have mended the matter very little, or rather not at all. The ſame wars between the chiefs continued; and the ſame murders and treacheries took place among the inhabitants, till they were invaded by the Danes or Normans, about the end of the eighth century. At this time, we are told, that the monarchical power was weak, by reaſon of the factious and aſſuming diſpoſition of the inferior dynaſties; but that the evils of the political conſtitution had conſiderably ſubſided by the reſpect paid to religion and learning. The firſt invaſions of the Danes were made in ſmall parties for the ſake of plunder, and were repelled by the chieftain whoſe dominions were invaded. Other parties appeared in different parts of the iſland, and terrified the inhabitants by the havoc they committed. Theſe were in like manner put to flight, but never failed to return in a ſhort time; and in this manner was Ireland harraſſed for the ſpace of 20 years, before the inhabitants thought of putting an end to their inteſtine conteſts, and uniting againſt the common enemy. The northern pirates, either by force or treaty, gradually obtained ſome ſmall ſettlements on the iſland; till at length Turges, or Turgeſius, a warlike Norwegian, landed with a powerful armament in the year 815. He divided his fleet and army, in order to ſtrike terror in different quarters. His followers plundered, burned, and maſſacred, without mercy, and perſecuted the clergy in a dreadful manner on account of their religion. The Danes already ſettled in Ireland, flocked to the ſtandard of Turgeſius, who thus was enabled to ſeat himſelf in Armagh, from which he expelled the clergy, and ſeized their lands. The Iriſh, in the mean time, were infatuated by their private quarrels; till at laſt, after ſome ill-conducted and unſucceſsful efforts, they ſunk into a ſtate of abject ſubmiſſion, and Turgeſius was proclaimed monarch of the whole iſland, in 845.

4
Invaſion of the Danes.

The new king proved ſuch a tyrant, that he ſoon became intolerable. A conſpiracy was formed againſt him; and he was ſeized by Melachline prince of Meath, in a time of apparent peace. An univerſal inſurrection enſued; the Danes were maſſacred or diſperſed; their leader condemned to death for his cruelties, and drowned in a lake. The foreigners, however, were not exterminated, but the remains of them were allowed to continue on the iſland as ſubjects or tributaries to ſome particular chieftains. A new colony ſoon arrived, but under pretence of peaceable intentions, and a deſign of enriching the country by commerce. The Iriſh, through an infatuated policy, ſuffered them to become maſters of Dublin, Limeric, Waterford, and other maritime places, which they enlarged and fortified with ſuch works as had till then been unknown in Ireland. The Danes did not fail to make uſe of every opportunity of enlarging their territories, and new wars quickly enſued. The Iriſh were ſometimes victorious, and ſometimes not; but were never able to drive out their enemies, ſo that they continued to be a very diſtinguiſhed and powerful *ſept*, or tribe, in Ireland. The wars with the Danes were no ſooner at an end, than the natives, as uſual, turned their arms againſt each other. The country was haraſſed by the competitions of the chiefs; laws and religion loſt their influence, and the moſt horrid licentiouſneſs and immorality prevailed. Thus the whole iſland ſeemed ready to become a prey to the firſt invader, when an attempt was made upon it by Magnus king of Norway. This attempt miſcarried, through his own raſhneſs; for, having landed without oppoſition, he advanced into the country without the leaſt apprehenſion. The conſequence of this was, that he was ſurrounded and cut in pieces with all his followers. His death, however, proved of little benefit to Ireland; the ſame diſorders which had gradually reduced the kingdom to a ſtate of extreme weakneſs, ſtill continued to operate, and to facilitate the ſucceſs of the Engliſh invaſion, which happened in the reign of Henry II.

5
Henry II. of England meditates an invaſion of Ireland.

The firſt motives which induced this monarch to think of an expedition againſt Ireland are not well known. It was ſuppoſed that he had been provoked by ſome aſſiſtance which the Iriſh princes had given to the French; but, whatever might be in this, it is certain that the deſign was conceived ſoon after he aſcended the throne; and his flatterers ſoon furniſhed him with ſufficient reaſons for conſidering the Iriſh as his ſubjects. It was affirmed, that they had originally poſſeſſed themſelves of their country by permiſſion of Gurguntius a Britiſh king; and that, as deſcendents of the Britons, they were the natural and rightful ſubjects of the Engliſh monarch. It was alſo ſuggeſted, that the renowned king Arthur, Egfred the Northumbrian prince, and Edgar one of the Saxon kings of England, had all led their armies into Ireland, and there made valuable acquiſitions, which their ſucceſſor was in honour bound to recover and maintain. All theſe ſuggeſtions, however, or whatever elſe had occurred to himſelf, ſeemed yet inſufficient to Henry; and therefore he took the moſt effectual method to enſure his reputation, namely, by an application to the pope. To him he repreſented, that the inhabitants of Ireland were ſunk into the moſt wretched ſtate of corruption, both with regard to morals and religion; that Henry, zealous for the honour and enlargement of God's kingdom, had conceived the pious deſign of erecting it in this unhappy country; was ready to devote himſelf and all his powers to this meritorious ſervice; implored the benediction of the pontiff; and requeſted his permiſſion and authority to enter Ireland, to reduce the diſobedient and corrupt, to eradicate all ſin and wickedneſs, to inſtruct the ignorant, and ſpread the bleſſed influence of the goſpel in all its purity and perfection; promiſing at the ſame time to pay a yearly tribute to St Peter from the land thus to be reduced to his obedience, and to the holy ſee. Adrian, the reigning pope, rejoiced at this application which tended ſo much to the advancement of his own power. A bull was therefore immediately formed, conformable to the moſt ſanguine wiſhes of Henry, which was ſent to England without delay, together with a ring, the token of his inveſtiture as rightful ſovereign of Ireland. But whatever inclination the king of England or the pope might at this time (A. D. 1156) have for

6
Is inveſted with the ſovereignty by the Pope.

for the ſubjection of Ireland, the ſituation of the Engliſh affairs obliged him to defer it for ſome time.

7 State of Ireland at that time.

The ſtate of Ireland, as we have already obſerved, was at this time extremely favourable for an invaſion. The monarch enjoyed little more than a titular dignity, being haraſſed by a faction, and oppoſed by powerful rivals. A number of chieftains who aſſumed the title and rights of royalty, paid a precarious tribute to their ſuperior, and united, if they were diſpoſed to unite, with him, rather as his allies than his ſubjects. In Ulſter, the family of the northern *Hi Nial*, as it was called, exerciſed an hereditary juriſdiction over the counties now called *Tirone*, *Derry*, and *Donnegal*. They alſo claimed a right of ſupremacy over the lords of Fermanagh, Antrim, and Argial, which included the counties of Armagh, Monaghan, Lowth, and ſome adjacent diſtricts: while Dunleve, prince of Uladh (now Down), diſputed the ſuperiority of this family, and affected an independent ſtate. In Munſter, reigned the deſcendants of Brien, a famous ſovereign of former times, impatient to recover the honours of their family; but at laſt, being confined by powerful rivals to the territory of North Munſter, they were obliged to leave the family of Mac Arthy ſovereigns of Deſmond, the ſouthern diviſion. In Connaught, the princes known by the name of *O'Connor*, were acknowledged ſovereigns of the eaſtern territory. Tiernan O'Ruarc, an active and reſtleſs military chief, had the ſupremacy in Breſſney, containing the modern county of Leitrim, and ſome adjacent diſtricts. Meath, or the ſouthern Hi-Nial, was ſubject to the family of Clan-Colman, Murchard O'Malachlyn, and his ſucceſſors. Leinſter, divided into ſeveral principalities, was ſubject to Dermod, a fierce, haughty, and oppreſſive tyrant. His father had governed with great cruelty. Seventeen of his vaſſal lords had been either put to death, or had their eyes put out, by his order in one year; and Dermod ſeemed to inherit too great a portion of the ſame temper. His ſtature and bodily ſtrength made him admired by the inferior orders of his ſubjects, and theſe he was careful to protect and favour. His donations and endowments of religious houſes recommended him to the clergy; but his tributary chieftains felt the weight of his pride and tyranny, and to them his government was extremely odious.

The chief competitors for the rank of monarch of Ireland, in the mean time, were, the heirs of the two houſes of O'Connor, and the northern Hi-Nial. Torlogh O'Connor was in poſſeſſion; but he was not generally recogniſed, and was oppoſed by his rival O'Lochlan: notwithſtanding which, he maintained his dignity with magnificence and vigour, till a deciſive victory gained by him over O'Brien raiſed O'Lochlan's jealouſy ſo much, that he obliged him, in a convention of the ſtates, to allow him the ſovereignty of the northern diviſion. In conſequence of this partition, it was reſolved to transfer the territory of O'Ruarc to a perſon more inclined to the intereſts of the two ſovereigns. An expedition was accordingly undertaken; O'Ruarc was ſurpriſed, defeated, and driven from his dominions. Dermod, who had conceived an unlawful paſſion for Dervorghal, the wife of O'Ruarc, took the opportunity of her huſband's diſtreſſes, to carry her off in triumph. O'Ruarc conceived the moſt implacable reſentment againſt Dermod; and therefore applying himſelf to Torlogh, promiſed an inviolable attachment to his intereſt; and prevailed on him not only to reinſtate him in his poſſeſſions, but to revenge the inſult offered by Dermod, and to reſtore his wife. By means of ſuch a powerful ally, O'Ruarc found frequent opportunities of haraſſing his antagoniſt till the death of Torlogh, which happened in 1156, upon which O'Lochlan ſucceeded to the ſovereignty. Dermod was the firſt to acknowledge the authority of this new ſovereign, by whoſe means he hoped to be able to revenge himſelf on O'Ruarc. He ſoon found, however, that he had acted too precipitately. His patron, having treacherouſly ſeized and put out the eyes of Dunleve prince of Down, the neighbouring chieftains took arms, in order to ſecure themſelves from his barbarity. O'Lochlan was defeated and killed; upon which the monarchy devolved on Roderic the ſon of the late Torlogh O'Connor.

The new prince had acquired the reputation of valour, and was determined to eſtabliſh this reputation by ſome remarkable exploit in the beginning of his reign. Having therefore engaged in his ſervice the Oſtmen, or deſcendants of the Danes, he marched againſt Dermod as the chief partizan of his fallen rival. The king of Leinſter was ſeized with the utmoſt conſternation; and in deſpair ſet fire to his own town of Ferns, leſt the enemy ſhould have the ſatisfaction of ſpoiling it. Roderic ſtill advanced, attended by O'Ruarc, Dermod's implacable enemy, and ſoon over-ran the whole province. All the inferior lords at once acknowledged Roderic's authority. Dermod was depoſed, as a man utterly unworthy of his ſtation; another of his family was raiſed to the throne; and the unfortunate prince, finding it impoſſible to ſtay with ſafety in Ireland, embarked with 60 of his followers for England, and ſoon arrived at the port of Briſtol, with a deſign to ſolicit aſſiſtance from king Henry.

8 Dermod, an exiled prince, ſolicits aſſiſtance from Henry II.

In England, Dermod's character was unknown, and he was regarded as an injured prince driven from his throne by an iniquitous confederacy. The clergy received him as the benefactor of their order, and entertained him in the monaſtery of Auguſtines with great hoſpitality. Having learned that Henry was then in Aquitain, he immediately went thither, and in a very abject manner implored his aſſiſtance, promiſing to acknowledge him as his liege lord, and to hold his dominions, which he was thus confident of regaining, in vaſſalage to Henry and his heirs.

Though nothing could be more flattering to the ambition of the king of England than this ſervile addreſs, yet the ſituation of his own affairs rendered it impoſſible for him at that time to reap from it any of the advantages with which it flattered him. He therefore diſmiſſed the Iriſh prince with large preſents, and a letter of credence addreſſed to all his ſubjects; notifying his grace and protection granted to the king of Leinſter; and declaring, that whoſoever within his dominions ſhould be diſpoſed to aid the unfortunate prince in the recovery of his kingdom, might be aſſured of his free licence and royal favour.

Dermod returned to England highly pleaſed with the reception he had met with; but notwithſtanding the king's letter, none of the Engliſh ſeemed to be diſpoſed to try their fortunes in Ireland. A month

9 Perſuades ſome adventurers to follow him to Ireland.

elapſed without any proſpect of ſuccours, ſo that Dermod began to deſpair. At laſt, however, he perſuaded, with great promiſes, Richard Earl of Chepſtow, or, as it was formerly called, *Strigul*; a nobleman of conſiderable influence in Wales, but of broken fortune, to aſſiſt him with a conſiderable force to be tranſported next ſpring into Ireland. Overjoyed at this firſt inſtance of ſucceſs, he advanced into South Wales, where, by the influence of the biſhop of St David's, he procured many other friends. Robert Fitz-Stephen, a brave and experienced officer, covenanted with him to engage in his ſervice with all his followers, and Maurice Fitz-Gerald his maternal brother; while Dermod, on his part, promiſed to cede to the two principal leaders, Fitz-Stephen and Fitz-Gerald, the entire dominion of the town of Wexford, with a large adjoining territory, as ſoon as, by their aſſiſtance, he ſhould be reinſtated in his rights.

The Iriſh prince having now accompliſhed his purpoſe, ſet ſail for Ireland in the winter of 1169, and recovered a ſmall part of his dominions even before the arrival of his new allies; but being attacked with a ſuperior force by his old enemies Roderic and O'Ruarc, he found himſelf obliged to feign ſubmiſſion till the Engliſh allies came to his aſſiſtance. The expected ſuccours arrived in the month of May 1170, in a creek called the *Bann*, near the city of Wexford. Robert Fitz-Stephen commanded 30 knights, 60 men in armour, and 300 archers. With theſe came Harvey of Mountmorres, nephew to earl Richard. He had no military force along with him; but came ſolely with a view of diſcovering the nature of the country, and reporting it to his uncle. Maurice of Pendergaſt commanded 10 knights and 200 archers: and thus the Engliſh force which was to contend with the whole ſtrength of Ireland, amounted to no more than 600 men.

10 Their ſuc- ſs.

Trifling as this aſſiſtance may ſeem, it nevertheleſs changed the face of affairs almoſt inſtantaneouſly. Numbers of Dermod's ſubjects, who had abandoned him in his diſtreſs, now flocked to his ſtandard. Wexford was immediately attacked, and ſurrendered in a few days; Fitz-Stephen and Fitz-Gerald were jointly inveſted with the lordſhip of this city and its domain; and Harvey of Mountmorres was declared lord of two conſiderable diſtricts on the coaſt. After three or four weeks ſpent in feaſting and rejoicing, a new expedition was undertaken againſt the prince of Oſſory, (a diſtrict of Leinſter), who had not only revolted from Dermod, but put out the eyes of one of his ſons, and that with ſuch cruelty, that the unhappy youth expired under the operation. The allied army was now increaſed to 3000 men, who were oppoſed by the prince of Oſſory at the head of 5000, ſtrongly entrenched among woods and moraſſes. By the ſuperior conduct of the Engliſh troops, however, the Iriſh were decoyed from their advantageous ſituation, and thus were entirely defeated. The Engliſh were for keeping the field till they had totally reduced their enemies: but Dermod, accuſtomed only to ravage and plunder, contented himſelf with deſtroying the country; and a ſudden reverſe of fortune ſeemed ready to take place. The prince of Oſſory, though defeated, ſtill appeared in arms, and only waited for an opportunity of again oppoſing the enemy in the field. Maurice Pendergaſt alſo joined him with his whole troop, being provoked by Dermod, who had refuſed him leave to return to Wales. This defection, however, was in part ſupplied by the arrival of Fitz-Gerald with 10 knights, 30 horſemen, and 100 archers. Pendergaſt in a ſhort time repented of his new alliance, and retired into Wales; ſo that the prince was obliged to make his ſubmiſſion to Dermod, which the latter with ſome reluctance accepted.

In the mean time, Roderick having ſettled all his other affairs, advanced againſt the allies with a powerful army. Dermod was thrown into deſpair; but, encouraged by Fitz-Stephen, he encamped in a very ſtrong ſituation, where he was ſoon beſieged by Roderic. The latter, however, dreading the valour of the Engliſh, condeſcended to treat, firſt with them, and then with Dermod, in order to detach them from the intereſts of each other: but as this proceeded evidently from fear, his offers were rejected by both parties; upon which he began to prepare for battle: but at the very time when the engagement ſhould have commenced, either through the ſuggeſtions of his clergy, or of his own fears, Roderic entered into a new negociation; which at laſt terminated in a peace. The terms were, that Dermod ſhould acknowledge the ſupremacy of Roderic, and pay him ſuch ſervice as the monarchs of Ireland had uſually received from inferior princes; and as a ſecurity for his faithful performance of this article, he delivered up his favourite ſon as an hoſtage to Roderic: but in order to eſtabliſh this accommodation on the firmeſt baſis, the latter obliged himſelf to give his daughter in marriage to the young prince as ſoon as Leinſter ſhould be reduced, and the peace of the iſland effectually reſtored. By a ſecret article, Dermod engaged to diſmiſs the Britiſh forces immediately after the ſettlement of his own province, and in the mean time not to bring over any further reinforcements from England.

11 Peace concluded.

Thus ended the firſt Britiſh expedition into Ireland; the conſequences of which were ſo little dreaded at that time by the natives, that their hiſtorians, though they dwell upon the provincial wars and conteſts in other parts of the iſland, ſpeak of the ſettlement of the Welſhmen in Leinſter with a careleſs indifference. But though the ſettlement of this colony ſeemed very little alarming to the generality, it could not eſcape the obſervation of diſcerning perſons, that a man of Dermod's character would not long keep his treaties; and that on the firſt emergency he would have recourſe to his former allies, who thus would eſtabliſh themſelves more and more, till at laſt they would reduce the country entirely under their ſubjection. Theſe reflections, if any ſuch were then made, were in a ſhort time verified. Dermod was ſcarce ſettled in his own dominions, when he began to aſpire at the ſovereignty, and form ſchemes for dethroning Roderic. He applied to Fitz-Stephen and Fitz-Gerald; by whom he was again directed to apply to Richard earl of Chepſtow, more commonly known by the name of *Strongbow*, on account of his feats of archery. Richard was very much inclined to accept of his invitation; but thought it incumbent upon him firſt to obtain the conſent of king Henry. The king, however, did not incline that his ſubjects ſhould make conqueſts for themſelves in any other country, and therefore

12 New machinations of Dermod.

therefore diſmiſſed Richard with an equivocal anſwer; but the latter being willing to underſtand his ſovereign's words in the moſt favourable ſenſe, immediately ſet about the neceſſary preparations for his expedition. In May 1711, Raymond le Groſs, Richard's domeſtic friend, and the near relation of Fitz-Stephen and Fitz-Gerald, landed at a place called *Dondonalf*, near Waterford, with 10 knights and 70 archers; and along with them came Hervey of Mountmorres, attended by a ſmall train. The Engliſh immediately intrenched themſelves, and erected a temporary fort for themſelves: which proved a very neceſſary precaution; for the natives, juſtly attributing this new debarkation to the practices of Dermod, inſtantly formed a tumultuous army, and marched to expel the invaders. The Engliſh prepared to meet them; but when they perceived the great ſuperiority of the enemy, they thought proper to retire to their fort. Here, however, they muſt have been totally cut off, had they not luckily collected a numerous herd of cattle from the neighbouring country for their ſubſiſtence. Theſe they drove with fury among the Iriſh, who were thus put into the utmoſt confuſion. The invaders ſeized the favourable moment; and, falling upon their diſordered enemies, put them to flight, and drove great numbers of them into the ſea, where they periſhed. Seventy priſoners were taken, all of them principal citizens of Waterford; who, though they offered large ſums for their ranſom, and even that the city ſhould be delivered up to the Engliſh, were all barbarouſly put to death. This ſucceſs and cruelty ſo intimidated the Iriſh, that they ſuffered theſe mercileſs invaders to maintain their ſtation unmoleſted, and wait for the arrival of their aſſociates.

13
A new body of Engliſh arrive in Ireland.

14
Their ſucceſs and cruelty.

Richard in the mean time having aſſembled his vaſſals, led them through Wales, where he was joined by great numbers of other adventurers; but, when juſt on the point of embarking, was ſurpriſed by a poſitive command from the king, to deſiſt from his intended enterprize, on pain of forfeiture of his lands and honours. He was now, however, too much intereſted in his ſcheme to retract; and therefore pretended to diſbelieve the authenticity of the royal mandate. On the eve of the feaſt of St. Bartholomew, he landed at Waterford with 200 knights and 1200 infantry, all choſen and well appointed ſoldiers. They were immediately joined by Raymond and his troop; and the very next day it was reſolved to make an attempt upon Waterford. The city was taken by ſtorm, and a dreadful maſſacre enſued; to which the cruel Dermod had the merit of putting an end. The marriage of Richard with Eva, the daughter of Dermod, was ſolemnized without delay, and a ſcene of joy and feſtivity ſucceeded the calamities of war.

15
Earl Richard arrives with a powerful reinforcement.

A new expedition was now undertaken againſt Dublin; the inhabitants of which had either manifeſted ſome recent diſaffection to Dermod, or had never been thoroughly forgiven for their old defection. Roderic advanced againſt the allied army with a formidable body, conſiſting, as is ſaid, of 30,000 men: but, fearing to come to a general engagement, he contented himſelf with ſome ſlight ſkirmiſhes; after which, great part of his vaſſals forced him to diſmiſs them, and Dublin was left to its fate. The inhabitants were treated very ſeverely; however, a conſiderable body of them, with Heſculph their governor, had the good fortune to gain ſome veſſels lying in the harbour, and made their eſcape to the northern iſlands. Earl Richard was now inveſted with the lordſhip of Dublin; and appointed Milo de Cogan, a brave Engliſh knight, his governor; while he himſelf, in conjunction with the forces of Dermod, over-ran the country of Meath, committing every where the moſt horrid cruelties. Roderic, in the mean time, unable to oppoſe them in the field, ſent deputies to Dermod, commanding him to retire, and putting him in mind that his ſon was in his hands, and muſt anſwer with his life for the breach of thoſe treaties which his father made ſo little ſcruple to violate. Natural affection, however, had very little place in the breaſt of Dermod. He expreſſed the utmoſt indifference about his ſon; and, with the greateſt arrogance, claimed the ſovereignty of all Ireland: Roderic, provoked at this anſwer, cut off the young prince's head.

This piece of impotent cruelty ſerved only to make the king odious to his own ſubjects, while Dermod and his Engliſh allies committed every where the greateſt devaſtations, and threatened to ſubdue the whole iſland. This indeed they would probably have accompliſhed, had not the extraordinary ſucceſs of Strongbow alarmed king Henry; who, fearing that he might render himſelf totally independent on the crown of Britain, iſſued his royal edict, ſtrictly forbidding any Engliſh veſſel from paſſing into Ireland with men, arms, or proviſions; and commanding all his ſubjects at that time reſident in Ireland, of whatever rank or degree, to return to their country before the enſuing feaſt of Eaſter, on pain of forfeiting their lands, and being declared traitors.

16
All the adventurers recalled by the king.

Our adventurers were plunged into the greateſt diſtreſs by this peremptory edict. They now found themſelves cut off from all ſupplies in the midſt of their enraged enemies, and in danger of being forſaken by thoſe who had attached themſelves to them during their ſucceſs. Raymond was diſpatched with a moſt ſubmiſſive meſſage to the offended monarch; but before he received any favourable anſwer, every thing was thrown into confuſion by the death of Becket *, ſo that the king had neither leiſure nor inclination to attend to the affairs of Ireland. About the ſame time the death of Dermod their great ally ſeemed almoſt to give a finiſhing ſtroke to the Engliſh affairs. An univerſal defection took place among their aſſociates; and before they had time to concert any proper meaſures, Heſculph, who had formerly eſcaped from Dublin, appeared before that city with a formidable body of troops armed after the Daniſh manner. A furious attack enſued; which at laſt ended in the defeat and captivity of Heſculph, who was immediately put to death. This danger, however, was ſoon followed by one ſtill greater. Roderic had formed a powerful confederacy with many of the Iriſh chieftains, and the kings of the northern iſles, in order to extirpate the Engliſh totally from the iſland. The harbour of Dublin was blocked up by a fleet of 30 ſhips from the northern iſles; while the confederated Iriſh took their ſtations in ſuch a manner as to ſurround the city, and totally cut off all ſupplies of proviſions. In two month's time the Engliſh were reduced to great ſtraits.

17
Diſtreſs of the Engliſh.

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* See *England*, nº 117, 118.

ſtraits. On the firſt alarm, Richard had ſent for aſſiſtance to Fitzſtephen; who having weakened his own force, in order to ſerve the earl, the people of Wexford had riſen and beſieged Fitzſtephen in his fort called *Carrig* near that city. A meſſenger now arrived, informing Strongbow that his friend was in the utmoſt danger, and muſt fall into the hands of his enemies if not aſſiſted within three days; upon which a council of war was called, in order to deliberate on the meaſures neceſſary to be purſued in this deſperate emergency. It was ſoon reſolved to enter into a treaty with Roderic upon any terms that were not totally ſervile or oppreſſive. Laurence prelate of Dublin was appointed to carry the terms; which were, that Richard propoſed to acknowledge Roderic as his ſovereign, and to hold the province of Leinſter as his vaſſal, provided he would raiſe the ſiege. Laurence ſoon returned with an anſwer, probably of his own framing; namely, that Dublin, Waterford, Wexford, and all the forts poſſeſſed by the Britiſh, ſhould be immediately given up; and that the earl and his aſſociates, ſhould depart with all their forces by a certain day, leaving every part of the iſland free from their uſurpations, and abſolutely renouncing all their pretended claims. On theſe conditions they were to be ſpared; but the leaſt reluctance or delay would determine the beſiegers to ſtorm the city.

18
They to-
lly defeat
heir ene-
ies.

Theſe terms, though they contained nothing inſolent or unreaſonable, conſidering the preſent ſituation of the Engliſh, were yet intolerable to our indigent adventurers. After ſome time ſpent in ſilence, Milo de Cogan, ſuddenly ſtarting up, declared his reſolution to die bravely rather than ſubmit to the mercy of barbarians. The ſpirit of deſperate valour was inſtantly caught by the whole aſſembly; and it was reſolved to riſk their whole fortune on one deſperate effort, by ſallying out againſt the enemy, and to make their attack upon that quarter where Roderic himſelf commanded. Accordingly, having perſuaded a body of the townſmen to take part in this deſperate enterprize, they marched out againſt their enemies, who expected nothing leſs than ſuch a ſudden attack. The beſiegers were ſecure and careleſs, without diſcipline or order; in conſequence of which, they were unable to ſuſtain the furious aſſault of the Engliſh. A terrible ſlaughter enſued, and the Iriſh inſtantly fled in the greateſt confuſion; their monarch himſelf eſcaping only by mixing half naked with the crowd. The other chieftains who were not attacked caught the panic, and broke up their camps with precipitation; while the victors returned from the purſuit to plunder, and among other advantages gained as much proviſion as was ſufficient to ſupport them for a whole year.

Strongbow being thus relieved from his diſtreſs, committed the government of Dublin to Milo de Cogan, while he proceeded immediately to Wexford in order to relieve Fitzſtephen: but in this he was diſappointed; for that brave officer, having often repulſed his enemies, was at laſt treacherouſly deceived into ſubmiſſion and laid in irons. Strongbow, however, continued to advance; and was again attacked by the Iriſh, whom he once more defeated. On his arrival at Wexford, he found it burnt to the ground; the enemy having retired with Fitzſtephen and the reſt of the priſoners to Holy Iſland, a ſmall iſland in the middle of the harbour, from whence they ſent a deputation, threatening to put all the priſoners to death if the leaſt attempt was made to moleſt them in their preſent ſituation. The earl then proceeded to Waterford, and from thence to Ferns; where he for ſome time exerciſed a regal authority, rewarding his friends and puniſhing his enemies. A more important object, however, ſoon engaged his attention. The king of England having ſettled his affairs as well as he could, now determined to conquer Ireland for himſelf. A ſummons was inſtantly diſpatched to earl Richard, expreſſing the greateſt reſentment at his preſumption and diſobedience, and requiring his immediate preſence in England. The earl found himſelf under a neceſſity of obeying; and having made the beſt diſpoſitions the time would permit for the ſecurity of his Iriſh poſſeſſions, embarked for England, and met the king at Newnham near Glocester. Henry at firſt affected great diſpleaſure; but ſoon allowed himſelf to be pacified by a ſurrender of the city of Dublin, and a large territory adjacent, together with all the maritime towns and forts acquired by Strongbow; while on his part he conſented that the earl ſhould have all his other poſſeſſions granted in perpetuity, to be held of the king and his heirs. The other adventurers made their peace in a ſimilar manner; while the Iriſh chieftains, inſtead of uniting in the defence of their country, only thought how to make the moſt of the approaching invaſion, or at leaſt how to avert the threatened evils from their own particular diſtricts. They ſaw the power of their own ſovereign on the point of total diſſolution; and they ſaw it with indifference, if not with an envious and malignant ſatisfaction. Some were even ready to prevent their invader, and to ſubmit before he appeared on the coaſt. The men of Wexford, who had poſſeſſed themſelves of Fitzſtephen, reſolved to avert the conſequences of their late perfidy and cruelty, by the forwardneſs of their zeal for the ſervice of the king of England, and the readineſs of their ſubmiſſions. Their deputies caſt themſelves at Henry's feet; and, with the moſt paſſionate expreſſions of obedience, humbly intreated that he would accept them as his faithful vaſſals, ready to reſign themſelves, their lands, and poſſeſſions, to his abſolute diſpoſal. "They had already, (they ſaid), endeavoured to approve their zeal by ſeizing Robert Fitzſtephen, a traitor to his ſovereign, who had lately entered their territory by force of arms without any due warrant or fair pretence, had ſlaughtered their people, ſeized their lands, and attempted to eſtabliſh himſelf independent of his liege lord. They kept him in chains, and were ready to deliver him to the diſpoſal of his ſovereign."—The king received them with expreſſions of the utmoſt grace and favour; commended their zeal in repreſſing the unwarrantable attempts of Fitzſtephen; declared that he ſhould ſoon inquire into his crimes, and the wrongs they had ſuſtained, and inflict condign puniſhment for every offence committed by his undutiful ſubjects.—Thus were the Iriſhmen diſmiſſed in the utmoſt joy and exultation; and the artifice of Henry, while it inſpired theſe men with diſpoſitions favourable to his intereſts, proved alſo the moſt effectual means of ſaving Fitzſtephen from their cruelty.

19
Earl Richard ſummoned to England.

Henry, having completed the preparations neceſſary for

20 King Henry lands in Ireland.

21 Many Iriſh chieftains ſubmit to him.

for his expedition, embarked at Milford with ſeveral of his barons, 400 knights, and about 4000 ſoldiers, on board a fleet of 240 ſail. He landed at Waterford on the feaſt of St Luke in October 1172; with a profeſſed deſign not to conquer, but to take poſſeſſion of a kingdom already his own, as being granted him by the pope. Moſt of the Iriſh indeed ſeemed to be of the ſame opinion, and therefore ſubmitted without the leaſt reſiſtance. Strongbow ſet them an example, by making a formal ſurrender of Waterford, and doing homage to the king for the territory of Leinſter. Fitz-Stephen was delivered up, with many accuſations of tyranny and injuſtice. He was at firſt ſent to priſon; but ſoon purchaſed his liberty, by ſurrendering Wexford, and doing homage for the reſt of his poſſeſſions to the king. The prince of Deſmond was the firſt Iriſh chieftain who ſubmitted. On the very day after the king's arrival, he attended his court, reſigned the city of Corke, did him homage, and ſtipulated to pay a tribute for the reſt of his territory. An Engliſh governor and garriſon were immediately appointed to take poſſeſſion of his capital; and the king diſplayed his power and magnificence by marching to Liſmore, where he choſe a ſituation and gave the neceſſary orders for building a fort. The prince of Thomond next ſubmitted and did homage. He was followed by the princes of Oſſory, Decies, and all the inferior chiefs of Munſter.

The king, after having provided for the ſecurity of all his newly acquired territories, and put garriſons in the cities of Limerick, Corke, Waterford, and Wexford, proceeded to take poſſeſſion of Dublin, which had been ſurrendered by Strongbow. The neighbouring lords took the opportunity of ſubmitting as he advanced. O'Carrol of Argial, a chieftain of great conſequence, repaired to his camp, and engaged to become his tributary; and even O'Ruarc, whom Roderic had made lord of a conſiderable part of Meath, voluntarily ſubmitted to the new ſovereign.

22 Roderic ſtill holds out.

Roderic, though ſurpriſed at the defection of ſo many of his allies, ſtill determined to maintain his own dignity, and at leaſt preſerve his province of Connaught, ſeeing he could no longer call himſelf monarch of the whole iſland. With this deſign he entrenched himſelf on the banks of the Shannon; and now, when diſencumbered from a crowd of faithleſs and diſcontented followers, he appears to have acted with a ſpirit and dignity becoming his ſtation. Hugh de Lacy and William Fitz-Andelm were commiſſioned by the king to reduce him: but Roderic was too ſtrong to be attacked with any probability of ſucceſs by a detachment from the Engliſh army; and he at leaſt affected to believe, that his ſituation was not yet ſo totally deſperate as to reduce him to the neceſſity of reſigning his dignity and authority, while his own territory remained inviolate, and the brave and powerful chiefs of Ulſter ſtill kept retired in their own diſtricts without any thoughts of ſubmiſſion. Henry in the mean time attempted to attach the Iriſh lords to his intereſts by elegant and magnificent entertainments, ſuch as to them appeared quite aſtoniſhing. Some hiſtorians pretend that he eſtabliſhed the Engliſh laws in all thoſe parts which had ſubmitted to his juriſdiction; but this muſt appear extremely improbable, when we conſider how tenacious a rude and barbarous people are of their ancient laws and cuſtoms. The Iriſh lords had been accuſtomed to do homage to a ſuperior; and they had made no ſubmiſſion to Henry which they had not formerly done to Roderic, and probably thought their ſubmiſſion to the king of England more honourable than that to their Iriſh monarchs; and it cannot be ſuppoſed, that a wiſe and politic monarch, ſuch as Henry undoubtedly was, ſhould form at once ſuch an extravagant ſcheme as altering the laws of a great number of communities, none of which he had ſubdued by force of arms. By his tranſactions both with the natives and adventurers, however, Henry had attained the abſolute dominion of ſeveral maritime cities and their dependencies; ſo that he had both a conſiderable number of real ſubjects, and a large extent of territory, in the iſland. To theſe ſubjects indeed Henry granted the Engliſh laws; and gave the city of Dublin by charter to the inhabitants of Briſtol, to be held of him and his heirs, with the ſame liberties and free cuſtoms which they enjoyed at Briſtol, and throughout all his land. And, by another charter, executed ſoon after, he confirmed to his burgeſſes of Dublin all manner of rights and immunities throughout his whole land of England, Normandy, Wales, and Ireland, wherever they and their effects ſhall be, to be fully and honourably enjoyed by them as his free and faithful ſubjects. And as it was not eaſy to induce his Engliſh ſubjects immediately to ſettle in theſe maritime towns, he permitted the Oſtmen to take poſſeſſion of Waterford; and to them he granted a particular right of denization, whereby they were inveſted with the rights and privileges of free ſubjects, and for the future to be governed by the laws of his realm. For the better execution of theſe new laws, the king alſo made a diviſion of the diſtricts now ſubject to him into ſhires or counties; which was afterwards improved and enlarged, as the extenſion of the Engliſh ſettlements and the circumſtances of the country required. Sheriffs were appointed both for the counties and cities, with itinerant judges, and other miniſters of juſtice, and officers of ſtate, and every appendage of Engliſh government and law. To complete the whole ſyſtem, a chief governor, or repreſentative of the king, was apappointed. His buſineſs was to exerciſe the royal authority, or ſuch parts of it as might be committed to him in the king's abſence; and, as the preſent ſtate of Ireland, and the apprehenſions of war or inſurrections, made it neceſſary to guard againſt ſudden accidents, it was provided, That in caſe of the death of any chief governor, the chancellor, treaſurer, chief-juſtices, and chief baron, keeper of the rolls, and king's ſerjeant at law, ſhould be empowered, with conſent of the nobles of the land, to elect a ſucceſſor, who was to exerciſe the full power and authority of this office, until the royal pleaſure ſhould be further known.

24 rders e on king's rture.

23 Henry obliged to leave Ireland.

But while Henry was thus regulating the government of his new dominions, he received the unwelcome news, that two cardinals, Albert and Theodine, delegated by the pope, had arrived in Normandy the year before, to make inquiſition into the death of Becket; that having waited the king's arrival until their patience was exhauſted, they now ſummoned him to appear without delay, as he would avert the dreadful ſentence of excommunication, and preſerve his dominions from a general interdict. Such denunciations were of too great conſequence to admit of his longer ſtay in Ireland; he therefore ordered his forces and the officers of his houſehold to embark without delay, reſerving three ſhips for the conveyance of himſelf and his immediate attendants. Having therefore but a ſhort time to ſecure his Iriſh intereſts, he addreſſed himſelf to the original Engliſh adventurers, and by grants and promiſes laboured to detach them from Strongbow, and to bind them firmly to himſelf. To make amends for what he had taken from Fitz-Stephen, he granted him a conſiderable diſtrict in the neighbourhood of Dublin, to be held by knight's ſervice; at the ſame time entruſting the maritime towns to his own immediate dependants. Waterford was committed to Humphrey de Bohun, Robert Fitz-Bernard, and Hugh de Gundville, with a train of 20 knights. In Wexford were ſtationed William Fitz-Andelm, Philip of Haſtings, and Philip de Braoſa, with a like number of attendants. Hugh de Lacy had a grant of all the territory of Meath, where there was no fortified place, and where of conſequence no particular reſervation was neceſſary, to be held of the king and his heirs, by the ſervice of 50 knights, in as full a manner as it had been enjoyed by any of the Iriſh princes. He alſo conſtituted him lord governor of Dublin, with a guard of 20 knights. Robert Fitz-Stephen and Maurice Fitz-Gerald were appointed his coadjutors, with an equal train; and theſe, with others of the firſt adventurers, were thus obliged, under the the pretence of an honourable employment, to reſide at Dublin, ſubject to the immediate inſpection of de Lacy, in whom Henry ſeems to have placed his chief confidence. Lands were aſſigned in the neighbourhood of each city for the maintenance of the knights and ſoldiers. Orders were given to build a caſtle in Dublin, and fortreſſes in other convenient places; and to John de Courcey, a baron diſtinguiſhed by his enterpriſing genius and abilities for war, was granted the whole province of Ulſter, provided he could reduce it by force of arms.

24 orders e on king's rture.

Henry was no ſooner gone, than his barons began to contrive how they might beſt ſtrengthen their own intereſts, and the Iriſh how they might beſt ſhake off the yoke to which they had ſo readily ſubmitted. De Lacy parcelled out the lands of Meath to his friends and adherents, and began to erect forts to keep the old inhabitants in awe. This gave offence to O'Ruarc, who ſtill enjoyed the eaſtern part of this territory as a tributary prince. He repaired to Dublin, in order to obtain redreſs from Lacy for ſome injuries real or pretended; but, as the parties could not come to an agreement, another conference was appointed on a hill called *Taragh*. Both parties came with a conſiderable train of armed followers; and the event was a ſcuffle, in which O'Ruarc and ſeveral of his followers were killed, and which ſerved to render the Engliſh not a little odious to the natives.

This ſpirit of diſaffection had ſoon after an opportunity of ſhewing itſelf on the rebellion of king Henry's ſons, of which an account is given under the article ENGLAND, n° 119, *& ſeq.* The king had been obliged to weaken his forces in Ireland, by withdrawing ſeveral of his garriſons. The ſoldiers who remained were alſo diſcontented with their general Hervey of Mountmorres, on account of his ſeverity in diſcipline, and reſtraining them from plunder, to which they imagined themſelves intitled on account of the deficiencies of their pay. Raymond le Gros, the ſecond in command, was much more beloved by the ſoldiery: and to ſuch a height had the jealouſies between the commanders ariſen, that all effectual oppoſition to the Iriſh chieftains was prevented; and the event might have been fatal to the Engliſh intereſt, had not Henry found out a remedy. He ſummoned earl Richard to attend him at Rouen in Normandy, and communicated his intentions of committing the affairs of Ireland to his ſole direction. The earl expreſſed the utmoſt readineſs to ſerve his maſter; but obſerved, that he had already experienced the envy and malignity of his ſecret enemies; that if he ſhould appear in ſuch a diſtinguiſhed character as that of the king's deputy in Ireland, their inſidious practices would be renewed, and his conduct miſrepreſented. He therefore requeſted that a colleague might be appointed in the commiſſion; and recommended Raymond as a perſon of approved loyalty and abilities, as well as highly acceptable to the ſoldiery. The king replied, with an affected air of regard and confidence, that he had his free conſent to employ Raymond in any ſervice he ſhould deem neceſſary, not as a colleague, but as an aſſiſtant; but that he relied entirely on the earl himſelf, and implicitly truſted every thing to his direction. To reward his ſervices, he granted him the town of Wexford, together with a fort erected at Wicklow; and then diſmiſſed him with the moſt gracious expreſſions of favour.

25 Strongbow the firſt governor of Ireland.

The earl landed at Dublin, where he was received with all the reſpect due to the royal commiſſion. He ſignified the king's pleaſure, that Robert Fitz-Bernard, with the garriſon of Waterford, ſhould inſtantly embark and repair to Normandy; that Robert Fitz-Stephen, and Maurice Pendergaſt, ſhould attend the ſervice of their ſovereign in England; and, agreeably to the king's inſtructions, took on him the cuſtody of the cities of Dublin, Waterford, and Wexford. Hugh de Lacy, and Milo de Cogan, were, with the other lords, commanded to repair to England for the ſervice of the king; by which the earl's forces were conſiderably weakened, and he ſoon found himſelf under a neceſſity of appointing Raymond to the chief command. The new general proved ſucceſsful in ſome enterprizes againſt the rebellious Iriſh; but having preſumed upon his merits to demand in marriage Baſilia the earl's ſiſter, Richard refuſed his conſent, and Raymond retired into Wales.

Thus the ſupreme command again devolved upon Hervey of Mountmorres; who, being ſenſible that his character had ſuffered much from a compariſon with that of Raymond, determined to emulate his ſucceſſes by ſome bold attempt againſt the rebels. A detachment of 400 of his men, however, had the misfortune to be ſurprized and cut off by the enemy; and this ſucceſs ſerved as a ſignal for a general revolt. Several of the Leinſter chieftains, who had lately made their ſubmiſſions, and bound themſelves to the ſervice of king Henry, now openly diſclaimed all engagements. Even Donald Kevanagh, ſon to the late king Dermod, who had hitherto adhered to the Engliſh in their greateſt difficulties, now declared againſt them, and claimed

26 A general revolt of the Iriſh.

claimed a right to the kingdom of Leinſter; while Roderic, on his part, was active in uniting the princes of Ulſter, the native lords of Meath, and other chiefs, againſt their common enemy. This produced the immediate recall of Raymond; and Richard no longer refuſed his conſent to the marriage with his ſiſter, which was ſolemnized immediately on Raymond's arrival. The very next morning, the bridegroom was obliged to take the field againſt Roderic, who had committed great devaſtations in Meath. By the vigorous conduct of the Engliſh commander, however, he was not only prevented from doing farther miſchief, but at laſt convinced of the folly of reſiſtance; and therefore determined to make a final ſubmiſſion. Yet, conſcious of his dignity, he diſdained to ſubmit to a ſubject; and therefore, inſtead of treating with earl Richard, he ſent deputies directly to the king. The deputies were, Catholicus archbiſhop of Tuam, the abbot of St Brandan, and *Maſter Lawrence*, as he is ſtyled, chancellor to the king of Connaught.

27
Roderic ſubmits to king Henry.

28
Terms of his ſubmiſſion.

The terms of this ſubmiſſion, by which Henry became ſole monarch of Ireland, were as follow: Roderic conſented to do homage and pay tribute, as liege-man to the king of England; on which condition he was allowed to hold the kingdom of Connaught, as well as his other lands and ſovereignties, in as ample a manner as he had enjoyed them before the arrival of Henry in Ireland. His vaſſals were to hold under him in peace, as long as they paid their tribute and continued faithful to the king of England; in which Roderic was to enforce their due obedience, and for this purpoſe to call to his aſſiſtance the Engliſh government, if neceſſary. The annual tribute to be paid was every 10th merchantable hide, as well from Connaught, as from the reſt of the iſland; excepting thoſe parts under the immediate dominion of the king of England and his barons, viz. Dublin and Meath with their appurtenances, Wexford and all Leinſter, and Waterford with its lands as far as Dungarvan incluſive; in all which diſtricts Roderic was not to interfere, nor claim any power or authority. The Iriſh who had fled from theſe diſtricts were to return, and either pay their tribute, or perform the ſervices required by their tenures, at the option of their immediate lords; and, if refractory, Roderic, at the requiſition of their lords, was to compel them to return. He was to take hoſtages from his vaſſals, ſuch as he and his liege-lord ſhould think proper; and on his part to deliver either theſe or others to the king, according to the royal pleaſure. His vaſſals were to furniſh hawks and hounds annually to the Engliſh monarch; and were not to detain any tenant of his immediate demeſnes in Ireland, contrary to his royal pleaſure and command. This treaty was ſolemnly ratified in a grand council of prelates and temporal barons, among whom we find the archbiſhop of Dublin one of the ſubſcribing witneſſes. As metropolitan of Leinſter, he was now become an Engliſh ſubject, and was probably ſummoned on this occaſion as one obliged to attend, and who had a right to aſſiſt in the king's great council. It is alſo obſervable, that Henry now treated with Roderic not merely as a provincial prince, but as monarch of Ireland. This is evidently implied and ſuppoſed in the articles; although his monarchical powers and privileges were little more than nominal, frequently diſregarded and oppoſed by the Iriſh toparchs. Even by their ſubmiſſions to Henry, many of them in effect diſavowed and renounced the ſovereignty of Roderic; but now his ſupremacy ſeems to be induſtriouſly acknowledged, that the preſent ſubmiſſion might appear virtually the ſubmiſſion of all the ſubordinate princes, and thus the king of England be inveſted with the ſovereignty of the whole iſland. The marks of ſovereignty, however, were no more than homage and tribute: in every other particular, the regal rights of Roderic were left inviolate. The Engliſh laws were only to be enforced in the Engliſh pale: and, even there, the Iriſh tenant might live in peace, as the ſubject of the Iriſh monarch; bound only to pay his quota of tribute, and not to take arms againſt the king of England.

29
Cauſes of the ſubſequent diſtreſſes of Ireland.

But though the whole iſland of Ireland thus became ſubject to the king of England, it was far from being ſettled in tranquillity, or indeed from having the ſituation of its inhabitants mended almoſt in any degree. One great occaſion of diſturbance was, that the Engliſh laws were confined only to thoſe parts which had been ſubdued by force of arms; while the chieftains that had only ſubmitted to pay tribute, were allowed to retain the ancient Iriſh laws within the limits of their own juriſdictions. By theſe old Iriſh laws, many crimes accounted capital with us, ſuch as robbery, murder, &c. might be compenſated by a ſum of money. Hence it happened, that very unequal puniſhments were inflicted for the ſame offence. If one Engliſhman killed another, he was puniſhed with death; but if he killed an Iriſhman, he was puniſhed only by a fine. If an Iriſhman, on the other hand, killed an Engliſhman, he was certainly puniſhed with death: and as in times of violence and outrage, the crime of murder was very frequent, the circumſtance juſt mentioned tended to produce an implacable hatred between the original inhabitants and the Engliſh. As the Iriſh laws were thus more favourable to the barbarity natural to the tempers of ſome individuals, many of the Engliſh were alſo tempted to lay aſide the manners and cuſtoms of their countrymen altogether, and to aſſociate themſelves with the Iriſh, that, by becoming ſubject to their laws, they might thus have an opportunity of gratifying their brutal inclinations with leſs controul than formerly; and in proceſs of time, theſe *degenerate Engliſh*, as they were called, proved more bitter enemies to their countrymen than even the Iriſh themſelves.

Another cauſe of the diſtreſſes of Ireland was, the great power of the Engliſh barons, among whom Henry had divided the greateſt part of his Iriſh dominions. The extent of their authority only inflamed them with a deſire for more; and, inſtead of contributing their endeavours to increaſe the power of their ſovereign, or to civilize the barbarous people over whom they were placed, they did every thing in their power to counteract and deſtroy each other. Henry himſelf, indeed, ſeems to have been infected with a very fatal jealouſy in this reſpect; for, though the abilities and fidelity of Raymond had abundantly manifeſted themſelves, the king never could allow himſelf to continue him in the government of the iſland: and the conſequence of degrading him never failed to be a ſcene of uproar and confuſion. To theſe two reaſons we muſt likewiſe add another; namely, that in thoſe parts of the kingdom where the Iriſh chieftains enjoyed the ſovereignty, they were at full liberty to make war upon each other as formerly, without the leaſt reſtraint. This likewiſe induced many of the Engliſh to degenerate, that they might have an opportunity of ſharing the plunder got by theſe petty wars; ſo that on the whole, the iſland was a perpetual ſcene of horror, almoſt unequalled in the hiſtory of any country.

30 Fitz-Andelm's bad government.

After the death of earl Richard, Raymond was immediately elected to ſucceed him; but was ſuperſeded by the king, who appointed William Fitz-Andelm, a nobleman allied to Raymond, to ſucceed in his place. The new governor had neither inclination nor abilities to perform the taſk aſſigned to him. He was of a rapacious temper, ſenſual and corrupt in his manners; and therefore only ſtudied to enrich himſelf. The native Iriſh, provoked by ſome depredations of the Engliſh, commenced hoſtilities; but Fitz-Andelm, inſtead of repreſſing theſe with vigour in the beginning, treated the chieftains with affected courteſy and flattery. This they had ſufficient diſcernment to ſee, and to deſpiſe; while the original adventurers had the burden of the whole defence of the *Engliſh pale*, as the Engliſh territories were called, thrown upon them, at the ſame time that the bad conduct of the governor was the cauſe of perpetual diſorders. The conſequence of this was, that the lords avowed their hatred of Fitz-Andelm: the ſoldiers were mutinous, ill-appointed, and unpaid: and the Iriſh came in crowds to the governor with perpetual complaints againſt the old adventurers, which were always decided againſt the latter; and this deciſion increaſed their confidence, without leſſening their diſaffection.

In this unfavourable ſtate of affairs, John de Courcey, a bold adventurer, who had as yet reaped none of the benefits he expected, reſolved to undertake an expedition againſt the natives, in order to enrich himſelf with their ſpoils. The Iriſh at that time were giving no offence; and therefore pleaded the treaty lately concluded with King Henry: but treaties were of little avail, when put in competition with the neceſſities of an indigent and rapacious adventurer. The conſequence was, that the flame of war was kindled through the whole iſland. The chieftains took advantage of the war with the Engliſh, to commence hoſtilities againſt each other. Deſmond and Thomond, in the ſouthern province, were diſtracted by the jealouſies of contending chiefs, and the whole land was waſted by unnatural and bloody quarrels. Treachery and murder were revenged by practices of the ſame kind, in ſuch a manner as to perpetuate a ſucceſſion of outrages the moſt horrid, and the moſt diſgraceful to humanity. The northern province was a ſcene of the like enormities; though the new Engliſh ſettlers, who were conſidered as a common enemy, ought to have united the natives among themſelves. All were equally ſtrangers to the virtues of humanity; nor was religion, in the form it then aſſumed, capable of reſtraining theſe violences in the leaſt.

31 ſuper- by de

Ireland was thus in a ſhort time reduced to ſuch a ſtate, that Henry perceived the neceſſity of recalling Fitz-Andelm, and appointing another governor. He was recalled accordingly; and Hugh de Lacey appointed to ſucceed him. He left his government without being regretted, and is ſaid by the hiſtorians of thoſe times to have done only one good action during the whole courſe of his adminiſtration. This action was nothing more important, than the removing of a relic, called the *the ſtaff of Jeſus*, from the cathedral of Armagh to that of Dublin; probably that it might be in greater ſafety, as the war raged violently in Ulſter. De Lacey, however, was a man of a quite different diſpoſition, and every way qualified for the difficult government with which he was inveſted: but at the ſame time, the king, by inveſting his ſon John with the lordſhip of Ireland, gave occaſion to greater diſturbances than even thoſe which had already happened. The nature of this lordſhip hath been much diſputed; but the moſt probable opinion is, that the king's ſon was now to be inveſted with all the rights and powers which had formerly belonged to Roderic, who was allowed the title of *king of Ireland*. It doth not appear, indeed, that Henry had any right to deprive Roderic of theſe powers, and ſtill leſs had he to diſpoſe of any of the territories of thoſe chieftains who had agreed to become his tributaries; which nevertheleſs he certainly did, and which failed not to be productive of an immediate war with theſe chiefs.

32 Prince John made lord of Ireland.

The new governor entered on his office with all that ſpirit and vigour which was neceſſary; but being miſrepreſented to the king by ſome factious barons, he was in a ſhort time recalled, and two others, totally unfit for the goverment, appointed in his room. This error was ſoon corrected, and Lacey was replaced in three months. The ſame jealouſy which produced his firſt degradation, ſoon produced a ſecond; and Philip de Braoſa, or *Philip of Worceſter*, as he is called, a man of a moſt avaricious diſpoſition, was appointed to ſucceed him. This governor behaved in ſuch a manner, that his ſuperſtitious ſubjects expected every moment that the vengeance of heaven would fall upon him, and deliver them from his tyranny. His power, however, was of ſhort duration; for now prince John prepared to exerciſe the authority with which his father had inveſted him in Ireland. He was attended by a conſiderable military force: his train was formed of a company of gallant Normans in the pride of youth; but luxurious, inſolent, and followed by a number of Engliſhmen, ſtrangers to the country they were to viſit, deſperate in their fortunes, accuſtomed to a life of profligacy, and filled with great expectations of advantage from their preſent ſervice. The whole aſſembly embarked in a fleet of 60 ſhips; and arrived at Waterford after a proſperous voyage, filling the whole country with the greateſt ſurpriſe and expectation.

33 His indiſcretion.

The young prince had not yet arrived at the years of diſcretion; nor indeed, from his ſubſequent conduct, doth it appear that his diſpoſition was ſuch as qualified him in the leaſt for the high dignity to which he was raiſed. The hardy Welſhmen who firſt migrated into Ireland, immediately waited upon him to do him homage; but they were diſagreeable to the gay courtiers, and to the prince himſelf, who minded nothing but his pleaſures. The Iriſh Lords were at firſt terrified by the magnificent repreſentation of the force of the Engliſh army; and being reconciled to ſubmiſſion by the dignity of the prince's ſtation, haſtened in crowds to Waterford to do him homage.

34
A general revolt.

They exhibited a ſpectacle to the Norman courtiers, which the latter did not fail to treat with contempt and ridicule. The Iriſh Lords, with uncouth attire, thick buſhy beards, and hair ſtanding on end, advanced with very little ceremony; and, according to their own notions of reſpect, offered to kiſs the young prince. His attendants ſtepped in, and prevented this horrid violation of decorum by thruſting away the Iriſhmen. The whole aſſembly burſt into peals of laughter, pulled the beards, and committed ſeveral other indignities on the perſons of their gueſts; which were immediately and ſeverely reſented. The chieftains left the court, boiling with indignation; and meeting others of their countrymen haſtening to do homage to the prince, they informed them of the reception they themſelves had met with. A league was inſtantly formed to extirpate the Engliſh, and the whole nation flew to arms; while John and his courtiers, inſtead of oppoſing the enemy, employed themſelves in harraſſing and oppreſſing thoſe who were under their immediate juriſdiction. The country was therefore over-run by the barbarians, agriculture entirely neglected, and a dreadful famine threatened to follow the calamities of war.

35
Suppreſſed by John de Courcey.

This terrible devaſtation had continued for eight months before the king was fully acquainted with it. He then determined to recal his ſon; but was at a loſs whom he ſhould name for his ſucceſſor. Lacey had been murdered by an Iriſh peaſant, and the king was at laſt obliged to have recourſe to John de Courcey, whoſe boiſterous valour ſeemed now to be abſolutely neceſſary to prevent the Engliſh from being totally exterminated. The new governor was obliged at firſt to act on the defenſive; but as his enemies ſoon forgot their league, and began their uſual hoſtilities againſt each other, he was at laſt enabled to maintain his authority of the Engliſh government, and to ſupport their acquiſitions in Ireland, though not to extend them.

36
Miſerable ſtate of Ireland under Richard I.

In this ſituation were the affairs of Ireland when Henry II. died, and was ſucceeded by his ſon Richard I. The new king was determined on an expedition to the holy land, which left him no leiſure to attend to the affairs of Ireland. John, by virtue of the powers granted him by his father, took upon him the management of Iriſh affairs; and immediately degraded de Courcey from his government, appointing in his place Hugh de Lacey the younger. De Courcey, provoked at this indignity, retired into Ulſter, where he was immediately engaged in a furious war with the natives, and at laſt almoſt entirely detached himſelf from the Engliſh government. The greateſt confuſion enſued; Hugh de Lacy was recalled from his government, and William Petit, earl marſhal of England, appointed in his place. Petit's adminiſtration proved more unfortunate than that of any of his predeceſſors. Confederacies every where took place againſt the Engliſh; the latter were every where defeated, their towns taken; and their power would certainly have been annihilated, had not the Iriſh, as uſual, turned their arms againſt each other.

37
Somewhat better under John.

In this deſperate ſituation matters continued during the whole reign of king Richard, and part of the reign of John, while the diſtreſſes of the country were increaſed by the diſſentions and diſaffection of the Engliſh lords, who aſpired at independency, and made war upon each other like Iriſh chieftains. The prudent conduct of a governor named *Meiler Fitz-Henry*, however, at laſt put an end to theſe terrible commotions; and about the year 1208, the kingdom was more quiet than it had been for a long time before. In 1210, John came over to Ireland in perſon with an army, with a deſign, as he ſaid, to reduce his refractory nobles to a ſenſe of their duty. More than 20 Iriſh chiefs waited upon him immediately to do him homage; while three of the Engliſh barons, Hugh and Walter de Lacy, and William de Braoſa, fled to France. The king, at the deſire of his Iriſh ſubjects, granted them, for their information, a regular code and charter of laws, to be depoſited in the exchequer of Dublin, under the king's ſeal. For the regular and effectual execution of theſe laws, beſides the eſtabliſhment of the king's courts of judicature in Dublin, there was now made a new and more ample diviſion of the king's lands of Ireland into counties, where ſheriffs, and many other officers, were appointed. Theſe counties were, Dublin, Meath, Kildare, Argial, now called *Lowth*, Katherlagh, Kilkenny, Wexford, Waterford, Cork, Kerry, Limeric, Tipperary; which marks the extent of the Engliſh dominions at this time as confined to a part of Leinſter and Munſter, and to thoſe parts of Meath and Argial which lie in the province of Ulſter, as now defined. Before his departure, the king gave liberty to John de Grey, biſhop of Norwich, whom he appointed governor, to coin money of the ſame weight with that of England; and which, by royal proclamation, was made current in England as well as Ireland.

38
Relapſes into its former ſtate under Henry III.

This eccleſiaſtical governor is ſaid to have managed affairs ſo happily, that, during the violent conteſts between John and his barons, Ireland enjoyed an unuſual degree of tranquillity. We are not to imagine, however, that this unhappy country was at this or indeed any other period, till the end of Queen Eliſabeth's reign, perfectly free from diſorders, only they were confined to thoſe diſtricts moſt remote from the Engliſh government. In 1219, the commotions were renewed, through the immeaſurable ambition and contentions of the Engliſh barons, who deſpiſed all controul, and oppreſſed the inhabitants in a terrible manner. The diſorders in England during the reign of Henry III. encouraged them to deſpiſe the royal authority; they were ever the ſecret enemies, and ſometimes the avowed adverſaries, of each other; and in many places where they had obtained ſettlements, the natives were firſt driven into inſurrections by their cruelty, and then puniſhed with double cruelty for their reſiſtance. The Engliſh laws, which tended to puniſh the authors of theſe outrages, were ſcorned by an imperious ariſtocratic faction, who, in the phrenzy of rapine and ambition, trampled on the moſt ſalutary inſtitutions. In 1228, a remonſtrance was preſented to the king againſt this dangerous neglect and ſuſpenſion of the laws; which he anſwered by a mandate to the chief governor, directing that the whole body of nobility, knights, free tenants, and bailiffs of the ſeveral counties, ſhould be convened; that the charter of Engliſh laws and cuſtoms received from king John, and to which they were bound by oath, ſhould be read over in their preſence; that they ſhould be directed for the future ſtrictly to obſerve and adhere to theſe; and that proclamation ſhould be made in every county of Ireland, ſtrictly enjoining obedience, on pain of forfeiture of lands and tenements. How little effect was produced by this order, we may learn from another, dated in 1246; where the barons are commanded, for the peace and tranquillity of the land, to *permit* it to be governed by the laws of England.

39 Exceſſive depravation of manners.

Nothing indeed can be conceived more terrible than the ſtate of Ireland during the reign of Henry III. People of all ranks appear to have been ſunk in the loweſt degree of depravity. The powerful Engliſh lords not only ſubverted the peace and ſecurity of the people, by refuſing to admit the ſalutary laws of their own country, but behaved with the utmoſt injuſtice and violence to the natives who did not enjoy the benefits of the Engliſh conſtitution. The clergy appear to have been equally abandoned with the reſt: nor indeed could it be otherwiſe; for, through the partialities of Henry himſelf, the neglected, the worthleſs, and the depreſſed among the Engliſh clergy, found refuge in the church of Ireland. What were the manners of theſe clergy, will appear from the following petition of a widow to king Edward I.

"Margaret le Blunde, of Caſhel, petitions our lord the king's grace, that ſhe may have her inheritance which ſhe recovered at Chonmell before the king's judges, &c. againſt David Macmackerwayt biſhop of Caſhel.

"*Item*, the ſaid Margaret petitions redreſs on account that her father was killed by the ſaid biſhop.

"*Item*, for the impriſonment of her grandfather and mother, whom he ſhut up and detained in priſon until they periſhed by famine, becauſe they attempted to ſeek redreſs for the death of their ſon, father of your petitioner, who had been killed by the ſaid biſhop.

"*Item*, for the death of her ſix brothers and ſiſters, who were ſtarved to death by the ſaid biſhop, becauſe he had their inheritance in his hands at the time he killed their father.

"And it is to be noted, that the ſaid biſhop had built an abbey in the city of Caſhel, on the king's lands granted for this purpoſe, which he hath filled with robbers, who murder the Engliſh, and depopulate the country; and that when the council of our lord the king attempts to take cognizance of the offence, he fulminates the ſentence of excommunication againſt them.

"It is to be noted alſo, that the ſaid Margaret has five times croſſed the Iriſh ſea. Wherefore, ſhe petitions for God's ſake, that the king's grace will have compaſſion, and that ſhe may be admitted to take poſſeſſion of her inheritance.

"It is further to be noted, that the aforeſaid biſhop hath been guilty of the death of many other Engliſhmen beſides that of her father; and that the aforeſaid Margaret hath many times obtained writs of our lord the king, but to no effect, by reaſon of the influence and bribery of the ſaid biſhop.

"She further petitions, for God's ſake, that ſhe may have coſts and damages, &c."

40
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tion un-
r Ed-
ard I.

Matters continued in the ſame deplorable ſtate during the reign of Edward I. with this additional grievance, that the kingdom was infeſted by invaſions of the Scots. The Engliſh monarch indeed poſſeſſed all that prudence and valour which were neceſſary to have reduced the iſland to a ſtate of tranquillity; but his project of conquering Scotland left him but little leiſure to attend to the diſtracted ſtate of Ireland. Certain it is, however, that the grievous diſtreſs of that country gave him great uneaſineſs; ſo that he tranſmitted his mandate to the prelates of Ireland, requiring them to interpoſe their ſpiritual authority for compoſing the public diſorders. About the ſame time, the Iriſh who lay contiguous to the Engliſh, and who dwelt among them, preſented a petition to the king, offering to pay him 8000 merks, upon condition that they were admitted to the privileges of Engliſh ſubjects. To this petition he returned a favourable anſwer; but his good intentions were defeated by the licentious nobility, who knew that theſe laws would have circumſcribed their rapacious views, and controuled their violence and oppreſſion. Petitions of the ſame kind were ſeveral times repeated during this reign, but as often defeated; though ſome means were uſed for the peace of the kingdom, ſuch as the frequent calling of parliaments, appointing ſheriffs in ſome new counties, &c.

41 Invaſion of the Scots in the reign of Edward II.

Theſe means were not altogether without effect. They ſerved to give ſome check to the diſorders of the realm, though by no means to terminate or ſubdue them. The incurſions of the natives were repreſſed, and the Engliſh lords began to live on better terms with each other; and, in 1311, under Edward II. the moſt powerful of them were reconciled by the marriage of Maurice and Thomas Fitz-John, afterwards the heads of the illuſtrious houſes of Deſmond and Kildare, to two daughters of the earl of Ulſter. But juſt at this happy period, when the nation ſeemed to have ſome proſpect of tranquillity, more dreadful calamities than any hitherto related were about to take place. The Scots had juſt recovered their liberty under Robert Bruce, and were now in no danger of being again enſlaved by a foreign power. Edward, the king's brother, as a recompence for his ſervices, demanded a ſhare of the royal authority. This was refuſed by Robert, and Edward was for the preſent ſatisfied by being declared heir apparent to the crown. But the king, wiſely conſidering the neceſſity of finding out ſome employment for a youth of ſuch an aſpiring and ambitious diſpoſition, pointed out to his brother the iſland of Ireland, the conqueſt of which would be eaſy, on account of the diſtracted ſtate in which it almoſt always was, and which would make him an independent ſovereign. This propoſal was eagerly embraced by Edward, and every thing neceſſary for the expedition immediately got ready. On the 25th of May 1315, he landed on the north-eaſtern coaſt of Ireland with 6000 men, to aſſert his claim to the ſovereignty of this kingdom. The Iriſh lords of Ulſter, who had invited and encouraged him to this enterprize, were now prepared to receive their new monarch, flocked with eagerneſs to his ſtandard, and prepared to wreak their vengeance on the common enemy. Their progreſs was marked by deſolation and carnage. The Engliſh ſettlers were ſlaughtered, or driven from their poſſeſſions, their caſtles levelled with the ground, and their towns ſet on fire. The Engliſh lords were neither prepared to reſiſt the invaſion, nor ſufficiently united among themſelves. The conſequence was, that the enemy for ſome time met with no interruption. An intolerable ſcarcity of proviſions, however, prevented Bruce from purſuing his advantages; and tho' his brother landed in Ireland with a powerful army, the famine prevented him from being of any eſſential ſervice. The forces which he left behind him, however, proved of conſiderable advantage; and by means of this reinforcement, he was enabled to take the city of Carrickfergus.

41
They are totally defeated.

The terrible devaſtations committed by Bruce and his aſſociates, now induced ſome Engliſh lords to enter into an aſſociation to defend their poſſeſſions, and repel theſe invaders. For this purpoſe, they raiſed a conſiderable body of forces; which coming to an engagement with Fedlim prince of Connaught, one of Bruce's principal allies, entirely defeated and killed him with 8000 of his men. This defeat, however, had very little effect on the operations of Bruce himſelf. He ravaged the country to the walls of Dublin, traverſed the diſtrict of Oſſory, and penetrated into Munſter, deſtroying every thing with fire and ſword. The Engliſh continued to augment their army, till at laſt it amounted to 30,000 men; and then Bruce, no longer able to oppoſe ſuch a force, found it neceſſary to retire into the province of Ulſter. His retreat was effected with great difficulty; and during the time of his inactivity, the diſtreſſes of his army increaſed to ſuch a degree, that they are ſaid to have fed upon the bodies of their dead companions. At laſt an end was put to the ſufferings and the life of this adventurer in the battle of Dundalk, in 1318, where he was defeated and killed by the Engliſh under Sir Robert Birmingham. A brave Engliſh knight, named *Maupas*, had ruſhed forward to encounter Bruce himſelf, and both antagoniſts had killed each other; the body of Maupas being found, after the battle, ſtretched upon that of Bruce. The king of Scotland had been advancing with powerful ſuccours to his brother: but Edward, confident of victory, refuſed to wait his arrival; and Robert, on hearing of his brother's death, inſtantly retired.

43
Miſeries of the Iriſh under Edward III.

The defeat of the Scottiſh invaders did not put an end to the diſturbances of this unhappy country. The contentions of the Engliſh with one another, of the Iriſh with the Engliſh, and among themſelves, ſtill kept the iſland in a ſtate of the utmoſt barbarity and confuſion. An attempt was made indeed, in the reign of Edward II. to eſtabliſh an univerſity in Dublin; but for want of proper encouragement the inſtitution for ſome time languiſhed, and then expired amidſt the confuſion and anarchy of the country. The reign of Edward III. proved not much more favourable than preceding times had been. He was too much taken up with the idea of conquering France, to pay much regard to the intereſts of Ireland. The unhappy people, indeed, ſenſible of their own miſeries, petitioned the king to admit all his ſubjects in Ireland to a participation of the Engliſh laws; but the petition being delivered as uſual to the chief governor, and laid before the parliament, it was either clandeſtinely defeated or openly rejected. A new ſcene of tumult and bloodſhed immediately enſued; which at laſt produced an order from the king, prohibiting all Iriſhmen, or Engliſhmen married and having eſtates in Ireland, from bearing any public office whatever.—This, inſtead of having a tendency to promote peace, made the diſorders much greater than before; and at laſt produced a remonſtrance from the ſtates met at Kilkenny, in which they grievouſly complain not only of the diſorders of the kingdom, but alſo of the conduct of the king himſelf in the edict abovementioned: and to this remonſtrance the king thought proper to give a gracious and condeſcending anſwer, in order to procure from Ireland the ſuccours he wanted in his expedition againſt France.

44
Statute of Kilkenny.

It is not be ſuppoſed, that mere promiſes, unaſſiſted by any vigorous exertion, could make the leaſt alteration in the ſtate of a kingdom involved in ſo much miſery. The diſorders, however, at laſt became inſupportable to the inhabitants themſelves; and a parliament was ſummoned in 1367, the reſult of which was the famous ſtatute of Kilkenny. The preamble to this act recites, that the Engliſh had become mere Iriſh in their language, names, apparel, and manner of living; had rejected the Engliſh laws, and ſubmitted to thoſe of the Iriſh, with whom they had united by marriage-alliance, to the ruin of the common-wealth.—It was therefore enacted, that marriage, nurture of infants, &c. with the Iriſh, ſhould be conſidered and puniſhed as high treaſon.—Again, if any man of Engliſh race ſhall uſe an Iriſh name, the Iriſh language, or the Iriſh apparel, or any mode or cuſtom of the Iriſh, the act provides, that he ſhall forfeit lands and tenements, until he hath given ſecurity in the court of chancery to conform in every particular to the Engliſh manners; or if he have no lands, that he ſhall be impriſoned till the like ſecurity be given. The Brehon law was pronounced to be a pernicious cuſtom and innovation lately introduced among the Engliſh ſubjects; and it was therefore ordained, that in all their controverſies they ſhould be governed by the common law of England; and that whoever ſhould ſubmit to the Iriſh juriſdiction, ſhould be adjudged guilty of high treaſon. As the Engliſh had been accuſtomed to make war or peace with the bordering Iriſh at pleaſure, they were now expreſsly prohibited from levying war without ſpecial warrant from the ſtate.—It was alſo made highly penal for the Engliſh to permit their Iriſh neighbours to graze their lands, to preſent them to eccleſiaſtical benefices, or to receive them into monaſteries or religious houſes; to entertain their bards, who perverted their imaginations by romantic tales; or their news-tellers, who ſeduced them by falſe reports.—It was made felony to impoſe or ceſs any forces upon the Engliſh ſubject againſt his will. And as the royal liberties and franchiſes were become ſanctuaries for malefactors, expreſs power was given to the king's ſheriffs to enter into all franchiſes, and there to apprehend felons and traitors.—Laſtly, becauſe the great lords, when they levied forces for the public ſervice, acted with partiality, and laid unequal burthens upon the ſubjects, it was ordained that four wardens of the peace in every county ſhould adjudge what men and armour every lord or tenant ſhould provide.—The ſtatute was promulged with particular ſolemnity; and the ſpiritual lords, the better to enforce obedience, denounced an excommunication on thoſe who ſhould preſume to violate it in any inſtance.

This ſtatute, it is evident, could not tend to promote the peace of the kingdom. This could only have been done by removing the animoſity between the native Iriſh and Engliſh; but ſo far was the ſtatute of Kilkenny from having any tendency of this kind, that it manifeſtly tended to increaſe the hatred between them. During the whole of this reign, therefore, the ſtate of the Iriſh government continued to be greatly diſordered and embroiled. The Engliſh intereſt gradually declined; and the connections of the king's ſubjects with the original inhabitants, occaſioned by their vicinity and neceſſary intercourſe, in deſpite of all legal injunctions, obliged the king to relax the ſeverity of the ſtatutes of Kilkenny, in caſes where they proved impracticable, or oppreſſive in the execution. The perpetual hoſtility, however, in which the different parties lived, proved an effectual bar to the introduction of thoſe arts which contribute to the comfort and refinement of mankind. Even foreign merchants could not venture into ſuch a dangerous country without particular letters of protection from the throne. The perpetual ſucceſſion of new adventurers from England, led by intereſt or neceſſity, ſerved only to inflame diſſention, inſtead of introducing any eſſential improvement. Lawyers ſent from England were notoriouſly inſufficient, if not corrupt; and, as ſuch, had frequently been the objects of complaint. The clergy were a mean grovelling race, totally influenced by the crown. Even prelates were commonly made the inferior agents of government in collecting forces, and raiſing war againſt the Iriſh enemy; but were not to be enticed into this ſervice, except by remittances from the exchequer. Attendance in parliament they dreaded as the greateſt hardſhip; and either recurred to mean excuſes to avert the penalty of abſence, or ſued to the king to be exempted by patent from contributing or aſſenting to thoſe laws by which they were to be governed.

45
Power of
he Engliſh
evives un-
er Henry
II.

In this deplorable ſituation the kingdom continued till the time of Henry VII. who laid the foundation of the future civilization of the Iriſh, as he alſo did of the Engliſh nation. This he effected by enacting ſome ſalutary laws, and appointing faithful and active governors to ſee them put in execution. Of theſe governors Sir Edward Poynings contributed more than any other to the tranquillity of the ſtate. During his adminiſtration was enacted the law known by the name of *Poyning's Law*, and which hath ſince been the ſubject of much political debate. The purport of it was, That no parliament ſhould be held in that iſland without firſt giving notice to the king of England, and acquainting him with the acts to be paſſed in that parliament; neither ſhould any act paſſed, or any parliament held, without the approbation of the king and council, be deemed valid. Thus was the power of the turbulent barons greatly broken; and the governor, not having it in his power to aſſemble parliaments when he pleaſed, became a perſon of much leſs conſequence. The whole Iriſh legiſlation alſo became dependent on that of England, and hath ever ſince continued to be ſo.

46
oyning's
w.

From this time we may date the revival of the Engliſh power in Ireland; which from the Scottiſh war in the time of Edward II. had gradually declined into a miſerable and precarious ſtate of weakneſs. The authority of the crown, which had at laſt been defied, inſulted, and rejected, even in the Engliſh territory, was reſtored and confirmed, and the rebellions vigorouſly oppoſed and ſuppreſſed. The ſeignory of the Britiſh crown over the whole body of the Iriſh, which in former reigns ſeemed to have been totally forgotten, was now formally claimed and aſſerted, and ſome of the moſt ferocious chieftains by their marriage-connections became the avowed friends of the Engliſh power. An ignominious tribute, called the *Black Rent*, was indeed ſtill paid to ſome chieftains; but their hoſtilities were oppoſed and chaſtiſed, and even in their own diſtricts they were made to feel the ſuperiority of Engliſh government.

47
All the
diſorders
ended in
the reign
of queen
Elizabeth.

During the reign of Henry VIII. the Iriſh affairs were neglected; and the diſorders, which had only been checked, and never thoroughly eradicated, returned as uſual. They were further promoted by the innovations in religion which the king introduced, and which were exceedingly diſagreeable both to Engliſh and Iriſh. The Reformation, however, continued to make ſome progreſs, though ſlowly, during the reign of Edw. VI. and even in the reign of queen Mary; for as the perſecution did not reach thither, many Proteſtants fled to Ireland in order to avoid the queen's cruelty. The machinations of the Spaniards againſt queen Elizabeth excited the Iriſh to freſh inſurrections. The king of Spain, indeed, not only encouraged the natives in thoſe inſurrections, but actually ſent over troops to aſſiſt them in driving out the Engliſh altogether. This they had well nigh effected; but the Spaniards, upon ſeeing an army of Iriſh defeated by an handful of their enemies, were ſo much provoked, that they ſurrendered all the places they had made themſelves maſters of, and even offered to aſſiſt the Engliſh in reducing the rebels; though it was not thought proper to accept of their aſſiſtance. The conſequence of this was, that the Iriſh, abandoned by theſe allies, were unable to carry on the war; and the grand rebel O'Neal of Tirowen, or Tirone, after much treachery, evaſion, and many pretended ſubmiſſions, was at laſt obliged to ſubmit in good earneſt. He fell upon his knees before the deputy, and petitioned for mercy with an air and aſpect of diſtreſs. He ſubſcribed his ſubmiſſion in the moſt ample manner and form. He implored the queen's gracious commiſeration; and humbly ſued to be reſtored to his dignity, and the ſtate of a ſubject, which he had juſtly forfeited. He utterly renounced the name of *O'Neal*, which he had aſſumed on account of the great veneration in which it was held among the Iriſh. He abjured all foreign power, and all dependency except on the crown of England; reſigned all claim to any lands excepting ſuch as ſhould be conferred upon him by letters patent; promiſing at the ſame time to aſſiſt the ſtate in aboliſhing all barbarous cuſtoms, and eſtabliſhing law and civility among his people. The lord deputy, on the part of the queen, promiſed a full pardon to him and all his followers; to himſelf the reſtoration of his blood and honours, with a new patent for his lands, except ſome portions reſerved for certain chieftains received into favour, and ſome for the uſe of Engliſh garriſons.

No inſurgent now remained in this kingdom who had not obtained or ſued for mercy. Many, indeed, were driven by neceſſity to the continent, and earned a ſubſiſtence by ſerving in the armies of Spain; and thus a race of Iriſh exiles was trained to arms, filled with a ma-

malignant reſentment againſt the Engliſh. Thus the honour of reducing all the enemies of the crown of England in this iſland, after a continued conteſt for 440 years, was reſerved for the arms of Elizabeth. The ghaſtlineſs of famine and deſolation was now ſomewhat enlivened by the reſtoration of tranquillity. Indeed, from the moſt authentic accounts, the prices of proviſions were ſo high, that, conſidering the value of money at that time, it is ſurpriſing how the inhabitants could ſubſiſt. From an account of the rates of proviſions taken by the mayor of Dublin in 1602, it appears, That wheat had riſen from 36 s. to 9 l. the quarter; barley-malt from 10s. to 43s. the barrel; oat-malt from 5s. to 22s. the barrel; peaſe from 5s. to 40s. the peck; oats from 3s. 4d. to 20s. the barrel; beef from 26s. 8d. to 8 l. the carcaſe; mutton from 3s. to 26s. the carcaſe; veal from 10s. to 29s. the carcaſe; a lamb from 12 d. to 6s.; a pork from 8s. to 20s.

47
Exorbitant prices of proviſions at that time.

48
The Iriſh civilized by James I.

Under James I. Ireland began to aſſume a quite different appearance. That monarch valued himſelf upon promoting the arts of peace, and made it his ſtudy to civilize his barbarous Iriſh ſubjects. By repeated conſpiracies and rebellions, a vaſt tract of land had eſcheated to the crown in ſix northern counties, Tyrconnel, now called *Donnegal,* Tirone, Derry, Farmanagh, Cavan, and Armagh, amounting to about 500,000 acres; a tract of country covered with woods, where rebels and banditti found a ſecure refuge, and which was deſtined to lie waſte without the timely interpoſition of government. James reſolved to diſpoſe of theſe lands in ſuch a manner as might introduce all the happy conſequences of peace and cultivation. He cauſed ſurveys to be taken of the ſeveral counties where the new ſettlements were to be eſtabliſhed; deſcribed particularly the ſtate of each; pointed out the ſituations proper for the erections of towns and caſtles; delineated the characters of the Iriſh chieftains, the manner in which they ſhould be treated, the temper and circumſtances of the old inhabitants, the rights of the new purchaſers, and the claims of both; together with the impediments to former plantations, and the methods of removing them.

At his inſtances it was reſolved, that the perſons to whom lands were aſſigned ſhould be either new undertakers from Great Britain, eſpecially from Scotland, or *ſervitors,* as they were called; that is, men who had for ſome time ſerved in Ireland, either in civil or military offices; or old Iriſh chieftains or captains. Among the laſt were included even thoſe Iriſh who had engaged in the rebellion of Tirone, and ſtill harboured their ſecret diſcontents. To gain them, if poſſible, by favour and lenity, they were treated with particular indulgence. Their under-tenants and ſervants were allowed to be of their own country and religion; and, while all the other planters were obliged to take the oath of allegiance, they were tacitly excepted. The ſervitors were allowed to take their tenants either from Ireland or Britain, provided no Popiſh recuſants were admitted. The Britiſh undertakers were confined to their own countrymen.

In the plantations which had been formerly attempted, the Iriſh and Engliſh had been mixed together, from a fond imagination that the one would have learned civility and induſtry from the other. But experience had now diſcovered, that this intercourſe ſerved only to make the Iriſh envy the ſuperior comforts of their Engliſh neighbours, and to take the advantage of a free acceſs to their houſes to ſteal their goods and plot againſt their lives. It was therefore deemed neceſſary to plant them in ſeparate quarters; and in the choice of theſe ſituations, the errors of former times were carefully corrected. The original Engliſh adventurers, on their firſt ſettlement in Ireland, were captivated by the fair appearance of the plain and open diſtricts. Here they erected their caſtles and habitations; and forced the old natives into the woods and mountains, their natural fortreſſes. There they kept themſelves unknown, living by the milk of their kine, without huſbandry or tillage; there they increaſed to incredible numbers by promiſcuous generation; and there they held their aſſemblies, and formed their conſpiracies without diſcovery. But now the northern Iriſh were placed in the moſt open and acceſſible parts of the country, where they might lie under the cloſe inſpection of their neighbours, and be gradually habituated to agriculture and the mechanic arts. To the Britiſh adventurers were aſſigned places of the greateſt ſtrength and command; to the ſervitors, ſtations of the greateſt danger, and greateſt advantage to the crown: but as this appeared a peculiar hardſhip, they were allowed guards and entertainment, until the country ſhould be quietly and completely planted.

The experience of ages had ſhewn the inconvenience of enormous grants to particular lords, attended with ſuch privileges as obſtructed the adminiſtration of civil government: and, even in the late reign, favourite undertakers had been gratified with ſuch portions of land as they were by no means able to plant. But, by the preſent ſcheme, the lands to be planted were divided in three different proportions; the greateſt to conſiſt of 2000 Engliſh acres, the leaſt of 1000, and the middle of 1500. One half of the eſcheated lands in each county was aſſigned to the ſmalleſt, the other moiety divided between the other proportions: and the general diſtributions being thus aſcertained, to prevent all diſputes between the undertakers, their ſettlements in the reſpective diſtricts were to be determined by lot. Eſtates were aſſigned to all, to be held of them and their heirs. The undertakers of 2000 acres were to hold of the king *in capite;* thoſe of 1500 by knights ſervice; thoſe of 1000 in common ſoccage. The firſt were to build a caſtle, and incloſe a ſtrong court-yard, or *bawn,* as it was called, within four years; the ſecond, to finiſh an houſe and bawn within two years; and the third, to incloſe a bawn; for even this rude ſpecies of fortification was accounted no inconſiderable defence againſt an Iriſh enemy. The firſt were to plant upon their lands, within three years, 48 able men of Engliſh or Scottiſh birth, to be reduced to 20 families; to keep a demeſne of 600 acres in their own hands; to have four fee-farmers on 120 acres each; ſix leaſe-holders, each on 100 acres; and on the reſt, eight families of huſbandmen, artificers, and cottagers. The others were under the like obligations proportionably. All were, for five years after the date of their patents, to reſide upon their lands either in perſon, or by ſuch agents as ſhould be approved by the ſtate, and to keep a ſufficient quantity of arms for their defence. The Britiſh and ſervitors were not to alienate their lands to mere Iriſh, or to demiſe any portions of them to ſuch perſons as ſhould refuſe to take the oaths to government; they were to let them at determined rents, and for no ſhorter term than 21 years or three lives. The houſes of their tenants were to be built after the Engliſh faſhion, and united together in towns or villages. They had power to erect manours, to hold courts-baron, and to create tenures. The old natives, whoſe tenures were granted in fee-ſimple, to be held in ſoccage, were allowed the like privileges. They were enjoined to ſet their lands at certain rents, and for the like terms as the other undertakers; to take no Iriſh exactions from their inferior tenants, and to oblige them to forſake their old Scythian cuſtom of wandering with their cattle from place to place for paſture, or *creaghting*, as they called it; to dwell in towns, and conform to the Engliſh manner of tillage and huſbandry. An annual rent from all the lands was reſerved to the crown for every 60 Engliſh acres, ſix ſhillings and eight pence from the undertakers, ten ſhillings from ſervitors, and 13 ſhillings and four pence from Iriſh natives. But for two years they were exempt from ſuch payments, except the natives, who were not ſubject to the charge of tranſportation. What gave particular credit to this undertaking, was the capital part which the city of London was perſuaded to take in it. The corporation accepted of large grants in the county of Derry; they engaged to expend L. 20,000 on the plantation, to build the cities of Derry and Colerain, and ſtipulated for ſuch privileges as might make their ſettlements convenient and reſpectable. As a competent force was neceſſary to protect this infant plantation, the king, to ſupport the charge, inſtituted the order of baronets, an hereditary dignity, to be conferred on a number not exceeding 200; each of whom, on paſſing his patent, was to pay into the exchequer ſuch a ſum as would maintain 30 men in Ulſter, for three years, at 8 *d.* daily pay.

But ſcarcely had the lands been allotted to the different patentees, when conſiderable portions were reclaimed by the clergy as their rightful property. And ſo far had the eſtates of the northern biſhoprics been embarraſſed, both by the uſurpations of the Iriſh lords, and the claims of patentees, that they ſcarcely afforded a competent, much leſs an honourable proviſion for men of worth and learning, while the ſtate of the parochial clergy was ſtill more deplorable. Moſt of the northern churches had been either deſtroyed in the late wars, or fallen to ruin: the benefices were ſmall, and either ſhamefully kept by the biſhops in the way of commendam or ſequeſtration; or filled with miniſters as ſcandalous as their income. The wretched flock was totally abandoned; and for many years Divine Service had not been uſed in any pariſh-church of Ulſter, except in cities and great towns. To remedy theſe abuſes, and to make ſome proper proviſion for the inſtruction of a people immerſed in lamentable ignorance, the king ordained, that all eccleſiaſtical lands ſhould be reſtored to their reſpective ſees and churches, and that all lands ſhould be deemed eccleſiaſtical from which biſhops had in former times received rents or penſions: that compoſitions ſhould be made with the patentees for the ſite of cathedral churches, the reſidences of biſhops and dignitaries, and other church-lands which were not intended to be conveyed to them; who were to receive equivalents if they compounded freely; or elſe to be deprived of their patents as the king was deceived in his grant, and the poſſeſſions reſtored to the church. To provide for the inferior clergy, the biſhops were obliged to reſign all their impropriations, and relinquiſh the tythes paid them out of pariſhes, to the reſpective incumbents; for which ample recompence was made out of the king's lands. Every proportion allotted to undertakers was made a pariſh, with a parochial church to each. The incumbents, beſides their tythes and duties, had glebe-lands aſſigned to them of 60, 90, or 120 acres, according to the extent of their pariſhes. To provide for a ſucceſſion of worthy paſtors, free-ſchools were endowed in the principal towns, and conſiderable grants of lands conferred on the univerſity of Dublin, which had been re-eſtabliſhed by queen Elizabeth, together with the advowſon of ſix parochial churches, three of the largeſt, and three of the middle proportion in each county.

Such was the general ſcheme of this famous northern plantation, ſo honourable to the king, and of ſuch conſequence to the realm of Ireland. Its happy effects were immediately perceived, although the execution by no means correſponded with the original idea. Buildings were ſlowly erected; Britiſh tenants were difficult to be procured in ſufficient numbers; the old natives were at hand, offered higher rents, and were received into thoſe diſtricts from which it was intended to exclude them. In this particular, the Londoners were accuſed of being notoriouſly delinquent. They acted entirely by agents; their agents were intereſted and indolent, and therefore readily countenanced this dangerous intruſion of the natives; an error of which ſufficient cauſe was afterwards found to repent. For the preſent, however, a number of loyal and induſtrious inhabitants was poured into the northern counties, conſiderable improvements made by the planters, and many towns erected. To encourage their induſtry, and advance his own project, the king was pleaſed to incorporate ſeveral of theſe towns, ſo that they had a right of repreſentation in the Iriſh parliament.

49
State of Ireland ſince that time.

The only diſturbance that now enſued was from the Popiſh party, who never could bear to ſee the Proteſtant religion eſtabliſhed in preference to their own, while they had power to reſiſt. After numberleſs ineffectual machinations and complaints, their fury broke out in a terrible maſſacre of the new Engliſh ſettlers in the year 1641 *. The affairs of Britain were at that time in ſuch confuſion, that the rebellion could not be quelled in leſs than ten years; during which time the country was reduced to a moſt deplorable ſituation. It recovered again under Cromwell, Charles II. and the ſhort reign of James II. On the acceſſion of William III. matters were once more thrown into confuſion by an attempt made in favour of the exiled monarch, who came over thither in perſon, and whoſe bad ſucceſs is related under the article BRITAIN, n° 309.—325. Since that time, Ireland hath recovered from the miſerable ſituation to which it was ſo long reduced. As yet, however, it is far from being in ſuch a flouriſhing ſtate as either South or North Britain. The great obſtacle to the improvement of the kingdom is the extreme poverty and oppreſſion of the common people. The produce of the kingdom, either in corn or cattle, is not above two thirds at moſt of what by good cultivation it might yield. The high roads throughout the ſouthern and weſtern parts are lined with beggars, who live in huts or cabbins without chimnies, or any covering capable of defending the wretched inhabitants from the cold, wind, and rain. "It is a ſcandal (ſays a judicious traveller, who lately viſited Ireland,) to the proprietors of this fertile country, that there is not the greateſt plenty of good corn and hay in it; but ſome of the beſt land in the king's dominions is ſuffered to be torn in pieces, and cultivated in the vileſt manner, by a ſet of abject miſerable occupiers; who are abſolutely no better than ſlaves to the deſpicable, lazy, and oppreſſive ſubordinate landlords."

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* See *Britain*, n° 103,—106.

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Ireland enjoys a peculiar bleſſing in not producing or nouriſhing any venomous creature. Mr O'Halloran ſays, that even frogs were never known to live there before the reign of William III. Indeed, it is not improbable but the breed of them might have come from France in the ſuite of James II.

The climate of Ireland would almoſt perfectly agree with that of England, were the ſoil equally improved, being abundantly fruitful both in corn and graſs, eſpecially the latter; in conſequence of which, an infinite number of black cattle and ſheep are bred, particularly in the province of Connaught. Few countries produce finer grain than that which grows in the improved parts of this kingdom. The northern and eaſtern counties are beſt cultivated and incloſed, and the moſt populous.

Ireland is known to have many rich mines; and there is no inconſiderable proſpect of gold and ſilver in ſome parts of the kingdom. No country in the world abounds more in beautiful lakes, both freſh and ſalt-water ones; and it is alſo plentifully watered with many beautiful rivers. The commodities which Ireland exports, as far as her preſent trade will permit, are hides, tallow, beef, butter, cheeſe, honey, wax, hemp, metals, and fiſh: wool and glaſs were, till December 23, 1779, prohibited; but her linen trade is of late grown of very great conſequence. England, in the whole, is thought to gain yearly by Ireland upwards of 1,400,000l. and in many other reſpects ſhe muſt be of very great advantage to that kingdom. Formerly, indeed, ſhe was rather a burden to her elder ſiſter, than any benefit; but the times are changed now, and improve every day.

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Linen manufacture early introduced.

Mr O'Halloran ſays, the linen manufacture was carried on in Ireland in very early days, to a great extent; and Gratianus Lucius quotes a deſcription of the kingdom, printed at Leyden in 1627, in which the author tells us, "That this country abounds with flax, which is ſent ready ſpun in large quantities to foreign nations. Formerly, (ſays he), they wove great quantities of linen, which was moſtly conſumed at home, the natives requiring above 30 yards of linen in a ſhirt or ſhift." So truly expenſive was the Iriſh faſhion of making up ſhirts, on account of the number of plaits and folds, that, in the reign of Henry VIII. a ſtatute paſſed, by which they were forbidden, under a ſevere penalty, to put more than ſeven yards of linen in a ſhirt or ſhift.

We may form ſome idea of what the trade of Ireland muſt have been in former times, when, ſo late as the reign of Brien Boru, who died in 1014, notwithſtanding the ravages and diſtreſſes which a Daniſh war, of above 200 years continuance, muſt have produced throughout the kingdom, the annual duties ariſing from goods imported into the ſingle port of Limerick, and paid in red wine, amounted to 365 pipes! Even ſo lately as the laſt century, it is ſcarcely credible what riches this city derived from the bare manufacture of ſhoes, which were exported in amazing quantities; whereas now, inſtead of ſhoes and boots, we ſee the raw hides ſhipped off for foreign markets.

No country in the world ſeems better ſituated for a maritime power than Ireland, where the ports are convenient to every nation in Europe, and the havens ſafe and commodious. The great plenty of timber, the ſuperior excellence of the oak, and the acknowledged ſkill of her ancient artizans, in wood-works, are circumſtances clearly in her favour. That the Iriſh formerly exported large quantities of timber, is manifeſt from the churches of Glouceſter, Weſtminſter-monaſtery and palace, &c. being covered with Iriſh oak.

52
Government, p
pulation, &c.

The government of the kingdom is in the hands of a viceroy, or lord-lieutenant, who lives in very great ſpendor. In his abſence there are lords-juſtices, (ſtyled their *excellencies*) generally three in number, viz. lord primate, lord high chancellor, and the ſpeaker of the houſe of commons. The parliament of Ireland meet every other Winter, or oftener, according to exigencies. Their only power conſiſts in propoſing bills, which are ſubject to the privy-council of England, and in a negative voice to any amendments. As to civil magiſtrates and the diſtribution of juſtice, they are here on the ſame footing as in England.

Ireland is divided into four large provinces, and thoſe again into 32 counties, as follows:

I. ULSTER.

Counties.	*Houſes.*	*Extent*, &c.
1. Antrim	20738	Length 68 } miles { 460 circumfer.
2. Armagh	13125	Breadth 98 }
3. Cavan	9268	Iriſh plantations.
4. Down	26090	Acres 2836837 4496205
5. Donnegal	12357	Pariſhes, 365 [Engliſh
6. Fermanagh	5674	Boroughs, 29
7. Londonderry	14528	Baronies, 55
8. Monaghan	26637	Archbiſhopric, 1
9. Tyrone	16545	Biſhoprics, 6
		Market-towns, 58

II. LEINSTER.

Counties.	*Houſes.*	*Extent*, &c.
1. Caterlogh, or Carlow	5444	Leng. 104 } miles } 360 circumf. Bread. 55 }
2. Dublin	24145	I. acr. 2642958, or 4281155
3. Kildare	8887	Pariſhes, 858 [Engliſh
4. Kilkenny	3231	Boroughs, 53
5. King's-county	9294	Baronies, 99
6. Longford	6057	Market-towns, 63
7. Lowth	8150	Archbiſhopric, 1
8. Meath (Eaſt)	14000	Biſhoprics, 3
9. Queen's-county	11226	The rivers are, the Boyne, Barrow, Liffy, Noir, and the May.
10. Weſtmeath	9621	
11. Wexford	13015	
12. Wicklow	7781	

III. MUNSTER.

Counties.	*Houſes.*	*Extent, &c.*
1. Clare	11381	Leng. 100 } miles { 600circumfer.
2. Cork	47334	Bread. 107
3. Kerry	11653	Acres 3289932, 5329146,
4. Limerick	19380	Pariſhes, 740 [Engliſh
5. Tipperary	18325	Boroughs, 26
6. Waterford	9485	Baronies, 63
		Houſes, 117197
		Archbiſhopric, 1
		Biſhops, 6

IV. CONNAUGHT.

1. Galway	15576	Length 90 } miles { 500circumfer.
		Breadth 80
2. Leitrim	5156	Acres 2272915, 3681746,
		Pariſhes, 330 [Engliſh
3. Mayo	15089	Boroughs, 10
		Baronies, 43
4. Roſcommon	8780	Archbiſhopric, 1
		Biſhop, 1
5. Sligo	5970	Houſes, 49966
		Rivers are the Shannon, May, Suck, and Gyll.

In 1731, while the duke of Dorſet was lord-lieutenant, the inhabitants were numbered, and it was found that the four provinces contained as follows:

	Proteſtants	Papiſts
Connaught	21604	221780
Leinſter	203087	447916
Munſter	115130	482044
Ulſter	360632	158020
	700453	1309768

There are 44 charter working-ſchools at preſent in Ireland, wherein 2025 boys and girls are maintained and educated. Theſe ſchools are maintained by an annual bounty of 1000l. by a tax upon hawkers and pedlars, and by ſubſcriptions and legacies. The children admitted, are thoſe born of Popiſh parents, or ſuch as would be bred Papiſts if neglected, and are of ſound limbs. Their age muſt be from ſix to ten; the boys at 16, and the girls at 14, are apprenticed into Proteſtant families. The firſt ſchool was opened in 1734. Five pounds are given to every perſon educated in theſe ſchools, upon his or her marrying a Proteſtant. An Engliſh act of parliament, lately tolerated the Catholic religion in Ireland, and by that means has relieved thouſands of uſeful ſubjects.

The return of houſes in Ireland for the year 1754, was 395,439; and for the year 1766, it was 424,046. Suppoſing therefore the numbers to have increaſed at the ſame rate, the number of houſes now cannot be leſs than 454,130; which, allowing five perſons to a family, will make the number of inhabitants 2,260,650: but as the return of houſes by hearth-collectors is rather under than above the truth, and as there are many families in every pariſh, who are by law excuſed from that tax, and therefore not returned, the number on a moderate eſtimate will be 2,500,000. Sir W. Petty reckoned 160,000 cabins without a chimney; and if there be an equal number of ſuch houſes now, the number of people will be above 3,000,000. Mr Molyneux ſays, "Ireland has certainly been better inhabited formerly; for on the wild mountains between Ardmach and Dundalk, are obſervable the marks of the plough, as they are alſo on the mountains of Altmore. The ſame has been obſerved in the counties of Londonderry and Donnegal. Mountains that are now covered with bogs have been formerly ploughed; for when you dig five or ſix feet deep, you diſcover a proper ſoil for vegetation, and find it ploughed into ridges and furrows: a plough was found in a very dead bog near Donnegal; and an hedge, with ſome wattles, ſtanding under a bog that was five or ſix feet in depth. The ſtump of a large tree was found in a bog ten feet deep at Caſtle-Forbes; the trunk had been burnt, and ſome of the cinders and aſhes ſtill were lying on the ſtump. Mr Molyneaux further ſays, that on the top of an high mountain, in the north, there were then remaining the ſtreets and other marks of a large town.

53 Appearance and character of the inhabitants.

Beauty ſeems to be more diffuſed in England, among the lower ranks of life, than in Ireland; which may, however, be attributed to the mere modes of living. In England, the meaneſt cottager is better fed, better lodged, and better dreſſed, than the moſt opulent farmers here, who, unaccuſtomed to what our peaſants reckon the comforts of life, know no luxury but in deep potations of aquavitæ.

From this circumſtance, we may account for a fact reported by the officers of the army here. They ſay, that the young fellows of Ireland, who offer to enliſt, are more generally below the given height, than in England. There can be no appeal from their teſtimony; for they were Iriſh, and the ſtandard is an infallible teſt. No reaſon, indeed, can be given why the cauſes which promote or prevent the growth of other animals, ſhould not have ſimilar effects upon the human ſpecies. In England, where there is no ſtint of proviſions, the growth is not checked; but, on the contrary, it is extended to the utmoſt bound of nature's original intention: whereas, in Ireland, where food is neither in the ſame quantity nor of the ſame quality, the body cannot expand itſelf, but is dwarfed and ſtunted in its dimenſions. The gentlemen of Ireland are full as tall as thoſe of England; the difference then, between them and the commonalty, can only proceed from the difference of food.

The inhabitants, in general, of this kingdom, are very far from what they have too often and unjuſtly been repreſented by thoſe of our country who never ſaw them, a nation of wild Iriſh. Miſerable and oppreſſed, as by far too many of them are, an Engliſhman will find as much civility in general, as amongſt the ſame claſs in his own country; and, for a ſmall pecuniary conſideration, they will exert themſelves to pleaſe you as much as any people, perhaps, in the king's dominions. Poverty and oppreſſion will naturally make mankind ſour, rude, and unſociable, and eradicate, or at leaſt ſuppreſs, all the more amiable principles and paſſions of humanity. But it ſhould ſeem unfair and ungenerous to judge of, or decide againſt, the natural diſpoſition of a man reduced by indigence and oppreſſion almoſt to deſperation. Let commerce, agriculture, and arts, but call forth the dormant activity of their genius, and rouze the native ſpirit of enterprize, which now lies torpid within them; let liberal laws unfetter their minds, and plenty cheer their tables, they will ſoon ſhew themſelves deſerving to rank the kingdom is the extreme poverty and oppreſſion of the common people. The produce of the kingdom, either in corn or cattle, is not above two thirds at moſt of what by good cultivation it might yield. The high roads throughout the ſouthern and weſtern parts are lined with beggars, who live in huts or cabbins without chimnies, or any covering capable of defending the wretched inhabitants from the cold, wind, and rain. "It is a ſcandal (ſays a judicious traveller, who lately viſited Ireland,) to the proprietors of this fertile country, that there is not the greateſt plenty of good corn and hay in it; but ſome of the beſt land in the king's dominions is ſuffered to be torn in pieces, and cultivated in the vileſt manner, by a ſet of abject miſerable occupiers; who are abſolutely no better than ſlaves to the deſpicable, lazy, and oppreſſive ſubordinate landlords."

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Linen manufacture early introduced.

Mr O'Halloran ſays, the linen manufacture was carried on in Ireland in very early days, to a great extent; and Gratianus Lucius quotes a deſcription of the kingdom, printed at Leyden in 1627, in which the author tells us, "That this country abounds with flax, which is ſent ready ſpun in large quantities to foreign nations. Formerly, (ſays he), they wove great quantities of linen, which was moſtly conſumed at home, the natives requiring above 30 yards of linen in a ſhirt or ſhift." So truly expenſive was the Iriſh faſhion of making up ſhirts, on account of the number of plaits and folds, that, in the reign of Henry VIII. a ſtatute paſſed, by which they were forbidden, under a ſevere penalty, to put more than ſeven yards of linen in a ſhirt or ſhift.

We may form ſome idea of what the trade of Ireland muſt have been in former times, when, ſo late as the reign of Brien Boru, who died in 1014, notwithſtanding the ravages and diſtreſſes which a Daniſh war, of above 200 years continuance, muſt have produced throughout the kingdom, the annual duties ariſing from goods imported into the ſingle port of Limerick, and paid in red wine, amounted to 365 pipes! Even ſo lately as the laſt century, it is ſcarcely credible what riches this city derived from the bare manufacture of ſhoes, which were exported in amazing quantities; whereas now, inſtead of ſhoes and boots, we ſee the raw hides ſhipped off for foreign markets.

No country in the world ſeems better ſituated for a maritime power than Ireland, where the ports are convenient to every nation in Europe, and the havens ſafe and commodious. The great plenty of timber, the ſuperior excellence of the oak, and the acknowledged ſkill of her ancient artizans, in wood-works, are circumſtances clearly in her favour. That the Iriſh formerly exported large quantities of timber, is manifeſt from the churches of Glouceſter, Weſtminſter-monaſtery and palace, &c. being covered with Iriſh oak.

52
Government, population, &c.

The government of the kingdom is in the hands of a viceroy, or lord-lieutenant, who lives in very great ſpendor. In his abſence there are lords-juſtices, (ſtyled their *excellencies*) generally three in number, viz. lord primate, lord high chancellor, and the ſpeaker of the houſe of commons. The parliament of Ireland meet every other Winter, or oftener, according to exigencies. Their only power conſiſts in propoſing bills, which are ſubject to the privy-council of England, and in a negative voice to any amendments. As to civil magiſtrates and the diſtribution of juſtice, they are here on the ſame footing as in England.

Ireland is divided into four large provinces, and thoſe again into 32 counties, as follows:

I. ULSTER.

Counties.	*Houſes.*	*Extent*, &c.	
1. Antrim	20738	Length 68	miles 460 circumfer.
2. Armagh	13125	Breadth 98	
3. Cavan	9268	Iriſh plantations.	
4. Down	26090	Acres 2836837	4496205
5. Donnegal	12357	Pariſhes, 365	[Engliſh
6. Fermanagh	5674	Boroughs, 29	
7. Londonderry	14528	Baronies, 55	
8. Monaghan	26637	Archbiſhopric, 1	
9. Tyrone	16545	Biſhoprics, 6	
		Market-towns, 58	

II. LEINSTER.

Counties.	*Houſes.*	*Extent*, &c.	
1. Caterlogh, or Carlow	5444	Leng. 104 Bread. 55	miles 360 circumf.
2. Dublin	24145	I. acr. 2642958, or	4281155
3. Kildare	8887	Pariſhes, 858	[Engliſh
4. Kilkenny	3231	Boroughs, 53	
5. King's-county	9294	Baronies, 99	
6. Longford	6057	Market-towns, 63	
7. Lowth	8150	Archbiſhopric, 1	
8. Meath (Eaſt)	14000	Biſhoprics, 3	
9. Queen's-county	11226	The rivers are, the Boyne, Barrow, Liffy, Noir, and the May.	
10. Weſtmeath	9621		
11. Wexford	13015		
12. Wicklow	7781		

III. MUN-

III. MUNSTER.

Counties.	Houſes.	Extent, &c.
1. Clare	11381	Leng. 100 } miles { 600cir-
2. Cork	47334	Bread. 107 } cumfer.
3. Kerry	11653	Acres 3289932, 5329146,
4. Limerick	19380	Pariſhes, 740 [Engliſh
5. Tipperary	18325	Boroughs, 26
6. Waterford	9485	Baronies, 63
		Houſes, 117197
		Archbiſhopric, 1
		Biſhops, 6

IV. CONNAUGHT.

1. Galway	15576	Length 90 } miles { 500cir-
		Breadth 80 } cumfer.
2. Leitrim	5156	Acres 2272915, 3681746,
		Pariſhes, 330 [Engliſh
3. Mayo	15089	Boroughs, 10
		Baronies, 43
4. Roſcommon	8780	Archbiſhopric, 1
		Biſhop, 1
5. Sligo	5970	Houſes, 49966
		Rivers are the Shannon, May, Suck, and Gyll.

In 1731, while the duke of Dorſet was lord-lieutenant, the inhabitants were numbered, and it was found that the four provinces contained as follows:

	Proteſtants	Papiſts
Connaught	21604	221780
Leinſter	203087	447916
Munſter	115130	482044
Ulſter	360632	158020
	700453	1309768

There are 44 charter working-ſchools at preſent in Ireland, wherein 2025 boys and girls are maintained and educated. Theſe ſchools are maintained by an annual bounty of 1000l. by a tax upon hawkers and pedlars, and by ſubſcriptions and legacies. The children admitted, are thoſe born of Popiſh parents, or ſuch as would be bred Papiſts if neglected, and are of ſound limbs. Their age muſt be from ſix to ten; the boys at 16, and the girls at 14, are apprenticed into Proteſtant families. The firſt ſchool was opened in 1734. Five pounds are given to every perſon educated in theſe ſchools, upon his or her marrying a Proteſtant. An Engliſh act of parliament, lately tolerated the Catholic religion in Ireland, and by that means has relieved thouſands of uſeful ſubjects.

The return of houſes in Ireland for the year 1754, was 395,439; and for the year 1766, it was 424,046. Suppoſing therefore the numbers to have increaſed at the ſame rate, the number of houſes now cannot be leſs than 454,130; which, allowing five perſons to a family, will make the number of inhabitants 2,260,650: but as the return of houſes by hearth-collectors is rather under than above the truth, and as there are many families in every pariſh, who are by law excuſed from that tax, and therefore not returned, the number on a moderate eſtimate will be 2,500,000. Sir W. Petty reckoned 160,000 cabins without a chimney; and if there be an equal number of ſuch houſes now, the number of people will be above 3,000,000. Mr Molyneux ſays, "Ireland has certainly been better inhabited formerly; for on the wild mountains between Ardmach and Dundalk, are obſervable the marks of the plough, as they are alſo on the mountains of Altmore. The ſame has been obſerved in the counties of Londonderry and Donnegal. Mountains that are now covered with bogs have been formerly ploughed; for when you dig five or ſix feet deep, you diſcover a proper ſoil for vegetation, and find it ploughed into ridges and furrows: a plough was found in a very dead bog near Donnegal; and an hedge, with ſome wattles, ſtanding under a bog that was five or ſix feet in depth. The ſtump of a large tree was found in a bog ten feet deep at Caſtle-Forbes; the trunk had been burnt, and ſome of the cinders and aſhes ſtill were lying on the ſtump. Mr Molyneaux further ſays, that on the top of an high mountain, in the north, there were then remaining the ſtreets and other marks of a large town.

53
Appearance and character of the inhabitants.

Beauty ſeems to be more diffuſed in England, among the lower ranks of life, than in Ireland; which may, however, be attributed to the mere modes of living. In England, the meaneſt cottager is better fed, better lodged, and better dreſſed, than the moſt opulent farmers here, who, unaccuſtomed to what our peaſants reckon the comforts of life, know no luxury but in deep potations of aquavitæ.

From this circumſtance, we may account for a fact reported by the officers of the army here. They ſay, that the young fellows of Ireland, who offer to enliſt, are more generally below the given height, than in England. There can be no appeal from their teſtimony; for they were Iriſh, and the ſtandard is an infallible teſt. No reaſon, indeed, can be given why the cauſes which promote or prevent the growth of other animals, ſhould not have ſimilar effects upon the human ſpecies. In England, where there is no ſtint of proviſions, the growth is not checked; but, on the contrary, it is extended to the utmoſt bound of nature's original intention: whereas, in Ireland, where food is neither in the ſame quantity nor of the ſame quality, the body cannot expand itſelf, but is dwarfed and ſtunted in its dimenſions. The gentlemen of Ireland are full as tall as thoſe of England; the difference then, between them and the commonalty, can only proceed from the difference of food.

The inhabitants, in general, of this kingdom, are very far from what they have too often and unjuſtly been repreſented by thoſe of our country who never ſaw them, a nation of wild Iriſh. Miſerable and oppreſſed, as by far too many of them are, an Engliſhman will find as much civility in general, as amongſt the ſame claſs in his own country; and, for a ſmall pecuniary conſideration, they will exert themſelves to pleaſe you as much as any people, perhaps, in the king's dominions. Poverty and oppreſſion will naturally make mankind ſour, rude, and unſociable, and eradicate, or at leaſt ſuppreſs, all the more amiable principles and paſſions of humanity. But it ſhould ſeem unfair and ungenerous to judge of, or decide againſt, the natural diſpoſition of a man reduced by indigence and oppreſſion almoſt to deſperation. Let commerce, agriculture, and arts, but call forth the dormant activity of their genius, and rouze the native ſpirit of enterprize, which now lies torpid within them; let liberal laws unfetter their minds, and plenty cheer their tables, they will ſoon ſhew themſelves deſerving to rank with the moſt reſpectable ſocieties in Europe.

54 Account of the bogs in Ireland.

The bogs wherewith Ireland is in ſome places overgrown, are not injurious to health, as is commonly imagined; the watery exhalations from theſe are neither ſo abundant, nor ſo noxious, as thoſe from marſhes, which become prejudicial from the various animal and vegetable ſubſtances which are left to putrify as ſoon as the waters are exhaled by the ſun. Bogs are not, as one might ſuppoſe from their blackneſs, maſſes of putrefaction; but on the contrary, they are of ſuch a texture, as to reſiſt putrefaction above any other ſubſtance we know of. A ſhoe, all of one piece of leather, very neatly ſtitched, was taken out of a bog ſome years ago, yet entirely freſh;—from the very faſhion of which, there is ſcarce room to doubt, that it had lain there ſome centuries. Butter, called *rouſkin*, hath been found in hollowed trunks of trees, where it had been hid ſo long, that it was become hard and almoſt friable, yet not devoid of unctuoſity; that the length of time it had been buried was very great, we learn from the depth of the bog, which was ten feet, that had grown over it. But the common phenomenon of timber-trees dug out of theſe bogs, not only ſound, but alſo ſo embalmed as afterwards to defy the injuries of time, demonſtrate the antiſeptic quality of them.

The horns of the mooſe-deer muſt have lain many centuries in a bog; for the Iriſh hiſtories do not recognize the exiſtence of the animal whereon they grew. Indeed, human bodies have, in many places, been dug up entire, which muſt have lain there for ages.

The growth of bogs, however, is variable in different places, from the variety of conditions in the ſituation, ſoil, humidity, and quantity of vegetable food; in ſome places it is very rapid, in others very ſlow; and therefore their altitudes cannot afford any certain meaſure of time.

In the manufacturing counties of the north, peat-fuel has become ſo ſcarce, that turburies lett from five to eight guineas an acre. In ſome places they are ſo eradicated, there does not remain a trace of them, the ground being now converted into rich meadows and ſweet paſtures.

55 Trade of Ireland on the increaſe.

If we truſt to authorities, we muſt conclude that Ireland was not originally inferior to England, either in the fertility of the ſoil, or ſalubrity of the climate. When this country ſhall have felt the happy effects of the late indulgences of the Britiſh parliament, by repealing ſeveral acts which reſtrained the trade of this kingdom with foreign ports, and allowing the exportation of woollen manufactures and glaſs, and ſhall have received further indulgences from the ſame authority; and when the ſpirit of induſtry ſhall be infuſed, in conſequence of it, into the common people; their country will not be inferior to any other on the globe, under the ſame parallel. It is very difficult to ſay, whether foreign or domeſtic cauſes have operated moſt powerfully in laying waſte this fruitful country; which, by being relieved from their late unnatural prohibitions, will be enabled to furniſh a grand proportion of ſupplies to Great Britain, and will unavoidably become of vaſt importance by its reciprocal trade, in reſtraining the increaſe of that of France, who cannot carry on this important branch of traffic without the aſſiſtance of Iriſh wool. The wool of France is ſhort and coarſe, being, in the language of the manufacturers, neither fine in the thread nor long in the ſtaple. This obliges them to have recourſe to the wool of Ireland, which poſſeſſes both theſe qualities. Aſſiſted by a pack of Iriſh wool, the French are enabled to manufacture two of their own; which they will no longer be able to procure, as the Iriſh will now work up their own wool, which they uſed to export; great part of which found its way to France, and enabled them to ſupply other markets to the great prejudice of Britain. The happy effects of it have been already felt; for, notwithſtanding it was ſo late as December 23. 1779, that the royal aſſent was given to the taking off their reſtraints on woollen exports, it appears, that on January 10, following, an export-entry was made at the cuſtom-houſe of Dublin, of 1300 yards of ſerge for a foreign market, by William Worthington, Eſq.

IRENÆUS (St), biſhop of Lyons, was born in Greece about the year 120. He was the diſciple of Pappias and St Polycarp, by whom, it is ſaid, he was ſent into Gaul in 157. He ſtopped at Lyons, where he performed the office of a prieſt; and in 178 was ſent to Rome, where he diſputed with Valentinus, and his two diſciples Florinus and Blaſtus. At his return to Lyons, he ſucceeded Photinus, biſhop of that city; and ſuffered martyrdom in 202, under the reign of Severus. He wrote many works in Greek, of which there only remains a barbarous Latin verſion of his five books againſt heretics, ſome Greek fragments in different authors, and pope Victor's letter mentioned by Euſebius. The beſt editions of his works are thoſe of Eraſmus, in 1526; of Grabe, in 1702; and of Father Maſſuet, in 1710. St Irenæus's ſtyle is cloſe, clear, and ſtrong, but plain and ſimple. Dodwell has compoſed ſix curious diſſertations on the works of St Irenæus.

He ought not to be confounded with St Irenæus the deacon, who in 275 ſuffered martyrdom in Tuſcany, under the reign of Aurelian; nor with St Iræneus, biſhop of Sirmich, who ſuffered martyrdom on the 25th of March 304, during the perſecution of Diocleſian and Maximianus.

IRENE, empreſs of the eaſt, celebrated for her valour, wit, and beauty; but deteſtable for her cruelty, having ſacrificed her own ſon to the ambition of reigning alone. She died in 803.

IRIS, the RAINBOW. See RAINBOW.

IRIS, in anatomy. See there, n° 406, m.

IRIS, the *Flower de Luce*, or Flag-flower, &c. in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants.

There are 21 ſpecies, all herbaceous flowering perennials, both of the fibrous, tuberous, and bulbous rooted kind, producing thick annual ſtalks from 3 or 4 inches to a yard high, terminated by large hexapetalous flowers, having three of the petals reflexed quite back and three erect; moſt of which are very ornamental, appearing in May, June, and July.

Culture. All the ſpecies are eaſily propagated by offſets from the roots, which ſhould be planted in September, October, or November, though almoſt any time from September to March will do. They may alſo be raiſed from ſeed, which is the beſt method for procuring varieties. It is to be ſown in autumn, ſoon after it ripens, in a bed or border of common earth, and raked in. The plants will riſe in the ſpring, and are to be tranſplanted next autumn.

Properties. The roots of the Florentine white iris, when dry, are ſuppoſed to have a pectoral virtue. They have an agreeable ſmell, reſembling that of violets; and hence are uſed in perfumes, and in flavouring of liquors. When recent, they have a bitter, acrid, nauſeous taſte; and when taken into the body, prove ſtrongly cathartic; on which account they have been recommended in dropſies, in the doſe of three or four ſcruples.—The juice of the ſpecies called *baſtard acorus*, or *yellow flag-flower*, is alſo very acrid, and hath been found to produce plentiful evacuations from the bowels when other means had failed. For this purpoſe, it may be given in doſes of 80 drops every hour or two; but the degree of its acrimony is ſo uncertain, that it can hardly ever come into general uſe. The freſh roots have been mixed with the food of ſwine bitten by a mad-dog, and they eſcaped the diſeaſe, when others, bitten by the ſame dog, died raving mad. Goats eat the leaves when freſh; but cows, horſes, and ſwine, refuſe them. Cows will eat them when dry. The roots are uſed in the iſland of Jura for dying black.

IRON, a metal of a white, livid, greyiſh colour; extremely hard; and, next to platina, the moſt difficult to be fuſed. See METAL; METALLURGY; and CHEMISTRY, n° 145, 202, 242, 279, 382. See alſo COLOUR-*Making*, n° 13, 32; and DYEING, n° 17.

From ſome obſervations made by Mr King on a petrifaction found on the coaſt of Eaſt Lothian in Scotland, he hath concluded, that iron greatly promotes petrifaction *. He hath likewiſe obſerved, that ſolutions of iron may be of conſiderable efficacy in preventing the deſtruction of ſtones by the ſun and air. See the articles STONE, PETRIFACTION; alſo ROCK, MARBLE, MOUNTAIN, &c.

IRON-*Sick*, in the ſea-language, is ſaid of a ſhip or boat, when her bolts or nails are ſo eaten with ruſt, and ſo worn away, that they occaſion hollows in the planks, whereby the veſſel is rendered leaky.

IRON-*Wood*, in botany. See the article SIDEROXYLUM.

IRON-*Wort*, in botany. See the article SIDERITIS.

IRONY, in rhetoric, is when a perſon ſpeaks contrary to his thoughts, in order to add force to his diſcourſe; whence Quintilian calls it *diverſiloquium*.

Thus, when a notorious villain is ſcornfully complimented with the titles of a very honeſt and excellent perſon; the character of the perſon commended, the air of contempt that appears in the ſpeaker, and the exorbitancy of the commendations, ſufficiently diſcover the diſſimulation of irony.

Ironical exhortation is a very agreeable kind of trope; which, after having ſet the inconveniences of a thing in the cleareſt light, concludes with a feigned encouragement to purſue it. Such is that of Horace, when, having beautifully deſcribed the noiſe and tumults of Rome, he adds ironically,

"Go now, and ſtudy tuneful verſe at Rome!"

IROQUOIS, the name of five nations in North America, in alliance with the Britiſh colonies. They are bounded by Canada on the north, by the Britiſh plantations of New York and Penſilvania on the eaſt and ſouth, and by the lake Ontario on the weſt.

IRRADIATION, the act of emitting ſubtile effluvia, like the rays of the ſun, every way. See EFFLUVIA.

IRREGULAR, ſomething that deviates from the common forms or rules: thus, we ſay an irregular fortification, an irregular building, an irregular figure, &c. See the articles FORTIFICATION, &c.

IRREGULAR, in grammar, ſuch inflections of words as vary from the general rules; thus we ſay, irregular nouns, irregular verbs, &c.

The diſtinction of irregular nouns, according to Mr Ruddiman, is into three kinds, viz. variable, defective, and abundant; and that of irregular verbs into anomalous, defective, and abundant.

IRROMANGO, or ERRAMONGO, one of the new Hebrides iſlands, is about 24 or 25 leagues in circuit; the middle of it lies in E. Long. 169. 19. S. Lat. 18. 54. The inhabitants are of the middle ſize, and have a good ſhape and tolerable features. Their colour is very dark; and they paint their faces, ſome with black, and others with red pigment: their hair is curly and criſp, and ſomewhat woolly. Few women were ſeen; and thoſe very ugly: they wore a petticoat made of the leaves of ſome plant. The men were quite naked, excepting a belt tied about the waiſt, and a piece of cloth, or a leaf, uſed for a wrapper. No canoes were ſeen in any part of the iſland. They live in houſes covered with thatch; and their plantations are laid out by line, and fenced round. An unlucky ſcuffle between the Britiſh ſailors and theſe people, in which four of the latter were deſperately wounded, prevented captain Cook from being able to give any particular information concerning the produce, &c. of this iſland.

IRTIS, a large river of Aſia, in Siberia, which riſes among the hills of the country of the Kalmucks, and, running north-eaſt, falls into the Oby near Tobolſk. It abounds with fiſh, particularly ſturgeon, and delicate ſalmon.

IRVIN, a ſea-port town of Scotland, in the bailiewick of Cunningham; ſeated at the mouth of a river of the ſame name on the Frith of Clyde; in W. Long. 2. 55. N. Lat. 55. 36.

ISAAC, the Jewiſh patriarch, and example of filial obedience, died 1716, B. C. aged 180.

ISAIAH, the firſt of the four greater prophets, was the ſon of Amos; and was of royal blood, his father being brother to Azariah king of Juda. He propheſied under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, from the 785th to the 681ſt year before the Chriſtian æra; when king Manaſſeh cauſed him to be put to death in a very advanced age. His prophecies are in Hebrew; his ſtyle is noble, ſublime, and florid: he ſpeaks ſo clearly of Chriſt, and of the great circumſtances of his life and death, that he appears to be rather an evangeliſt and an hiſtorian who relates what has already happened, than a man who foretels what was not to be accompliſhed till ſeveral ages were paſſed.

ISÆUS, a Greek orator, born at Colchis, in Syria, was the diſciple of Lyſias, and the maſter of Demoſthenes; and taught eloquence at Athens, about 344 years B. C. Sixty-four orations are attributed to him; but he compoſed no more than 50, of which only 10 are now remaining. He took Lyſias for his model, and ſo well imitated his ſtyle and elegance, that we might eaſily confound the one with the other, were it not for the figures which Iſæus firſt introduced into frequent uſe. He was alſo the firſt who applied eloquence to politics, in which he was followed by his diſciple Demoſthenes.

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* Phil. Tran. LXIX. 35. et ſeq.

He ought not to be confounded with Iſæus, another celebrated orator, who lived at Rome in the time of Pliny the Younger, about the year 97.

ISATIS, WOAD; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants. There are four ſpecies; but the only one worthy of notice is the tinctoria, or common woad, which is cultivated in ſeveral parts of Britain for the purpoſes of dyeing; being uſed as a foundation for many of the dark colours. See COLOUR-*Making*, n° 37; and WOAD.

The plant is biennial; the lower leaves are of an oblong oval figure, and pretty thick conſiſtence, ending in obtuſe roundiſh points; they are entire on their edges, and of a lucid green. The ſtalks riſe four feet high, dividing into ſeveral branches, garniſhed with arrow-ſhaped leaves ſitting cloſe to the ſtalks; the branches are terminated by ſmall yellow flowers, in very cloſe cluſters, which are compoſed of four ſmall petals, placed in form of a croſs, which are ſucceeded by pods ſhaped like a bird's tongue, which, when ripe, turn black, and open with two valves, having one cell, in which is ſituated a ſingle ſeed.

This ſort is ſown upon freſh land which is in good heart, for which the cultivators of woad pay a large rent. They generally chooſe to have their lands ſituated near great towns, where there is plenty of dreſſing; but they never ſtay long on the ſame ſpot: for the beſt ground will not admit of being ſown with woad more than twice; and if it is oftener repeated, the crop ſeldom pays the charges of culture, &c. Thoſe who cultivate this commodity have gangs of people who have been bred to the employment; ſo that whole families travel about from place to place, wherever their principal fixes on land for the purpoſe. As the goodneſs of woad conſiſts in the ſize and fatneſs or thickneſs of the leaves, the only method to obtain this, is by ſowing the ſeed upon ground at a proper ſeaſon, and allowing the plants proper room to grow; as alſo to keep them clean from weeds, which, if permitted to grow, will rob the plants of their nouriſhment. After having made choice of a proper ſpot of land, which ſhould not be too light and ſandy, nor over ſtiff and moiſt, but rather a gentle hazel loam, whoſe parts will eaſily ſeparate, the next is to plough this up juſt before winter, laying it in narrow high ridges, that the froſt may penetrate through the ridges to mellow and ſoften the clods; then in the ſpring plough it again croſſwiſe, laying it again in narrow ridges. After it has lain for ſome time in this manner, and the weeds begin to grow, it ſhould be well harrowed to deſtroy them: this ſhould be repeated twice while the weeds are young; and, if there are any roots of large perennial weeds, they muſt be harrowed out, and carried off the ground. In June the ground ſhould be a third time ploughed, when the furrows ſhould be narrow, and the ground ſtirred as deep as the plough will go, that the parts may be as well ſeparated as poſſible; and when the weeds appear again, the ground ſhould be well harrowed to deſtroy them. Toward the end of July, or the beginning of Auguſt, it ſhould be ploughed the laſt time, when the land ſhould be laid ſmooth; and when there is a proſpect of ſhowers, the ground muſt be harrowed to receive the ſeeds, which ſhould be ſown in rows with the drill-plough, or in broad-caſt after the common method; but it will be proper to ſteep the ſeeds one night in water before they are ſown, which will prepare them for vegetation: if the ſeeds are ſown in drills, they will be covered with an inſtrument fixed to the plough for that purpoſe, but thoſe which are ſown broad-caſt in the common way muſt be well harrowed in. If the ſeeds are good, and the ſeaſon favourable, the plants will appear in a fortnight, and in a month or five weeks will be fit to hoe; for the ſooner this is performed when the plants are diſtinguiſhable, the better they will thrive, and the weeds being then young will be ſoon deſtroyed. The method of hoeing theſe plants is the ſame as for turneps: with this difference only, that theſe plants need not be thinned ſo much; for at the firſt hoeing, if they are ſeparated to the diſtance of four inches, and at the laſt to ſix inches, it will be ſpace enough for the growth of the plants; and if this is carefully performed, and in dry weather, moſt of the weeds will be deſtroyed: but as ſome of them may eſcape in this operation, and young weeds will riſe, ſo the ground ſhould be a ſecond time hoed in the beginning of October, always chooſing a dry time for this work; at this ſecond operation, the plants ſhould be ſingled out to the diſtance they are to remain. After this, if carefully performed, the ground will be clean from weeds till the ſpring, when young weeds will come up: therefore about the middle of March will be a good time to hoe the ground again; for while the weeds are young, it may be performed in leſs than half the time it would require if the weeds were permitted to grow large, and the ſun and wind will much ſooner kill them: this hoeing will alſo ſtir the ſurface of the ground, and greatly promote the growth of the plants; if this is performed in dry weather, the ground will be clean till the firſt crop of woad is gathered, after which it muſt be again well cleaned; if this is carefully repeated after the gathering each crop, the land will always lie clean, and the plants will thrive the better. The expence of the firſt hoeing will be about ſix ſhillings *per* acre, and for the after hoeings half that price will be ſufficient, provided they are performed when the weeds are young, for if they are ſuffered to grow large, it will require more labour, nor can it be ſo well performed.

If the land, in which this ſeed is ſown, ſhould have been in culture before for other crops, ſo not in good heart, it will require dreſſing before it is ſown, in which caſe rotten ſtable-dung is preferable to any other; but this ſhould not be laid on till the laſt ploughing, juſt before the ſeeds are ſown, and not ſpread till the land is ploughed, that the ſun may not exhale the goodneſs of it, which in ſummer is ſoon loſt when ſpread on the ground. The quantity ſhould not be leſs than 20 loads to each acre, which will keep the ground in heart till the crop of woad is ſpent.

The time for gathering of the crop is according to the ſeaſon: but it ſhould be performed as ſoon as the leaves are fully grown, while they are perfectly green; for when they begin to change pale, great part of their goodneſs is over, for the quantity will be leſs, and the quality greatly diminiſhed.

If the land is good, and the crop well huſbanded, it will produce three or four gatherings; but the two firſt are the beſt. Theſe are commonly mixed together in the manufacturing of it: but the after crops are always kept ſeparate; for if theſe are mixed with the other, the whole will be of little value. The two firſt crops will ſell from 25 to 30l. a ton; but the latter will not bring more than 7 or 8l. and ſometimes not ſo much. An acre of land will produce a ton of woad, and in good ſeaſons near a ton and an half.

When the planters intend to ſave the ſeeds, they cut three crops of the leaves, and then let the plants ſtand till the next year for ſeed; but if only one crop is cut, and that only of the outer leaves, letting all the middle leaves ſtand to nouriſh the ſtalks, the plants will grow ſtronger, and produce a much greater quantity of ſeeds.

Theſe ſeeds are often kept two years, but it is always beſt to ſow new ſeeds when they can be obtained. The ſeeds ripen in Auguſt; and when the pods turn to a dark colour, the ſeeds ſhould be gathered. It is beſt done by reaping the ſtalks in the ſame manner as wheat, ſpreading the ſtalks in rows upon the ground: and in four or five days the ſeeds will be fit to threſh out, provided the weather is dry; for if it lies long, the pods will open and let out the ſeeds.

There are ſome of the woad planters, who feed down the leaves in winter with ſheep; which is a very bad method: for all plants which are to remain for a future crop, ſhould never be eaten by cattle, for that greatly weakens the plants; therefore thoſe who eat down their wheat in winter with ſheep are equally blameable.

Iſatis, in zoology, a ſynonime of the *Lagopus*. See Canis.

ISAURA, (anc. geog.), a ſtrong city at mount Taurus, in Iſauria: twice demoliſhed: firſt by Perdiccas, or rather by the inhabitants, who, through deſpair, deſtroyed themſelves by fire, rather than fall into the hands of the enemy; again, by Servilius, who thence took the ſurname *Iſauricus*. Strabo ſays, there were two *Iſaurus*, the old and the new, but ſo near, that other writers took them but for one.

ISAURIA, (anc. geog.) a country touching Pamphylia and Cilicia on the north, rugged and mountainous, ſituate almoſt in mount Taurus, and taking its name from *Iſaura*.

ISCHIUM, in anatomy, one of the bones of the pelvis. See Anatomy, nº 40.

ISCHURY, a diſeaſe conſiſting of an entire ſuppreſſion of urine. See (the *Index* ſubjoined to) Medicine.

ISCLASTICS, a kind of games, or combats, celebrated in Greece and Aſia, in the time of the Roman emperors.

The victor at theſe games had very conſiderable privileges conferred on him, after the example of Auguſtus and the Athenians, who did the like to conquerors at the olympic, pythian, and iſthmian games. They were crowned on the ſpot immediately after their victory, had penſions allowed them, were furniſhed with proviſions at the public coſt, and were carried in triumph to their country.

ISCHIA, an Iſland of Italy, in the kingdom of Naples, about 15 miles in circumference, lying on the coaſt of the Terra di Lavoro, from which it is three miles diſtant. It is full of agreeable valleys, which produce excellent fruits. It hath alſo mountains on which grow vines of an excellent kind: likewiſe fountains, rivulets, and fine gardens.

Iſchia, a town of Italy, and capital of an iſland of the ſame name, with a biſhop's ſee, and a ſtrong fort. Both the city and fortreſs ſtand upon a rock, which is joined to the iſland by a ſtrong bridge; the rock is about ſeven furlongs in circumference. The city is like a pyramid of houſes piled upon one another, which makes a very ſingular and ſtriking appearance. At the end of the bridge next the city are iron gates, which open into a ſubterraneous paſſage, through which they enter the city. They are always guarded by ſoldiers who are natives of the iſland. E. Long. 13. 55. N. Lat. 40. 50.

ISENACH, a town of Germany, in the circle of Upper Saxony, from whence one of the Saxon princes takes the title of *duke*. There are iron mines in the neighbourhood. E. Long. 9. 17. N. Lat. 51. 0.

ISENBURG, a large town of Germany, capital of a county of the ſame name, with a handſome caſtle, ſeated on the river Seine, in E. Long. 7. 14. N. Lat. 50. 28. The county belongs to the elector of Treves.

ISENGHEIN, a town of the Auſtrian Netherlands, with the title of a *principality*, ſeated on the river Mandera, in E. Long. 3. 18. N. Lat. 50. 44.

ISH, in Scots law, ſignifies *expiry*. Thus we ſay "the *iſh* of a leaſe." It ſignifies alſo *to go out*; thus we ſay "free *iſh* and entry" from and to any place.

ISIA, feaſts and ſacrifices anciently ſolemnized in honour of the goddeſs Iſis.

The *iſia* were full of abominable impurities; and for that reaſon, thoſe who were initiated were obliged to take an oath of ſecrecy: they were held for nine days ſucceſſively; but were ſo abominable, that the ſenate aboliſhed them at Rome, under the conſulſhip of Piſo and Gabinius.

ISENARTS, or Eiſenarts, a conſiderable town of Germany in Auſtria, and in Styria; famous for its iron mines. E. Long. 15. 25. N. Lat. 46. 56.

ISERNIA, a town of Italy, in the kingdom of Naples, and in the county of Moliſe, with a biſhop's ſee. It is ſeated at the foot of the Appenines, in E. Long. 14. 20.

ISIDORUS, called Damiatenſis, or Peluſiota, from his living in a ſolitude near that city, was one of the moſt famous of all St Chryſoſtom's diſciples, and flouriſhed in the time of the general council held in 421. We have 2012 of his epiſtles in five books. They are ſhort, but well written in Greek. The beſt edition is that of Paris, in Greek and Latin, printed in 1638, in folio.

ISIGNI, a town of France, in Lower Normandy, with a ſmall harbour, and well known on account of its ſalt-works, its cyder, and its butter. W. Long. 0. 50. N. Lat. 49. 20.

ISIS, an Egyptian goddeſs, whoſe worſhip was ſo infamous, that the prieſts were forbid to ſpeak any thing of it; and the ſenate did often prohibit its practice in Rome. She is pictured with a *ſiſtrum* in her hand, a muſical inſtrument not much unlike a cymbal; and was often called *Terra*, from whence ſhe is repreſented as having many breaſts. Some hiſtorians ſay ſhe was queen of Egypt, and reigned there with her huſband Oſiris, A. M. 2500.

ISINGLASS. See ICHTHYOCOLLA.

ISLAND, a tract of dry land encompaſſed with water; in which ſenſe it ſtands contradiſtinguiſhed from CONTINENT, or TERRA FIRMA.

Several naturaliſts are of opinion, that the iſlands were formed at the deluge; others think, that there have been new iſlands formed by the caſting up of vaſt heaps of clay, mud, ſand, &c.; others think they have been ſeparated from the continent by violent ſtorms, inundations, and earthquakes. Theſe laſt have obſerved, that the Eaſt-Indies, which abound in iſlands more than any other part of the world, are likewiſe more annoyed with earthquakes, tempeſts, lightnings, volcanos, &c. than any other part. Others again conclude, that iſlands are as ancient as the world, and that there were ſome at the beginning; and, among other arguments, ſupport their opinion from Gen. x. 5. and other paſſages of Scripture.

Varenius thinks that there have been iſlands produced each of theſe ways. St Helena, Aſcenſion, and other ſteep rocky iſlands, he ſuppoſes to have become ſo by the ſea's overflowing their neighbouring champaigns: but by the heaping up huge quantities of ſand, and other terreſtrial matter, he thinks the iſlands of Zealand, Japan, &c. were formed. Sumatra and Ceylon, and moſt of the Eaſt-India iſlands, he thinks, were rent off from the main land; and concludes, that the iſlands of the Archipelago were formed in the ſame way, imagining it probable that Deucalion's flood might contribute towards it. The ancients had a notion that Delos, and a few other iſlands, roſe from the bottom of the ſea; which, how fabulous ſoever it may appear, agrees with later obſervations. Seneca takes notice, that the iſland Theraſia roſe thus out of the Ægean ſea in his time, of which the mariners were eye-witneſſes.

It is indeed very probable, that many iſlands have exiſted not only from the deluge, but from the creation of the world; and we have undoubted proofs of the formation of iſlands in all the different ways abovementioned. Another way, however, in which iſlands are frequently formed in the South Sea, is by the coralline inſects: (See CORALLINA.) On this ſubject the following curious diſſertation by Alexander Dalrymple, Eſq; hath appeared in the Philoſophical Tranſactions for the year 1767.

“ Theſe iſlands are generally long and narrow: they are formed by a narrow bar of land, incloſing the ſea within it; generally, perhaps always, with ſome ingreſs at leaſt to the tide; commonly with an opening capable of receiving a canoe, and frequently ſufficient to admit even larger veſſels.

“ The origin of theſe iſlands will explain their nature. What led me firſt to this deduction was an obſervation of Abdul Roobin, a Sooloo pilot, that all the iſlands lying off the north-eaſt coaſt of Borneo had ſhoals to the eaſtward of them.

“ Theſe iſlands being covered to the weſtward by Borneo, the winds from that quarter do not attack them with violence. But the north-eaſt winds, tumbling in the billows from a wide ocean, heap up the coral with which thoſe ſeas are filled. This, obvious after ſtorms, is perhaps at all other times imperceptibly effected.

“ The coral banks, raiſed in the ſame manner, become dry. Theſe banks are found of all depths, at all diſtances from ſhore, entirely unconnected with the land, and detached from each other: although it often happens that they are divided by a narrow gut without bottom.

“ Coral banks alſo grow, by a quick progreſſion, towards the ſurface; but the winds, heaping up the coral from deeper water, chiefly accelerate the formation of theſe into ſhoals and iſlands. They become gradually ſhallower; and, when once the ſea meets with reſiſtance, the coral is quickly thrown up by the force of the waves breaking againſt the bank; and hence it is, that, in the open ſea, there is ſcarce an inſtance of a coral bank having ſo little water that a large ſhip cannot paſs over, but it is alſo ſo ſhallow that a boat would ground on it.

“ I have ſeen theſe coral banks in all the ſtages; ſome in deep water, others with few rocks appearing above the ſurface; ſome juſt formed into iſlands, without the leaſt appearance of vegetation; and others from ſuch as have a few weeds on the higheſt part, to thoſe which are covered with large timber, with a bottomleſs ſea at a piſtol-ſhot diſtance.

“ The looſe coral, rolled inward by the billows in large pieces, will ground; and the reflux being unable to carry them away, they become a bar to coagulate the ſand, always found intermixed with coral; which ſand, being eaſieſt raiſed, will be lodged at top. When the ſand-bank is raiſed by violent ſtorms beyond the reach of common waves, it becomes a reſting-place to vagrant birds, whom the ſearch of prey draws thither. The dung, feathers, &c. increaſe the ſoil, and prepare it for the reception of accidental roots, branches, and ſeed, caſt up by the waves, or brought thither by birds. Thus iſlands are formed: the leaves and rotten branches intermixing with the ſand, form in time a light black mould, of which in general theſe iſlands conſiſt; more ſandy as leſs woody; and, when full of large trees, with a greater proportion of mould.

“ Cocoa nuts, continuing long in the ſea without loſing their vegetative powers, are commonly to be found in ſuch iſlands; particularly as they are adapted to all ſoils, whether ſandy, rich, or rocky.

“ The violence of the waves within the tropics, muſt generally be directed to two points, according to the monſoons.

“ Hence the iſlands formed from coral banks muſt be long and narrow, and lie nearly in a meridional direction. For even ſuppoſing the banks to be round, as they ſeldom are when large, the ſea, meeting moſt reſiſtance in the middle, muſt heave up the matter in greater quantities there than towards the extremities: and, by the ſame rule, the ends will generally be open, or at leaſt loweſt. They will alſo commonly have ſoundings there, as the remains of the bank, not accumulated, will be under water.

“ Where the coral banks are not expoſed to the common monſoon, they will alter their direction;

and be either round, extend in the parallel, or be of irregular forms, according to accidental circumſtances.

"The interior parts of theſe iſlands being ſea, ſometimes form harbours capable of receiving veſſels of ſome burthen, and, I believe, always abound greatly with fiſh; and, ſuch as I have ſeen, with turtle-graſs and other ſea-plants, particularly one ſpecies, called by the Sooloos *gammye*, which grows in little globules, and is ſomewhat pungent, as well as acid, to the taſte.

"It need not be repeated, that the ends of thoſe iſlands only are the places to expect ſoundings; and they commonly have a ſhallow ſpit running out from each point.

"Abdul Roobin's obſervation points out another circumſtance, which may be uſeful to navigators; by conſideration of the winds to which any iſlands are moſt expoſed, to form a probable conjecture which ſide has deepeſt water; and from a view which ſide has the ſhoals, an idea may be formed which winds rage with moſt violence."

Iſlands from their ſituation enjoy many great advantages, the principal of which are theſe. In the firſt place, many benefits are derived to the inhabitants of an iſland from its unity. The very largeſt country on a continent is ſtill but a part, which implies dependance, and is neceſſarily attended with a train of imperfections; from all of which, by the unerring and unalterable laws of nature, the people who live in an iſland are or may be entirely free. All countries on the continent are expoſed to continual dangers, againſt which their inhabitants muſt be perpetually upon their guard. This renders a large military force requiſite. It involves them in continual negotiations, leagues, and alliances; all of which, however, cannot exempt them from frequent wars, or the miſeries that attend them, and which have commonly bad effects on their internal policy. In the next place, the climate is generally mild and ſalubrious from the vapours of the ſurrounding ſea, which according to the latitude abates the violence of heat, and moderates the rigour of cold, both which are ſenſibly and conſtantly leſs than on continents under the ſame elevation of the pole. We have a remarkable inſtance of this, in the iſlands called anciently *Stœchades*, in the modern Latin *Inſulæ Arearum*, by us the iſlands of *Hieres*. They are three in number, lying in 43° north latitude, before the port of Toulon. In them, the fruits of France and Italy arrive at the higheſt perfection, and all the medical herbs of Italy, Greece, and Egypt, grow wild. Yet the climate is wonderfully temperate and pleaſant in all ſeaſons *.—There is alſo commonly a greater variety, and always a greater fertility, in the ſoil, occaſioned chiefly by the warmth of the circumambient air, frequent ſhowers, and, in conſequence of both, being continually impregnated with vegetable ſalts. Another conſiderable advantage ariſes from its acceſſibility on every ſide, by which it is open to receive ſupplies from other countries, and has the conveniency of exporting its commodities and manufactures to all markets, and, in compariſon of the continent, at all ſeaſons. The oppoſite ſides of an iſland may in regard to commerce be conſidered as two countries; each has its ports, its proper commodities, its proper correſpondencies; in conſequence of which, it promotes the cultivation, and procures vent for the manufactures, of a large diſtrict behind it; while the intermediate midland ſpace finds a profit in that inland trade, which theſe two diſtricts ſupply. The winds contrary on one ſide are favourable on the other; and the ſea, the common road to both coaſts, is continually ploughed by veſſels outward and homeward bound, which keeps up that active and enterprizing ſpirit which characterizes iſlanders. An iſland has at once the moſt extenſive and the moſt effectual frontier, and this on all ſides, ſubſiſting for ever, without repairs, and without expence: and, which is ſtill more, derives from this very frontier a great part of the ſubſiſtence of its inhabitants, and a valuable article in its commerce, from its fiſheries. It is commonly ſaid the ſea is a mine, but in truth it is better; its treaſures are more laſting and more certain, procured by labour ſolely, and fit for uſe or for ſale as ſoon as procured, quickly conſumed, and thereby the ſource of continual employment to a ſtout, hardy, laborious race of men, who likewiſe find employment for numbers, and are in various reſpects otherwiſe beneficial members of the community. The defence of this natural barrier, which, as we have ſaid, coſts nothing; but on the contrary yields much, is not only permanent, but in every reſpect more to be relied on than any that could be raiſed by the ſkill and induſtry of men at the greateſt expence. All theſe bleſſings and benefits are inſured by the leſſon that Nature dictates, ſome would ſay the law which ſhe preſcribes, to the inhabitants of every iſland, to place all their hopes in the aſſiduous cultivation of their own country, to bend all their endeavours to raiſing and extending their commerce, and to put their truſt in Providence, and in the ſafeguard which ſhe directs; men accuſtomed to robuſt and hardy exerciſes, and in what neceſſarily ariſes from their way of life, a naval force. The firſt inhabitants come in veſſels, are for a time dependent on the country from whence they came, arrive at independence by enlarging their correſpendence: and thus commerce is natural and eſſential to the people of an iſland; which is the reaſon that they thrive ſo long as they poſſeſs it, and gradually decline in the ſame proportion in which that decays.

* See
rica,
6.—23

Island *of Ice*. See Ice-*Iſland*.

Floating-Islands. Hiſtories are full of accounts of floating iſlands; but the greateſt part of them are either falſe or exaggerated. What we generally ſee of this kind is no more than the concretion of the lighter and more viſcous matter floating on the ſurface of the water in cakes; and, with the roots of the plants, forming congeries of different ſizes, which, not being fixed to the ſhore in any part, are blown about by the winds, and float on the ſurface. Theſe are generally found in lakes, where they are confined from being carried too far; and, in proceſs of time, ſome of them acquire a very conſiderable ſize. Seneca tells us of many of theſe floating iſlands in Italy; and ſome later writers have deſcribed not a few of them in other places. But, however true theſe accounts might have been at the time when they were written, very few proofs of their authenticity are now to be found; the floating iſlands having either diſappeared again, or been fixed to the ſides in ſuch a manner as to make a part of the ſhore. Pliny tells us of a great iſland which at one time ſwam about in the lake Cutilia in the country of Reatinum, which was diſcovered to the old Romans by a miracle; and Pomponius tells us, that in Lydia there were ſeveral iſlands ſo looſe in their foundations, that every little accident ſhook and removed them.

Island (or *Iceland*) *Cryſtal*, a body famous among the writers on optics, for its property of a double refraction; but named very improperly, as it has none of the diſtinguiſhing properties of cryſtal, and is plainly a body of another claſs. Dr Hill has determined it to be a genus of ſpars, which he has called, from their figure, *parallellopipedia*, and of which he has deſcribed ſeveral ſpecies; all of which, as well as ſome other bodies of a different genus, have the ſame properties. It is always found in form of an oblique parallellopiped with ſix ſides; and is found of various ſizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much leſs bright than the pureſt cryſtal; and its planes are all tolerably ſmooth, tho', when nicely viewed, they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very ſingular in the ſtructure of this body is, that all the ſurfaces are placed in the ſame manner, and conſequently it will ſplit off into thin plates either horizontally or perpendicularly; but this is found, on a microſcope examination, to be owing to the regularity of figure, ſmoothneſs of ſurface, and niceneſs of joining, in the ſmall parallellopiped concretions of which the whole is compoſed. It is very ſoft, and eaſily ſcratched with the point of a pin. It will not give fire on being ſtruck againſt ſteel; and ferments and is totally diſſolved in aquafortis. It was firſt diſcovered in Iceland, from whence it has its name; but has been found in France, Germany, and many other places. In England, fragments of other ſpars are often miſtaken for it; many of them having in ſome degree the ſame properties. For an account of the ſingular refractive property of this ſubſtance, ſee (the *Index* ſubjoined to) Optics.

ISLE-adam, a town of France, with a handſome caſtle, and the title of a baron; ſeated on the river Oiſe, three miles from Beaumont, and 20 from Paris. E. Long. 2. 13. N. Lat. 49. 7.

Isle-*de-Dieu*, a ſmall iſland of France in the ſea of Gaſcony, and on the coaſt of Poitou, from which it is 14 miles. W. Long. 2. 5. N. Lat. 46. 45.

Isle-*de-France*, is one of the 12 general governments of France; bounded on the north by Picardy; on the weſt by Normandy, on the ſouth by the government of Orleannois, and on the eaſt by that of Champagne. It is about 90 miles in length, and as much in breadth; and is watered by the rivers Seine, Marne, Oiſe, and Aiſne. The air is temperate, and the ſoil fertile; and it abounds in wine, corn, and fruits. In contains 10 ſmall diſtricts, and Paris is the capital city.

ISNY, an imperial town of Germany, in Suabia, and in Algow; ſeated on the river Iſny, in E. Long. 9. 10. N. Lat. 47. 33.

ISNIC, a town of Turky in Aſia, and in Natolia, with a Greek archbiſhop's ſee. It is the ancient Nice, famous for the firſt general council held here in 325. There is now nothing remaining of its ancient ſplendor but an aqueduct. The Jews inhabit the greateſt part of it; and it is ſeated in a country fertile in corn and excellent wine. E. Long. 30. 9. N. Lat. 47. 15.

ISOCHRONAL, is applied to ſuch vibrations of a pendulum, as are performed in the ſame ſpace of time; as all the vibrations or ſwings of the ſame pendulum are, whether the arches it deſcribes are ſhorter or longer.

Isochronal-*Line*, that in which a heavy body is ſuppoſed to deſcend without any acceleration.

ISOCRATES, one of the greateſt orators of Greece, was born at Athens, 436 B. C. He was the ſon of Theodorus, who had enriched himſelf by making muſical inſtruments, and gave his ſon a liberal education. Iſocrates was the diſciple of Prodicus, Gorgias, and other great orators. He endeavoured at firſt to declaim in public, but without ſucceſs; he therefore contented himſelf with inſtructing his ſcholars and making private orations. He always ſhewed great love for his country; and being informed of the loſs of the battle of Cheronea, he abſtained four days from eating, and died, aged 98. There are ſtill extant 21 of his diſcourſes or orations, which are excellent performances, and have been tranſlated from the Greek into Latin by Wolfius. Iſocrates particularly excelled in the juſtneſs of his thoughts, and the elegance of his expreſſions. There are alſo nine letters attributed to him.

ISOLA, a town of Italy, in the kingdom of Naples, and in the Farther Calabria, with a biſhop's ſee. It is a ſea-port town, and is ſeated 15 miles ſouth-eaſt of St Severina. E. Long. 7. 33. N. Lat. 39. 1.

ISOPERIMETRICAL figures, in geometry, are ſuch as have equal perimeters or circumferences.

ISOSCELES triangle, in geometry, one that has two equal ſides,

ISPAHAN, or, as the Perſians pronounce it, *Spauhawn*, the capital of Perſia, is ſituated in the province of Irac, Agemi, or Perſia Proper, upon the ruins, as generally ſuppoſed, of the ancient Hecatompylos, or, as others think, of the Aſpa of Ptolemy. Moſt of the Eaſtern aſtronomers and geographers place it in N. Lat. 32. 25. E. Long. 86. 40. It ſtands in a very extenſive plain, ſurrounded by mountains; and has eight diſtricts belonging to it, that contain about 400 towns and villages. The fertility of the ſoil, the mildneſs of the ſeaſons, and the fine temperature of the air, all conſpire to render Iſpahan one of the moſt charming and delightful cities in the world. It is unanimouſly agreed, that the preſent city is of no great antiquity; and the two parts into which it is divided, preſerve the names of two contiguous towns, from the junction of which it was formed. The inhabitants of theſe, notwithſtanding their neighbourhood, bear an inveterate antipathy to each other; which they diſcover on all public occaſions. Spauhawn owes the glory it now poſſeſſes to the great Shah Abas; who, after the conqueſt of the kingdoms of Lar and Ormus, charmed with the ſituation of this place, made it the capital of his empire, between the years 1620 and 1628. The mountains, with which this city is ſurrounded, defend it alike from the ſultry heats of ſummer, and the piercing winds of the winter-ſeaſon; and the plain on which it ſtands, is watered by ſeveral rivers, which contribute alike to its ornament and uſe. Of theſe rivers, the Zenderoud, after being joined by the Mahmood, paſſes by Spauhawn; where it has three fine bridges over it, and is as broad as the Seine at Paris. The waters of theſe united ſtreams are ſweet, pleaſant, and wholeſome, almoſt beyond compariſon; as, indeed, are all the ſprings found in the gardens belonging to the houſes of Spauhawn. The extent of Spauhawn is very great; not leſs, perhaps, than 20 miles within the walls, which are of earth, poorly built, and ſo covered with houſes and ſhaded with gardens, that in many places it is difficult to diſcover them. The Perſians are wont to ſay, *Spauhawn niſpigehon*, i. e. Spauhawn is half the world. Sir John Chardin ſays, that tho' ſome reckoned 11,000,000 of inhabitants in it, he did not himſelf look upon it as more populous than London. At a diſtance, the city is not eaſily diſtinguiſhed; for many of the ſtreets being adorned with plantains, and every houſe having its garden, the whole looks like a wood. The ſtreets in general are neither broad nor convenient; there being three great evils which attend them: the firſt is, that being built on common ſewers, theſe are frequently broke up, which is very dangerous, conſidering that moſt people are on horſeback; the ſecond is, that there are many wells or pits in them, which are not leſs dangerous; the third ariſes from the people's emptying all their ordure from the tops of their houſes: this laſt, indeed, is in ſome meaſure qualified by the dryneſs of the air, and by its being quickly removed by the peaſants, who carry it away to dung their grounds. Some reckon eight, and others ten gates, beſides poſterns; but all agree that there is no difficulty of entering at any hour of the day or night. The three principal ſuburbs annexed to it are, Abbas-abad, built by Shah Abas, and belonging to the people of Tauris; Julfa, inhabited by a colony of Armenians, called by ſome *New Julfa*, to diſtinguiſh it from the ancient city of that name, ſituated in Armenia, upon the Araxes, whence the original inhabitants of New Julfa were brought; and Ghebr-Abad, or, as the Arabs pronounce it, Kebr-Abad, the ſtreet of the magians, occupied entirely by the profeſſors of magiſm, or the religion of the ancient Perſians. The river Zenderoud ſeparates the city of Iſpahan and Abas-Abad, from Julfa and Ghebr-Abad. This city has ſuffered greatly ſince the commencement of the dreadful rebellion in 1721; the whole kingdom from that period, till a few years ago, having been almoſt a continued ſcene of blood, ravages, and confuſion. A celebrated modern traveller, who was on the ſpot, tells us, that the inhabitants of Julfa, not many years before the above revolution happened, amounted to 30,000 ſouls; had 13 churches; and above 100 prieſts; and paid the Perſian court 200 tomans yearly for the free exerciſe of their religion: that ſome of the ſtreets were broad and handſome, and planted with trees, with canals and fountains in the middle; others narrow and crooked, and arched a top; others again, though extremely narrow, as well as turning and winding many ways, were of an incredible length, and reſembled ſo many labyrinths: that, at a ſmall diſtance from the town, there were public walks, adorned with rows of plane-trees on each ſide, ways paved with ſtones, fountains, and ciſterns: that there were above 100 caravanſeras for the uſe of merchants and travellers, many of which were built by the kings and prime nobility of Perſia: that, as little rain fell there, the ſtreets were frequently full of duſt, which rendered the city diſagreeable during a conſiderable part of the ſummer; that the citizens, however, to make this inconvience more tolerable, uſed to water them when the weather was warmer than uſual: that there was a caſtle in the eaſtern part of the town, which the citizens looked upon as impregnable, in which the public money, and moſt of the military ſtores, were ſaid to be kept: that, notwithſtanding the baths and caravanſeras were almoſt innumerable, there was not one public hoſpital: that moſt of the public buildings were rather neat than magnificent, though the great meydan or market-place, the royal palace (which is three quarters of a league in circumference), and the alley denominated *Toher-bag*, adjoining to it, made a very grand appearance: that the former contained the royal moſque; the building denominated *kayſerich*, where all ſorts of foreign commodities were expoſed to ſale; and the mint, ſtyled by the Perſians *ſerraa-khoneh*, where the current-money of the kingdom was coined: that, beſides the native Perſians, there were then in Iſpahan above 10,000 Indians, all ſupported by trade; 20,000 Georgians, Circaſſians, and Tartars of Dagheſtan or Leſgees, with a conſiderable number of Engliſh, Dutch, Portugueſe, and a few French: that the Capuchins, diſcalceated or bare-footed Carmelites, Jeſuits, Dominicans, and Auſtin friars, had likewiſe their convents here, though they were unable to make any converts; and that there were above 100 moſques and public colleges. But ſince the fatal period abovementioned, the ſuburb of Julfa was almoſt totally abandoned by the Armenians. The government of Iſpahan, 23 leagues long and as many broad, comprehending ſeveral diſtricts, moſt of them formerly well peopled, appeared not many years ago little better than a deſart; moſt of the inhabitants of that fertile and delightful tract being fled and diſperſed. Multitudes of them had taken a precarious refuge in the mountains of Loriſtan, lying between Iſpahan and Suſter, whoſe lands were left untilled, and their houſes mouldered into ruins. In ſhort, all the diſtreſſes of an unſucceſsful war, or the invaſion of a barbarous enemy, could not have plunged the people of Iſpahan into greater miſery than the victories of their tyrannical king, Nadir Shah, who ſeemed more ſolicitous to humble his own ſubjects than his enemies. As this was the caſe before the death of that uſurper, in what condition muſt we ſuppoſe Iſpahan and the reſt of Perſia to be in now, as the kingdom hath been ever ſince, till very lately, deſolated by a civil war occaſioned by ſeveral competitors for the crown? Whoever deſires to be more fully informed in relation to the ſtate of the city before the troubles, may conſult Sir John Chardin, Mr Tavernier, M. le Brun, and Dr Kæmpfer, who is much later than the others.

ISPIDA, in ornithology. See Alcedo.

ISRAEL, a name given by the Deity to the patriarch Iſaac, and often uſed for the whole nation of the Jews.

Kingdom of Israel, that of the ten tribes after their revolt from the houſe of David; called alſo the kingdom of *Ephraim* and of *Samaria*; extending both on this and on the other ſide of Jordan; and from Syria, thro' Galilee, to the borders of Benjamin; compriſing the tribes of Dan and Simeon, and the weſt of Judah, quite to the borders of Egypt.

ISSACHAR, one of the diviſions of Paleſtine by tribes; lying to the ſouth of Zabulon, ſo as by a narrow ſlip to reach the Jordan, between Zabulon and Manaſſeh, Joſh. xix. But whether it reached to the ſea, is a queſtion; ſome holding that it did: an aſſertion not eaſy to be proved, as Joſhua makes no mention of the ſea in this tribe, nor does Joſephus extend it farther than to mount Carmel; and in Joſh. xvii. 10. Aſher is ſaid to touch Manaſſeh on the north, which could not be if Iſſachar extended to the ſea.

ISSOUDUN, a conſiderable town of France, in Berry. It carries on a great trade in wood, cattle, cloth, hats, and ſtockings; is ſeated partly on a plain, and partly on an eminence. E. Long. 2. 5. N. Lat. 46. 57.

ISSUE, in law. See PLEA *and Iſſue*.

ISSUES, in ſurgery, are little ulcers made deſignedly by the ſurgeon in various parts of the body, and kept open by the patient, for the preſervation and recovery of his health.

ISSUS, now AJAZO, a town of Cilicia in Natolia, with a harbour on the Levant Sea, a little to the north of Scanderoon. E. Long. 36. 25. N. Lat. 36. 56.

Near this place, in a difficult paſs between the mountains and the ſea, Alexander the Great fought his ſecond battle with Darius. One great cauſe of the defeat which the Perſians received here was the bad conduct of their monarch, who led his numerous forces into a narrow place, where they had not room to act. Alexander was ſo much ſurpriſed when he firſt received the news that Darius was behind him, that he could ſcarce believe it to be true: but when he was thoroughly ſatisfied of the fact, and that Darius had again paſſed the river Pinarus, he called a council of war, wherein, without aſking any body's advice, he only told them, that he hoped they would remember their former actions; and that they, who were always conquerors, were about to fight people who were always beat. He further obſerved, that Darius ſeemed to be infatuated, ſince he had with ſuch expedition quitted an open and champaign country, where his numbers might have acted with advantage, to fight in a place incloſed, where the Macedonian phalanx might be well drawn up, and where his numbers could only incommode him. He then made the neceſſary diſpoſitions for repaſſing the mountains, poſted guards where he found them neceſſary, and then commanded his troops to refreſh themſelves, and to take their reſt till morning.

At break of day he began to repaſs the mountains, obliging his forces to move in cloſe order where the road was narrow, and to extend themſelves as they had more room; the right wing keeping always cloſe to the mountain, and the left to the ſea-ſhore. On the right there was a battalion of heavy-armed troops, beſides the targeteers under the command of Nicanor the ſon of Parmenio. Next theſe, extending to the phalanx, were the corps of Cœnus and Perdiccas; and on the left, the reſpective bodies commanded by Amyntas, Ptolemy, and Meleager. The foot appointed to ſupport them were commanded by Craterus; but the whole left wing was committed to Parmenio, with ſtrict orders not to decline from the ſea-ſhore, leſt the Perſians ſhould ſurround them. Darius ordered 20,000 foot and 30,000 horſe to retire, finding that he already wanted room to draw up the reſt. His firſt line conſiſted of 30,000 Greek mercenaries, having on their right and left 60,000 heavy-armed troops, being the utmoſt the ground would allow. On the left, towards the mountain, he poſted 20,000 men, which, from the hollow ſituation of the place, were brought quite behind Alexander's right wing. The reſt of his troops were formed into cloſe and uſeleſs lines behind the Greek mercenaries, to the number in all of 600,000 men. When this was done, he ſuddenly recalled the horſe who had retired, ſending part of them to take poſt on his right againſt the Macedonians commanded by Parmenio; and the reſt he ordered to the left towards the mountain: but, finding them unſerviceable there, he ſent the greateſt part of them to the right; and then took upon himſelf, according to the cuſtom of the Perſian kings, the command of the main body. As ſoon as Alexander perceived that the weight of the Perſian horſe was diſpoſed againſt his left wing, he diſpatched, with as much ſecrecy as he could, the Theſſalian cavalry thither, and ſupplied their places on the right by ſome brigades of horſe from the van, and light-armed troops. He alſo made ſuch diſpoſitions, that, notwithſtanding the mighty advantage of the hollow mountain, the Perſians could not ſurround him. But, as theſe precautions had conſiderably weakened the centre of his army, he ordered thoſe advanced poſts on the enemy's left, of which he was moſt apprehenſive, to be attacked at the very beginning of the fight; and, when they were eaſily driven from them, he recalled as many troops as were neceſſary to ſtrengthen his centre.

When all things were in order, Alexander gave ſtrict command, that his army ſhould march very ſlowly. As for Darius, he kept his troops fixed in their poſts, and in ſome places threw up ramparts; whence the Macedonians rightly obſerved, that he thought himſelf already a priſoner. Alexander at the head of the right wing engaged firſt, and without any difficulty broke and defeated the left wing of Darius. But, endeavouring to paſs the river Pinarus after them, his troops in ſome meaſure loſing their order, the Greek mercenaries fell upon them in flank, and made them fight, not only for victory, but for their lives. Ptolemy the ſon of Seleucus, and 120 Macedonians of ſome rank, were killed upon the ſpot. But the foot next to Alexander's right wing coming in ſeaſonably to its relief, fell upon the mercenaries in flank, amongſt whom a dreadful carnage was made; they being in a manner ſurrounded by the horſe and light-armed troops, which at firſt purſued the left wing, and the foot that had now paſſed the river. The Perſian horſe on the right ſtill fought gallantly; but, when they were thoroughly informed of the rout of their left wing, of the deſtruction of the Greek mercenaries, and that Darius himſelf was fled, they began to break, and betake themſelves to flight alſo. The Theſſalian cavalry purſued them cloſe at the heels; the narrow craggy roads incommoded them exceedingly, ſo that vaſt numbers of them periſhed. As for Darius, he fled, ſoon after the left wing was broken, in a chariot with a few of his favourites: as far as the country was plain and open, he eſcaped well enough; but, when the roads became rocky and narrow, he quitted it, and, mounting an horſe, rode all the night: his chariot, in which were his cloak and his bow, fell into the hands of Alexander, who carried them back to his camp.

In reſpect to the battle of Iſſus, Diodorus informs us, that Alexander looked every-where about for Darius; and, as ſoon as he diſcovered him, with his handful of guards attacked him and the flower of the Perſian army which was about him; being as deſirous of obtaining this victory by his perſonal valour, as of ſubduing the Perſian empire by the courage of his ſoldiers. But when Oxathres, the brother of Darius, ſaw Alexander's deſign, and how fiercely he ſought to accompliſh it, he threw himſelf, with the horſe who were about him, between his brother's chariot and the enemy, where an obſtinate fight was maintained, till the dead bodies roſe like an entrenchment about the chariot of Darius. Many of the Perſian nobility were ſlain, and Alexander himſelf was wounded in the thigh. At laſt, the horſes in the chariot of Darius ſtarted, and became ſo unruly, that the king himſelf was forced to take the reins; the enemy, however, preſſed ſo hard upon him, that he was conſtrained to call for another chariot, and mounted it in great danger. This was the beginning of the rout, which ſoon after became general. According to this author, the Perſians loſt 200,000 foot, and 10,000 horſe; the Macedonians 300 foot, and 150 horſe.

Juſtin informs us, that the Perſian army conſiſted of 400,000 foot, and 100,000 horſe. He ſays, that the battle was hard fought, that both the kings were wounded, and that the Perſians ſtill fought gallantly when their king fled, but that they were afterwards ſpeedily and totally routed: he is very particular as to their loſs, which he ſays amounted to 61,000 foot, 10,000 horſe, and 40,000 taken priſoners; of the Macedonians he ſays there fell no more than 130 foot, and 150 horſe. Curtius ſays, that of the Perſians there fell 100,000 foot, and 10,000 horſe: of Alexander's army 504, he ſays, were wounded; 32 foot and 150 horſe killed. That we may not ſuſpect any error in tranſcribers, his own obſervation confirms the fact: *Tantulo impendio ingens victoria ſtetit*, "So ſmall was the coſt of ſo great a victory."

ISTHMIA, or ISTHMIAN *Games*; one of the four ſolemn games which were celebrated every fifth year in Greece. They had their name from the Iſthmus of Corinth, where they were celebrated. In their firſt inſtitution, according to Pauſanias, they conſiſted only of funeral rites and ceremonies in honour of Melicertes: but Theſeus afterwards, as Plutarch informs us, in emulation of Hercules, who had appointed games at Olympia in honour of Jupiter, dedicated thoſe to Neptune, his reputed father; who was regarded as the particular protector of the Iſthmus and commerce of Corinth. The ſame trials of ſkill were exhibited here as at the other three ſacred games; and particularly thoſe of muſic and poetry. Theſe games, in which the victors were only rewarded with garlands of pine-leaves, were celebrated with great magnificence and ſplendour as long as paganiſm continued to be the eſtabliſhed religion of Greece; nor were they omitted even when Corinth was ſacked and burned by Mummius the Roman general; at which time the care of them was tranſferred to the Sicyonians, but was reſtored again to the Corinthians when their city was rebuilt.

ISTHMUS, a narrow neck, or ſlip of ground, which joins two continents: or joins a peninſula to the terra firma, and ſeparates two ſeas. See PENINSULA.

The moſt celebrated iſthmuſes are thoſe of Panama, or Darien, which joins North and South America; that of Suez, which connects Aſia and Africa; that of Corinth, or Peloponneſus, in the Morea; that of Crim-Tartary, otherwiſe called *Taurica Cherſoneſus*; that of the peninſula Romania, and Eriſſo, or the iſthmus of the Thracian Cherſoneſus, 12 furlongs broad, being that which Xerxes undertook to cut through. The ancients had ſeveral deſigns of cutting the iſthmus of Corinth, which is a rocky hillock, about ten miles over; but they were all in vain, the invention of ſluices being not then known. There have been attempts too for cutting the iſthmus of Suez, to make a communication between the Red ſea and the Mediterranean: but theſe alſo failed; and in one of them, a king of Egypt is ſaid to have loſt 120,000 men.

ISTRIA, a peninſula of Italy, in the territory of Venice, lying in the north part of the Adriatic ſea. It is bounded by Carniola on the north; and on the ſouth, eaſt, and weſt, by the ſea. The air is unwholeſome, eſpecially near the coaſt; but the ſoil produces plenty of wine, oil, and paſtures; there are alſo quarries of fine marble. One part of it belongs to the Venetians, and the other to the houſe of Auſtria. Cabo d'Iſtria is the capital town.

ITALIAN, the language ſpoken in Italy. See the article LANGUAGE.

This tongue is derived principally from the Latin; and of all the languages formed from the Latin, there is none which carries with it more viſible marks of its original than the Italian. It is accounted one of the moſt perfect among the modern tongues, containing words and phraſes to repreſent all ideas, to expreſs all ſentiments, to deliver one's ſelf on all ſubjects, to name all the inſtruments and parts of arts, &c. It is, however, complained, that it has too many diminutives and ſuperlatives, or rather augmentatives; but without any great reaſon: for if theſe words convey nothing farther to the mind than the juſt ideas of things, they are no more faulty than our pleonaſms and hyperboles. The language correſponds to the genius of the people: they are ſlow and thoughtful; and accordingly their language runs heavily, though ſmoothly, and many of their words are lengthened out to a great degree. They have a great taſte for muſic; and, to gratify their paſſion this way, have altered abundance of their primitive words, leaving out conſonants, taking in vowels, ſoftening and lengthening out their terminations for the ſake of the cadence. Hence the language is extremely muſical, and ſucceeds better than any other in operas, and ſome parts of poetry; but it fails in ſtrength and nerves: hence alſo a great part of its words borrowed from the Latin became ſo far diſguiſed, that they are not eaſily known again.

ITALY, one of the fineſt countries of Europe, lying between 7 and 10 degrees of E. Long. and between 37 and 46 degrees of N. Lat. On the north,

north-weſt, and north-eaſt, it is bounded by France, Switzerland, the country of the Griſons, and Germany; on the eaſt, by the Adriatic ſea, or gulf of Venice; and on the ſouth and weſt, by the Mediterranean; its figure bearing ſome reſemblance to that of a boot. Its length from Aoſta, at the foot of the Alps in Savoy, to the utmoſt verge of Calabria, is about 600 miles; but its breadth is very unequal, being in ſome places near 400 miles, in others not above 25 or 30.

1
Its different names.

Italy was anciently known by the names of *Saturnia*, *Oenotria*, *Heſperia*, and *Auſonia*. It was called *Saturnia* from Saturn; who, being driven out of Crete by his ſon Jupiter, is ſuppoſed to have taken refuge here. The names of *Oenotria* and *Auſonia*, it borrowed from its ancient inhabitants the Oenotrians and Auſones; and that of *Heſperia*, or *Weſtern*, was given it by the Greeks, from its ſituation with reſpect to Greece. The name of *Italia*, or *Italy*, which, in proceſs of time, prevailed over all the reſt, is by ſome derived from Italus, a king of the Siculi: by others, from the Greek word *Italos*, ſignifying an ox; this country abounding, by reaſon of its rich paſtures, with oxen of an extraordinary ſize and beauty. All theſe names were originally peculiar to particular provinces of Italy, but afterwards applied to the whole country.

2
Diviſion in ancient times.

This country was in ancient times, like moſt others, divided into a great number of petty ſtates and kingdoms. In after-times, when the Gauls ſettled in the weſtern, and many Greek colonies in the eaſtern parts, it was divided, with reſpect to its inhabitants, into three great parts, viz. Gallia Ciſalpina, *Italy* properly ſo called, and Magna Grecia. The moſt weſtern and northern parts of Italy were in great part poſſeſſed by the Gauls: and hence took the name of *Gallia*, with the epithets of *Ciſalpina* and *Citerior*, becauſe they lay on the ſide of the Alps next to Rome; and *Togata*, with relation to the Roman gown or dreſs which the inhabitants uſed; but this laſt epithet is of a much later date than the former. This appellation was antiquated in the reign of Auguſtus, when the diviſion of Italy into eleven provinces, introduced by that prince, took place. Hence it is that the name of *Ciſalpine Gaul* frequently occurs in the authors who flouriſhed before, and ſcarce ever in thoſe who wrote after the reign of Auguſtus. This country extended from the Alps and the river Varus, parting it from Tranſalpine Gaul, to the river Aeſus; or, as Pliny will have it, to the city of Ancona, in the ancient Picenum. On the north, it was divided from Rhætia by the Alps, called *Alpes Rhæticæ*; and from Illyricum by the river Formio: but on this ſide, the borders of Italy were, in Pliny's time, extended to the river Arſia in Iſtria. On the ſouth, it reached to the Liguſtic ſea, and the Apennines parting it from Etruria; ſo that under the common name of *Ciſalpine Gaul* were comprehended the countries lying at the foot of the Alps, called by Pliny and Strabo the *Subalpine countries*, Liguria, Gallia Ciſpadana, and Tranſpadana. *Italy*, properly ſo called, extended, on the coaſt of the Adriatic, from the city of Ancona to the river Trento, now the Fortore; and, on the Mediterranean, from the Macra to the Silarus, now the Sele. Magna Græcia compriſed Apulia, Lucania, and the country of the Brutii. It was called *Greece*, becauſe moſt of the cities on the coaſt were Greek colonies. The inhabitants gave it the name of *Great*, not as if it was larger than Greece, but merely out of oſtentation, as Pliny informs us.

3
Subdued by the Romans

4
By the Heruli.

All theſe countries were inhabited by a great number of different nations ſettled at different times, and from many different parts. The names of the moſt remarkable of them were the *Aborigines*, or thoſe whoſe origin was utterly unknown, and conſequently were thought to have none; the *Sabines*, *Hetrurians* or *Tuſcans*, the *Umbri*, *Samnites*, *Campani*, *Apulii*, *Calabrii*, *Lucanii*, the *Brutii*, and the *Latins*. From a colony of the latter proceeded the Romans, who gradually ſubdued all theſe nations one after another, and held them in ſubjection for upwards of 700 years. All theſe nations were originally brave, hardy, temperate, and well ſkilled in the art of war; and the Romans much more ſo than the reſt. Their ſubjection to Rome, however, inured them to ſlavery; their oppreſſion by the emperors broke their ſpirit; and the vaſt wealth which was poured into the country from all parts of the world, during the time of the Roman proſperity, corrupted their manners, and made them degenerate from their former valour. Of this degeneracy the barbarous nations of the north took the advantage to invade the empire in innumerable multitudes. Though often repelled, they never failed to return; and it was found neceſſary to take great numbers of them into the Roman ſervice, in order to defend the empire againſt the reſt of their countrymen. In the year 476, the Heruli, preſuming on the ſervices they had done the empire, demanded a third part of the lands of Italy; and being refuſed, choſe one Odoacer, a man of low birth, but of great valour and experience, for their king; and having totally deſtroyed the remains of the Roman empire, proclaimed Odoacer king of Italy. The new monarch, however, did not think proper to alter the Roman form of government, but ſuffered the people to be governed by the ſenate, conſuls, &c. as before. He enjoyed his dignity in peace till the year 488, when Zeno, emperor of Conſtantinople, being hard preſſed by Theodoric king of the Oſtrogoths, adviſed him to turn his arms againſt Odoacer, whom he could eaſily overcome, and thus make himſelf ſovereign of one of the fineſt countries in the world.

5
Invaded by Theodoric the Oſtrogoth.

Theodoric accepted the propoſal with great joy, and ſet out for Italy, attended by an infinite number of people, carrying with them their wives, children, and effects, on waggons. Several Romans of great diſtinction attended him in this war; while, on the other hand, many of his countrymen choſe to remain in Thrace, where they became a ſeparate nation, and lived for a long time in amity with the Romans. The Goths, being deſtitute of ſhipping, were obliged to go round the Adriatic. Their march was performed in the depth of winter; and, during the whole time, a violent famine and plague raged in their army. They were alſo oppoſed by the Gepidæ and Sarmatians; but at laſt, having defeated theſe enemies, and overcome every other obſtacle, they arrived in Italy in the year 489. Theodoric advanced to the river Sontius, now Zonzo, near Aquileia, where he halted for ſome time to refreſh his troops. Here he was met by Odoacer at the head of a very numerous army, but compoſed of many different nations commanded by their reſpective chiefs, and conſequently without ſufficient union or zeal for the common cauſe. Theodoric therefore gained an eaſy victory, cut many of his enemies in pieces, and took their camp. Odoacer retired to the plains of Verona, and encamped there at a ſmall diſtance from the city; but Theodoric purſued him cloſe, and ſoon forced him to a ſecond engagement. The Goths obtained another victory; but it coſt them dear. Odoacer's men made a much better reſiſtance than before, and great numbers fell on both ſides. The victory, however, was ſo far deciſive, that Odoacer was obliged to ſhut himſelf up in Ravenna; ſo that Theodoric having now no enemy to oppoſe him in the field, beſieged and took ſeveral important places, and among the reſt Milan and Pavia. At the ſame time, Tuſa, commander in chief of Odoacer's forces, deſerted to the enemy with the greateſt part of the troops he had with him, and was immediately employed in conjunction with a Gothic officer in purſuit of his ſovereign. Odoacer had left that city, and was advanced as far as Faenza, where he was cloſely beſieged by Tuſa; but the traitor, declaring again for his old maſter, joined him with all his troops, and delivered up ſeveral officers that had been appointed by Theodoric to ſerve under him. Theſe were ſent in irons to Ravenna; and Odoacer being joined by Frideric, one of Theodoric's allies, with a conſiderable body of troops, once more advanced againſt his enemies. He recovered all Liguria, took the city of Milan, and at laſt beſiged Theodoric himſelf in Pavia. The Goths, having brought all their families and effects along with them, were greatly diſtreſſed for want of room; and muſt have undoubtedly ſubmitted, if their enemies had continued to agree among themſelves. The quarrels of his followers proved the ruin of Odoacer. Theodoric, finding that the enemy remitted the vigour of their operations, applied for ſuccours to Alaric king of the Viſigoths, who had ſettled in Gaul. As the Viſigoths and Oſtrogoths were originally one and the ſame nation, and the Viſigoths had received among them, ſome years before, a great number of Oſtrogoths, under the conduct of Videmir, couſin-german to Theodoric, the ſupplies were readily granted. The inaction of the enemy gave theſe ſuccours time to arrive; upon which Theodoric inſtantly joined them, and, marching againſt his enemies, gave them a total overthrow. Odoacer again took refuge in Ravenna, but was cloſely beſieged by Theodoric in 490. The ſiege laſted three years; during which Odoacer defended himſelf with great bravery, and greatly annoyed the beſiegers with his ſallies. Theodoric, however, impatient of delay, leaving part of his army to blockade the city, marched with the reſt againſt the ſtrong holds which Odoacer had garriſoned. All theſe he reduced with little difficulty; and in 492 returned to the ſiege of Ravenna. The beſieged were now reduced to great ſtraights both by the enemy without and a famine within, the price of wheat being riſen to ſix pieces of gold per buſhel. On the other hand, the Goths were quite worn out with the fatigues of ſuch a long ſiege; ſo that both parties being willing to put an end to the war, Odoacer ſent John biſhop of Ravenna to Theodoric with terms of accommodation. Jornandes informs us, that Odoacer only begged his life; which Theodoric bound himſelf, by a ſolemn oath, to grant him: but Procopius ſays, that they agreed to live together on equal terms. This laſt ſeems very improbable: but whatever were the terms of the agreement, it is certain that Theodoric did not keep them; for having a few days after invited Odoacer to a banquet, he diſpatched him with his own hand. All his ſervants and relations were maſſacred at the ſame time; except his brother Aonulphus, and a few more, who had the good luck to make their eſcape, and retired beyond the Danube.

6 Odoacer defeated.

7 Submits, and is put to death.

8 Theodoric proclaimed king of Italy, and uſes his power with moderation.

Thus Theodoric became maſter of all Italy, and took upon himſelf the title of *king* of that country, as Odoacer had done before; though, with a pretended deference to the emperor of Conſtantinople, he ſent meſſengers aſking liberty to aſſume that title after he had actually taken it. Having ſecured his new kingdom as well as he could by foreign alliances, Theodoric next applied himſelf to legiſlation, and enacted many ſalutary laws beſides thoſe of the Romans which he retained. He choſe Ravenna for the place of his reſidence, in order to be near at hand to put a ſtop to the incurſions of the barbarians. The provinces were governed by the ſame magiſtrates that had preſided over them in the times of the emperors, viz. the *conſulares*, *correctores*, and *præſides*. But beſides theſe, he ſent, according to the cuſtom of the Goths, inferior judges, diſtinguiſhed by the name of *counts*, to each city. Theſe were to adminiſter juſtice, and to decide all controverſies and diſputes. And herein the polity of the Goths far excelled that of the Romans. For in the Roman times a whole province was governed by a conſularis, a corrector, or a præſes, who reſided in the chief city, and to whom recourſe was to be had, at a great charge, from the moſt remote parts: but Theodoric, beſides theſe officers, appointed, not only in the principal cities, but in every ſmall town and village, inferior magiſtrates of known integrity, who were to adminiſter juſtice, and by that means ſave thoſe who had law-ſuits the trouble and expence of recurring to the governor of the whole province; no appeals to diſtant tribunals being allowed, but in matters of the greateſt importance, or in caſes of manifeſt injuſtice.

Under the adminiſtration of Theodoric Italy enjoyed as great happineſs as had been experienced under the very beſt emperors. As he had made no alteration in the laws except that abovementioned, ſo he contented himſelf with the ſame tributes and taxes that had been levied by the emperors; but was, on all occaſions of public calamity, much more ready to remit them than moſt of the emperors had been. He did not treat the natives as thoſe of the other Roman provinces were treated by the barbarians who conquered them. Theſe ſtripped the ancient proprietors of their lands, eſtates, and poſſeſſions, dividing them among their chiefs; and giving to one a province with the title of *duke*, to another a frontier country with the title of *marquis*; to ſome a city with the title of *count*, to others a caſtle or village with the title of *baron*. But Theodoric, who piqued himſelf upon governing after the Roman manner, and obſerving the Roman laws and inſtitutions, left every one in the full enjoyment of his ancient property. As to religion, though he himſelf, like moſt of his countrymen, profeſſed the tenets of Arius, he al-

allowed his ſubjects to profeſs the orthodox doctrine without moleſtation, giving liberty even to the Goths to renounce the doctrines in which they had been educated, and embrace the contrary opinions. In ſhort, his many virtues, and the happineſs of his ſubjects, are celebrated by all the hiſtorians of thoſe times. The end of his reign, however, was ſullied by the death of the celebrated philoſopher Boethius, and his father-in-law Symmachus. They were both beheaded in Pavia, on an unjuſt ſuſpicion of treaſon; and ſcarce was the ſentence put in execution when the king repented, and abandoned himſelf to the moſt pungent ſorrow. The exceſs of his grief affected his underſtanding; for, not long after, the head of a large fiſh being ſerved up to ſupper, he fancied the head of the fiſh to be that of Symmachus threatening him in a ghaſtly manner. Hereupon, ſeized with horror and amazement, he was carried to his bed-chamber, where he died in a few days, on the 2d of September 526.

9
Beheads Boethius and Symmachus, and dies of grief.

10
Amalaſuntha Regent; governs equitably.

After the death of Theodoric, the kingdom devolved to Athalric his grandſon; who being at that time only eight years of age, his mother Amalaſuntha took upon her the regency. Her adminiſtration was equally upright with that of Theodoric himſelf: but the barbarians of whom her court was compoſed, finding fault with the encouragement ſhe gave to learning, forced her to abandon the education of her ſon, who thereupon plunged into all manner of wickedneſs, and behaved to his mother with the greateſt arrogance; and the faction finding themſelves thus ſtrengthened, at laſt commanded the queen to retire from court.

Amalaſuntha, exerting her authority, ſeized three of the ringleaders of the ſedition, whom ſhe confined in the moſt remote parts of Italy. But theſe maintaining a ſecret correſpondence with their friends and relations, never ceaſed to ſtir up the people againſt her; inſomuch, that the queen, apprehending that the faction might in the end prevail, wrote to the emperor Juſtinian, begging leave to take refuge in his dominions. The emperor readily complied with her requeſt, offering a noble palace at Durazzo for her habitation; but the queen having in the mean time cauſed the three ringleaders to be put to death, and no new diſturbances ariſing thereupon, ſhe did not accept of the emperor's offer. In 533, Athalric having contracted a lingering diſtemper by his riotous living and debaucheries, Amalaſuntha, to avoid the calamities with which Italy was threatened in caſe of his death, formed a deſign of delivering it up to Juſtinian: but before her ſcheme was ripe for execution, Athalric died. Upon which the queen took for her collegue one Theodotus her couſin; obliging him, however, to ſwear that he would ſuffer her to enjoy and exerciſe her former power. This he very readily did, but ſoon forgot his promiſe; and, when ſhe took the liberty to remind him of it, cauſed her to be ſeized and confined in an iſland of the the lake Bolſena in Tuſcany. But as Theodotus had great reaſon to believe that this conduct would be reſented by Juſtinian, he obliged her to write to him that no injury or injuſtice had been done her. Along with this letter he ſent one written by himſelf, and filled with heavy complaints againſt Amalaſuntha. The emperor, however, was ſo far from giving credit to what Theodotus urged againſt her, that he openly eſpouſed her cauſe, wrote her a moſt affectionate letter, and aſſured her of his protection. But before this letter could reach her, the unhappy princeſs was ſtrangled in the bath by the friends of thoſe whom in the reign of her ſon ſhe had deſervedly put to death for raiſing diſturbances in the ſtate.

11
Is treacherouſly impriſoned, and put to death

12
For which reaſon Juſtinian makes war on the Goths.

On the news of Amalaſuntha's death, Juſtinian reſolved upon an immediate war with the Goths; and, to facilitate the enterprize, uſed his utmoſt endeavours to induce the Franks to aſſiſt him. To his ſolicitations he added a large ſum of money; which laſt was very acceptable to his new allies. They promiſed to aſſiſt the emperor to the utmoſt of their power; but, inſtead of performing their promiſe, while Juſtinian's arms were employed againſt the Goths, Thierri, the eldeſt ſon of Clovis, ſeized on ſeveral cities of Liguria, the Alpes Cottiæ, and great part of the preſent territory of Venice, for himſelf. Juſtinian, however, found ſufficient reſources in the valour of Beliſarius, notwithſtanding the defection of his treacherous allies. This celebrated general was veſted with the ſupreme command, and abſolute authority. His inſtructions were to pretend a voyage to Carthage, but to make an attempt upon Sicily; and, if he thought he could ſucceed in the attempt, to land there; otherwiſe to ſail for Africa, without diſcovering his intentions. Another general, named *Mundus*, commander of the troops in Illyricum, was ordered to march into Dalmatia, which was ſubject to the Goths, and attempt the reduction of Salonæ, the better to open a paſſage into Italy. This he accompliſhed without difficulty, and Beliſarius made himſelf maſter of Sicily ſooner than he himſelf had expected. The iſland was reduced on the laſt of December 535; upon which Beliſarius, without loſs of time, paſſed over to Reggio, which opened its gates to him. From Reggio he purſued his march to Rome, the provinces of Abrutium, Lucania, Puglia, Calabria, and Samnium, readily ſubmitting to him. The city of Naples endured a ſiege; but Beliſarius entered in thro' an aqueduct, and gave it up to be plundered by his ſoldiers.

Theodotus, alarmed at theſe ſucceſſes, and having neither capacity nor inclination to carry on the war, ſent ambaſſadors to Juſtinian with propoſals of peace. He agreed to renounce all pretenſions to the iſland of Sicily; to ſend the emperor yearly a crown of gold weighing 300 pounds; to ſupply him with 3000 men whenever he ſhould think proper to demand them. Several other articles were contained in the propoſal, which amounted to the owning of Juſtinian for his lord, and that he held the crown of Italy only through his favour. As he apprehended, however, that theſe offers might not yet be ſatisfactory, he recalled his ambaſſadors for further orders. They were now deſired to inform Juſtinian, that Theodotus was willing to reſign the kingdom to him, and content himſelf with a penſion ſuitable to his quality. But he obliged them by an oath not to mention this propoſal, till they found that the emperor would not accept of the other. The firſt propoſals were accordingly rejected as they had ſuppoſed; upon which the ambaſſadors produced the ſecond, ſigned by Theodotus himſelf, who, in his letter to the emperor, told him among other things, that being unacquainted with war, and addicted to the ſtudy of philoſophy, he preferred his quiet to a kingdom. Juſtinian, tranſported with joy, and

13
Theodotus offers to reſign the kingdom.

and imagining the war already finiſhed, anſwered the king in a moſt obliging manner, extolling his wiſdom, and giving him, beſides what he demanded, the greateſt honours of the empire. The agreement being confirmed by mutual oaths, lands were aſſigned to Theodotus out of the king's domain, and orders were diſpatched to Beliſarius to take poſſeſſion of Italy in his name.

In the mean time a body of Goths having entered Dalmatia, with a deſign to recover the city of Salonæ, were encountered by an inferior army of Romans, commanded by the ſon of Mundus abovementioned. The Goths proved victorious; and the young general of the Romans was killed, and moſt of his army cut in pieces. Mundus marched againſt the enemy to revenge the death of his ſon; but met with no better ſucceſs, his troops being defeated, and he himſelf killed in the engagement. Upon this the Romans abandoned Salonæ and all Dalmatia; and Theodotus, elated with his ſucceſs, refuſed to fulfil the articles of the treaty. Juſtinian diſpatched Conſtantianus, an officer of great valour and experience, into Illyricum, with orders to raiſe forces there, and to enter Dalmatia; at the ſame time he wrote to Beliſarius to purſue the war with the utmoſt vigour.

14
Theodotus
efuſes to
ulfil the
rticles of
he treaty.

The Goths were now reduced to the greateſt ſtraits. Conſtantianus drove them out of Dalmatia; and Beliſarius having reduced all the provinces which compoſe the preſent kingdom of Naples, advanced towards Rome. The chief men of the nation, finding their king incapable of preventing the impending ruin, aſſembled without his conſent, and diſpatched ambaſſadors to Beliſarius with propoſals of peace. Theſe propoſals were rejected; and Beliſarius returned for anſwer that he would hearken to no terms, nor ſheath his ſword, till Italy was reannexed to the empire to which it belonged. The Goths finding Theodotus ſtill inactive, unanimouſly depoſed him; and choſe in his ſtead one Vitiges, a man of great valour, but of a mean deſcent. Theodotus fled to Ravenna; but the new king diſpatched after him a meſſenger, who ſoon overtook him and cut off his head.

15
is de-
ſed, and
tiges cho-
in his
ad.

Vitiges began his government by writing a circular letter, in which he exhorted his countrymen to exert their ancient courage, and fight bravely for their lives and liberties. He then marched with what forces he could collect towards Rome; but not thinking himſelf able to defend that city againſt the Roman forces, he abandoned it to Beliſarius, and arriving at Ravenna was joined by the Goths from all parts, ſo that he ſoon found himſelf at the head of a conſiderable army. Beliſarius in the mean time entered Rome without oppoſition, on the 9th or 10th of December 537. The Gothic garriſon retired by the Porta Flaminia, while Beliſarius entered by the Porta Aſinaria. Leudaris, governor of the city, who ſtaid behind, was ſent, together with the keys, to the emperor. Beliſarius immediately applied himſelf to the repairing of the walls and other fortifications; filled the granaries with corn, which he cauſed to be brought from Sicily; and ſtored the place with proviſions, as if he had been preparing for a ſiege; which gave no ſmall uneaſineſs to the inhabitants, who choſe rather that their city ſhould lie open to every invader, than that they ſhould be liable to the calamities of a ſiege. While Beliſarius was thus employed at Rome, the city of Benevento, with great part of the territory of Samnium, was delivered up to him: at the ſame time the cities of Narnia, Spoleto, and Peruſia, revolting from the Goths, received Roman garriſons; as did moſt of the cities of Tuſcany.

16
He collects
a great
army.

In the mean time, Vitiges having collected an army of 150,000 men, reſolved to march directly to Rome, and engage Beliſarius; or if he declined an engagement, to lay ſiege to the city. But apprehending that the Franks, who were in confederacy with the emperor, might fall upon him at the ſame time, he ſent ambaſſadors to them, with offers of all the Gothic poſſeſſions in Gaul, beſides a conſiderable ſum of money, provided they joined him againſt the emperor. The Franks with their uſual treachery conſented to the propoſal, received the money and the territories agreed on, and then refuſed to fulfill the terms of the treaty. Vitiges, however, began his march to Rome, leaving behind him all the fortified towns on the road, the reduction of which he knew would coſt him too much trouble. Beliſarius, whoſe army, reduced by the many towns he had garriſoned, did not now amount to above 5000 men, diſpatched meſſengers to Conſtantianus in Tuſcany; and to Beſſas, by nation a Goth, but of the emperor's party, in Umbria, with orders to join him with all poſſible expedition; writing at the ſame time to the emperor himſelf for ſupplies, in the moſt preſſing manner. Conſtantianus joined him purſuant to his orders; and ſoon after, Beſſas, who, falling in with part of the enemy's vanguard, killed a conſiderable number of them, and put the reſt to flight. Beliſarius had built a fort upon a bridge about a mile from Rome, and placed a ſtrong garriſon in it to diſpute the paſſage with the enemy; but the garriſon, ſeized with a panic at the approach of the Goths, abandoned their poſt in the night, and fled into Campania. Early in the morning, Vitiges paſſed over great part of his army, and marched on till he was met by Beliſarius, who, knowing nothing of what had happened, came with 1000 horſe to view the ground about the bridge. He was greatly ſurpriſed when he beheld the enemy marching up againſt him: however, leſt he ſhould heighten their courage by his flight or retreat, he ſtood his ground, and received the enemy at the head of his ſmall body, expoſing himſelf, without his uſual prudence and diſcretion, to the greateſt dangers. Being known by ſome fugitives, and diſcovered to the enemy, they all aimed at him alone, which made his own men the more ſolicitous to defend him; ſo that the whole conteſt was for ſome time about his perſon. At laſt the Goths were driven back to their camp, which the Romans with great temerity attempted to force. In this attempt, however, they met with ſuch a vigorous reſiſtance, that they ſoon abandoned the enterpriſe, and retired with precipitation to a neighbouring eminence; whence they were forced down by the enemy, put to flight, and purſued to the very gates of the city. Here they were in greater danger than ever; for thoſe within, fearing that the enemy might in that confuſion enter with them, refuſed to admit them. The general himſelf cried out earneſtly to them, telling who he was, and commanding them to open the gates; but as they had been informed by thoſe who firſt fled, that he was ſlain,

17
Obſtinate
engagement
between the
Goths and
Romans.

ſlain, and they could not diſtinguiſh him on account of the blood and duſt with which his face was covered, they gave no ear to what he ſaid. In this extremity, having encouraged his men, who were now driven into a narrow compaſs, to make a laſt effort, he put himſelf at their head, and attacked the enemy with ſuch fury, that the Goths, imagining freſh troops were ſallying out upon them, began to give ground, and at laſt retired to their camp. The Roman general did not purſue them; but entered the city, where he was received with loud acclamations.

18 Rome beſieged by the Goths.

A few days after, the city was cloſely inveſted by Vitiges; who, to diſtreſs the inhabitants, pulled down the aqueducts by which water was conveyed into the city, and which had been built at an immenſe charge by the Roman emperors. Beliſarius on his part omitted nothing for his defence; inſomuch that the cowardly citizens aſſembled in a tumultuous manner, and railed at the general on account of his ſuppoſed temerity. Vitiges, to encourage this mutinous diſpoſition, diſpatched ambaſſadors to the ſenate with propoſals of peace. Theſe ambaſſadors, however, were diſmiſſed without any anſwer, and the ſiege was begun with great vigour. Beliſarius made a gallant defence; and in ſeven months is ſaid to have deſtroyed 40,000 of the Goths. About this time he received a ſupply of 1600 archers from the emperor; and theſe, in ſeveral ſucceſsful ſallies, are ſaid to have killed 4000 more of the enemy.

The Romans, elated with their ſucceſſes, now became impatient for an engagement; and at laſt, notwithſtanding all the remonſtrances of their general, forced him to lead them out againſt the enemy. The ſucceſs was anſwerable to the raſh attempt. The Romans were defeated, with the loſs of ſome of their braveſt officers, and a great many of their common ſoldiers; after which they contented themſelves with ſallying out in ſmall parties, which they commonly did with the greateſt ſucceſs.

But though the Romans had the ſatisfaction of thus cutting off their enemies, they were moſt grievouſly afflicted with a famine and plague; inſomuch that the inhabitants, no longer able to bear their calamities, were on the point of forcing Beliſarius to venture a ſecond battle, when a ſeaſonable ſupply of troops, viz. 3000 Iſaurians, 800 Thracian horſe, and 1300 horſe of other nations, together with 500 Italians who joined them by the way, arrived at Rome. Beliſarius immediately ſallied out by the Flaminian gate, and fell upon the Goths in order to give his allies time to enter by the oppoſite ſide of the city, which they did without the loſs of a man.—The Goths, hearing of the arrival of theſe troops, and their numbers being magnified as is uſual in ſuch caſes, began to deſpair of becoming maſters of the city; eſpecially as the famine and plague raged with great violence in their camp, and their army was much reduced. Ambaſſadors were therefore diſpatched to Beliſarius with propoſals of peace; but the only thing they could obtain was a ceſſation of arms for three months, during which time they might ſend ambaſſadors to the emperor. The negociations with the emperor, however, proved unſucceſsful; and the ſiege was purſued with great vigour till Vitiges received the news of the taking of Rimini by the Romans. As this city was but a day's journey from Ravenna, the Goths were ſo much alarmed, that they immediately raiſed the ſiege of Rome, after it had continued a year and nine days. Beliſarius fell upon their rear as they paſſed the bridge of the Tiber, and cut great numbers of them in pieces, while others, ſtruck with a panic, threw themſelves into the river and were drowned.

19 The ſiege raiſed.

The firſt enterprize of Vitiges, after raiſing the ſiege of Rome, was an attempt upon Rimini; but while he was employed in this ſiege, the Romans made themſelves maſters of Milan; upon which a Gothic general named *Uraia*, was immediately diſpatched with a powerful army to retake it. In the mean time, however, a ſupply of 7000 Romans arrived from the emperor, under the command of Narſes, a celebrated general. The immediate conſequence of this was the raiſing of the ſiege of Rimini; for Vitiges, perceiving the two Roman armies coming againſt him, and concluding, from the many fires they made, that they were much more numerous than they really were, fled in ſuch haſte, that the greateſt part of the baggage was left behind. The confuſion of the Goths was ſo great, that had not the garriſon been extremely feeble, they might have eaſily cut them off in their retreat, and thus put an end to the war at once. The ſucceſs of the Romans, however, was now retarded by ſome miſunderſtandings between the two generals; ſo that, though Beliſarius made himſelf maſter of Urbinum and Urbiventum, while Narſes reduced ſome other places; yet the important city of Milan was ſuffered to fall into the hands of the Goths, who maſſacred all the inhabitants that were able to bear arms, to the number of 300,000, and ſold the women for ſlaves. The city was alſo totally demoliſhed; and this diſaſter made ſuch an impreſſion on the mind of Juſtinian, that he immediately recalled Narſes, and gave the command of his troops to Beliſarius.

20 Milan taken by the Goths.

Vitiges, who had promiſed himſelf great advantages from the diſagreement of the two generals, was much diſappointed by the recall of Narſes; and therefore, dreading the power of Beliſarius when at the head of a formidable army, thought of engaging in alliance with ſome foreign prince. In his choice, however, he was ſomewhat at a loſs. He knew the treachery of the Franks, and therefore did not apply to them. He applied to the Lombards; but, though tempted by the offer of a large ſum of money, they continued inviolably attached to the Roman intereſt. At laſt he found means to perſuade Choſroes king of Perſia to make war upon Juſtinian, which he thought would infallibly procure the recall of Beliſarius. But the Roman general, underſtanding his deſign, puſhed on the war in the moſt vigorous manner; while in the mean time, the treacherous Franks, thinking both nations ſufficiently weakened by their mutual hoſtilities, reſolved to attack both, and ſeize upon the country for which they contended. Accordingly, Theodebert, unmindful of the oaths he had taken both to the Goths and Romans, paſſed the Alps at the head of 150,000, or, as ſome will have it, 200,000 men, and entered Liguria. As no hoſtilities were committed by them on their march, the Goths concluded that they were come to their aſſiſtance; and therefore took care to ſupply them with proviſions. Thus they croſſed the Po without oppoſition; and having ſecured the

21 Italy invaded by the Franks.

the bridge, marched towards the place where a body of Goths were encamped; who, looking upon them as friends, admitted them without heſitation. But they were ſoon convinced of their miſtake; for the Franks falling unexpectedly upon them, drove them out of the camp with great ſlaughter, and ſeized on their baggage and proviſions. A body of Romans that lay at a ſmall diſtance from the Goths, concluding that they had been defeated by Beliſarius, advanced with great joy to meet *him* as they imagined; but the Franks falling unawares upon them, treated them as they had done the Goths, and made themſelves maſters of their camp. Thus they acquired a very conſiderable booty and ſtore of proviſions: but the latter being ſoon conſumed, and the country round about quite exhauſted, vaſt numbers of the Franks periſhed; ſo that Theodebert at laſt found himſelf obliged to return. In his way he deſtroyed Genoa, and ſeveral other places, and arrived in his own dominions loaded with booty.

22
Succeſs of Beliſarius.

In the mean time, Beliſarius was making great progreſs. He took the cities of Auximum and Fæſulæ, after an obſtinate ſiege; the inhabitants of the former having for ſome time fed on graſs before they would ſurrender. After this he inveſted Ravenna, the capital of all the Gothic dominions in Italy. The place was defended by a very numerous garriſon, commanded by the king in perſon, who exerted all his bravery in the defence of his metropolis. As the ſiege, however, was puſhed on with great vigour, it was evident that the city muſt at laſt ſubmit; and the great ſucceſſes of the Romans began to give jealouſy to the neighbouring potentates. Theodebert king of the Franks offered to aſſiſt Vitiges with an army of 500,000 men; but Beliſarius, being informed of this negociation, ſent ambaſſadors to Vitiges, putting him in mind of the treachery of the Franks, and aſſured him that the emperor was ready to grant him very honourable terms. The king, by the advice of his counſellors, rejected the alliance of the Franks, and ſent ambaſſadors to Conſtantinople; but in the mean time, Beliſarius, in order to bring the citizens to his own terms, bribed one of them to ſet fire to a magazine of corn, by which means the city was ſoon ſtraitened for want of proviſions. But, notwithſtanding this diſaſter, they ſtill continued to hold out, till the arrival of the ambaſſadors from Conſtantinople, who brought very favourable terms. Theſe were, That the country beyond the Po, with reſpect to Rome, ſhould remain to the Goths; but that the reſt of Italy ſhould be yielded to the emperor, and the royal treaſure of the Goths ſhould be equally divided between him and the king. To theſe conditions, however, Beliſarius poſitively refuſed to aſſent; being deſirous of leading captive the king of the Goths, as he had formerly done the king of the Vandals, to Conſtantinople. He therefore purſued the ſiege with more vigour than ever, without hearkening to the complaints of his ſoldiers and officers, who were quite tired out with the length of the ſiege: he only obliged ſuch of the officers as were of opinion that the town could not be taken, to expreſs their opinion in writing, that they might not deny it afterwards.

The Goths were as weary of the ſiege as the Romans; but, fearing leſt Juſtinian ſhould tranſplant them to Thrace, formed a reſolution, without the conſent of their king, of ſurrendering to Beliſarius himſelf, and declaring him emperor of the weſt. To this they were the more encouraged by the refuſal of Beliſarius to agree to the terms propoſed by the emperor, from whence they concluded that he deſigned to revolt, and make himſelf emperor of Italy. Of this, however, Beliſarius had no deſign; but thought proper to accept of the title, in order to accelerate the ſurrender of the city, after acquainting his principal officers with what had paſſed. Vitiges at laſt diſcovered the plot; but finding himſelf in no condition to oppoſe it, he commended the reſolution of his people, and even wrote to Beliſarius, encouraging him to take upon him the title of *king*, and aſſuring him of his aſſiſtance. Hereupon Beliſarius preſſed the Goths to ſurrender; which, however, they ſtill refuſed, till he had taken an oath that he would treat them with humanity, and maintain them in the poſſeſſion of all their rights and privileges. Upon this he was admitted into the city, where he behaved with great moderation towards the Goths; but ſeized on the royal treaſure, and ſecured the perſon of the king. The Roman army, when it entered Ravenna, appeared ſo very inconſiderable, that the Gothic women, on beholding it, could not forbear ſpitting in the faces of their huſbands, and reviling them as cowards.

23
Ravenna reduced, and Vitiges taken priſoner.

The captivity of Vitiges, and the taking of Ravenna, did not put an end to the war. Beliſarius was ſoon after recalled to take the command of the army in the eaſt. The Goths were greatly ſurpriſed that he ſhould leave his new kingdom out of regard to the orders of the emperor; but, after his departure, choſe one Ildebald, a man of great experience in affairs both civil and military, for their king. He revived the drooping ſpirits of his countrymen, defeated the Romans, and reduced all the province of Venetia; but was in a ſhort time murdered, and Eraric, a Rugian, ſucceeded to the throne. He was ſcarce inveſted with the ſovereignty, when his ſubjects began to think of depoſing him, and raiſing Totila to the throne; which the latter accepted, upon condition that they previouſly diſpatched Eraric. This was accordingly done; after which Totila was proclaimed king of Italy, in the year 542.

24
Succeſs of Totila againſt the Romans.

The new king proved a very formidable enemy to the Romans, who now loſt ground every-where. They made an attempt on the city of Verona; in which they miſcarried through their own avarice, having diſputed about the diviſion of the plunder till the opportunity of taking the town was paſt. They were next defeated in two bloody engagements; the conſequence of which was, that the Goths made themſelves maſters of all the ſtrong places in Tuſcany. From thence marching into Campania and Samnium, they reduced the ſtrong town of Beneventum, and laid ſiege to Naples. During the ſiege of this laſt place, ſeveral detachments were ſent from the king's army, which took Cumæ, and recovered all Brutia, Lucania, Apulia, and Calabria, where they found conſiderable ſums which had been gathered for the emperor's uſe. The Romans, in the mean time, diſheartened by their loſſes, and deprived of thoſe ſums which ſhould have paid their wages, refuſed to take the field. A conſiderable fleet was therefore ſent by Juſtinian to the relief of Naples: but Totila, having timely notice of this deſign, manned, with incredible expedition, a great number of light veſſels; which, falling unexpectedly on the Roman fleet, took or ſunk every ſhip, and made priſoners of all on board, excepting a few who eſcaped in their boats. A ſimilar fate attended another fleet diſpatched from Sicily for the ſame purpoſe. They put to ſea in the depth of winter; and, meeting with a violent ſtorm, were driven aſhore near the enemy's camp; who ſunk the ſhips, and made what ſlaughter they pleaſed of the ſeamen and ſoldiers. Upon this ſecond diſaſter, the Neapolitans, deſpairing of further relief, ſubmitted to Totila; who granted them honourable terms, and treated them with great humanity. As they had been long pinched with famine, Totila, apprehending they might endanger their lives by indulging their appetites too much at firſt, placed guards at the gates to prevent their going out, taking care at the ſame time to ſupply them ſparingly with proviſions, but increaſing their allowance every day. Being thus by degrees reſtored to their former ſtrength, he ordered the gates to be ſet open, and gave every one full liberty to ſtay in the city, or remove, as he thought fit. The garriſon he treated with extraordinary kindneſs. They were firſt ſupplied with ſhips to carry them to Conſtantinople; but the king having diſcovered that their real deſign was to ſail to Rome, in order to reinforce the garriſon of that city, (which they knew he was ſoon to beſiege,) he was ſo far from puniſhing them as they expected, that he furniſhed them with horſes, waggons, and proviſions, and ordered a body of Goths to eſcort them to Rome by land, as the winds had proved unfavourable for their paſſage by ſea.

Totila having thus become maſter of Naples and moſt of the other fortreſſes in theſe parts, began to think of reducing Rome alſo. He firſt attempted to perſuade the citizens to a ſurrender: but finding his perſuaſions ineffectual, he ſent a detachment of his army into Calabria to reduce Otranto, which had not yet ſubmitted; after which, he marched with the reſt of his forces againſt the towns in the neighbourhood of Rome. The city of Tibur, now Tivoli, about 18 miles from Rome, was betrayed to him, and all the inhabitants, together with their biſhop, put to the ſword. Several other ſtrong holds in the neighbourhood of that city he took by ſtorm; ſo that Rome was in a manner blocked up by land, all communication with the neighbouring country being cut off.

Juſtinian, in the mean time, being greatly perplexed by the bad news he every day received from Italy, recalled Beliſarius from Perſia, notwithſtanding the ſucceſs which attended him there. To ſave Rome, however, was now impoſſible even for Beliſarius himſelf. As ſoon as he arrived in Italy, finding himſelf unable either to relieve the towns which were beſieged, or to ſtop the progreſs of the Goths, he diſpatched letters to Juſtinian, informing him, that being deſtitute of men, arms, and money, it was impoſſible for him to proſecute the war; upon which the emperor ordered new levies to be made, all the veterans being engaged in the Perſian war. In the mean time, however, Totila purſued his good fortune; took the cities of Firmum, Aſculum, Auximum, Spoletum, &c. and at length advanced to Rome, which he inveſted on all ſides. 25 Rome beſieged. As he drew near the city, two officers, whom Beliſarius had ſent into the city, ventured to make a ſally, though contrary to the expreſs orders of their general, thinking they ſhould ſurpriſe the Goths; but they were themſelves taken in an ambuſcade, and, moſt of their men being cut in pieces, narrowly eſcaped falling into the hands of the enemy. Beliſarius made ſeveral attempts to relieve the city: but all of them, however well concerted, by ſome accident or other proved unſucceſsful; which gave him ſo much uneaſineſs, that he fell into a feveriſh diſorder, and was for ſome time thought to be in danger of his life. The city was ſoon reduced to great ſtraits: a dreadful famine enſued; and the unhappy citizens having conſumed every thing that could be ſuppoſed to give them nouriſhment, even the graſs that grew near the walls, were obliged to feed on their own excrements. Many put an end to their lives, in order to free themſelves from the intolerable calamities they ſuffered. The reſt addreſſed their governor Beſſas in the moſt pathetic manner, intreating him to ſupply them with food; or if that was not in his power, either to give them leave to go out of the town, or to put an end to their miſeries by putting them to death. Beſſas replied, that to ſupply them with food was impoſſible, to let them go unſafe, and to kill them impious. In the end, however, he ſuffered thoſe who were willing to retire, to leave the city, upon paying him a ſum of money; but moſt of them either died on the road, or were cut in pieces by the enemy. At laſt, the beſieged, unable to bear their miſeries any longer, began to mutiny, and to preſs their governor to come to an agreement with Totila. This, however, he ſtill refuſed; upon which, four of the Iſaurians who guarded one of the gates, went privately to the camp of Totila, and offered to admit him into the city. 26 And taken. The king received this propoſal with great joy; and ſending four Goths of great ſtrength and intrepidity into the town along with them, he ſilently approached the gates in the night-time with his whole army. The gates were opened by the Iſaurians, as they had promiſed; and upon the firſt alarm, Beſſas with moſt of the ſoldiers and officers, fled out of the town. The inhabitants took ſanctuary in the churches; and only 60 of them and 26 ſoldiers were killed after the town was taken. Totila, however, gave his ſoldiers full liberty to plunder the city: which they did for ſeveral days together, ſtripping the inhabitants of all their wealth, and leaving nothing in their houſes but naked walls; by which means many perſons of diſtinction were reduced to beg their bread from door to door. In the houſe of Beſſas was found an immenſe treaſure, which he had ſcandalouſly amaſſed during the ſiege, by ſelling to the people, at an exorbitant price, the corn which had been ſtored up for the uſe of the garriſon.

Totila, thus become maſter of Italy, ſent ambaſſadors to Juſtinian with very reſpectful letters, deſiring to live on the ſame terms with him that Theodoric had done with his predeceſſor Anaſtaſius, promiſing in that caſe to reſpect him as his father, and to aſſiſt him, when he pleaſed, with all his force, againſt any other nation whatever. On the contrary, if the emperor rejected his offers, he threatened to level Rome with the ground, to put the whole ſenate to the ſword, and carry the war into Illyricum. The emperor returned no other

ther anſwer, than that he referred the whole to Beliſarius, who had full power to manage all things of that nature. Upon this Totila reſolved to deſtroy the city; and had actually thrown down a third part of the wall, when he received a letter from Beliſarius, diſſuading him from his intention. After having ſeriouſly conſidered this letter, Totila thought proper to alter his reſolution with regard to the deſtruction of the city; but ſent every one of the inhabitants into Lucania, without leaving a ſingle perſon in the metropolis. Beliſarius hearing of this, immediately returned to the capital, and undertook to repeople and repair it. He cleared the ditch which had been filled by Totila, but was for the preſent obliged to fill up the breaches in the walls with ſtones looſely heaped upon one another; and in this ſituation the city was again attacked by the Goths. Beliſarius, however, had taken care to ſupply the inhabitants with plenty of proviſions, ſo that they were now in no danger of ſuffering by famine; and the aſſaults of the enemy were vigorouſly repelled notwithſtanding the bad ſituation of the fortifications, ſo that Totila at laſt abandoned the enterprize.

27
Beliſarius
recalled.

In the mean time the Perſians gained great advantages over the Romans in the Eaſt, ſo that there was a neceſſity for recalling Beliſarius a ſecond time. He was no ſooner gone, than Totila renewed his efforts with greater vigour than ever; and at the ſame time the Franks, concluding that both Romans and Goths would be much weakened by ſuch a deſtructive war, ſeized upon Venetia which belonged to both nations, and made it a province of the French empire. Totila did not oppoſe them; but having obtained a reinforcement of 6000 Lombards, returned immediately before Rome, fully intent on making himſelf maſter of that metropolis. Having cloſely inveſted it by ſea and land, he hoped in a ſhort time to reduce it by famine: but againſt this the governor wiſely provided, by cauſing corn to be ſown within the walls; ſo that he could probably have defied the power of Totila, had not the city been again betrayed by the Iſaurians, who opened one of the gates, and admitted the enemy.

26
And taken

Thus the empire of the Goths was a third time eſtabliſhed in Italy; and Totila, immediately on his becoming maſter of Rome, diſpatched ambaſſadors to Juſtinian, offering to aſſiſt him as a faithful ally againſt any nation whatever, provided he would allow him the quiet poſſeſſion of Italy. But Juſtinian was ſo far from hearkening to this propoſal, that he would not even admit the ambaſſadors into his preſence; upon which Totila reſolved to purſue the war with the utmoſt vigour, and to make himſelf maſter, not only of thoſe places which the Romans poſſeſſed in Italy, but in Sicily alſo. This he fully accompliſhed, when Narſes, who had formerly been joined in the command with Beliſarius, was appointed general, with abſolute and uncontrouled authority. But while this general was making the neceſſary preparations for his expedition, Totila, having equipped a fleet of 300 galleys, ſent them to pillage the coaſts of Greece, where they got an immenſe booty. They made a deſcent on the iſland of Corfu; and having laid it waſte, they ſailed to Epirus, where they ſurpriſed and plundered the cities of Nicopolis and Anchialus, taking many ſhips on the coaſt, among which were ſome laden with proviſions for the army of Narſes. After theſe ſucceſſes they laid ſiege to Ancona in Dalmatia: but, being defeated both by ſea and land, Totila once more ſent ambaſſadors to Conſtantinople, offering to yield Sicily and all Dalmatia, to pay an annual tribute for Italy, and to aſſiſt the Romans as a faithful ally in all their wars; but Juſtinian, bent upon driving the Goths out of Italy, would not even ſuffer the ambaſſadors to appear in his preſence.

28
arſes ſent
to Italy.

Totila, finding that no terms could be obtained, began to levy new forces, and make great preparations by ſea and land. He ſoon reduced the iſlands of Corſica and Sardinia; but this was the laſt of his ſucceſſes. Narſes arrived in Italy with a very formidable army; and an immenſe treaſure to pay the troops their arrears, the want of which had been one great cauſe of the bad ſucceſs of Beliſarius in his laſt expedition. He immediately took the road to Rome; while Totila aſſembled all his forces, in order to decide the fate of Italy by a general engagement. The battle proved very obſtinate; but at laſt the Gothic cavalry being put to the rout, and retiring in great confuſion among the infantry, the latter were thereby thrown into ſuch diſorder, that they could never afterwards rally. Narſes, obſerving their confuſion, encouraged his men to make a laſt effort; which the Goths not being able to withſtand, betook themſelves to flight, with the loſs of 6000 men killed on the ſpot. Totila finding the day irrecoverably loſt, fled with only five horſemen for his attendants; but was purſued and mortally wounded by a commander of one of the bodies of barbarians who followed Narſes. He continued his flight, however, for ſome time longer; but was at laſt obliged to halt in order to get his wound dreſſed, ſoon after which he expired.

29
Who defeats and
kills Totila.

This diſaſter did not yet entirely break the ſpirit of the Goths. They choſe for their king one Teia, deſervedly eſteemed one of the moſt valiant men of their nation, and who had on ſeveral occaſions diſtinguiſhed himſelf in a moſt eminent manner. All the valour and experience of Teia, however, were now inſufficient to ſtop the progreſs of the Romans. Narſes made himſelf maſter of a great number of cities, and of Rome itſelf, before the Goths could aſſemble their forces. The Roman general next proceeded to inveſt Cumæ, which Teia determined at all events to relieve, as the royal treaſure was lodged in that city. This brought on an engagement, which, if Procopius is to be credited, proved one of the moſt bloody that ever was fought. The Roman army conſiſted of vaſt multitudes brought from different nations: the Goths were few in compariſon; but, animated by deſpair, and knowing that all was at ſtake, they fought with the utmoſt fury. Their king placed himſelf in the firſt rank, to encourage his men by his example; and is ſaid to have given ſuch proofs of his valour and conduct as equalled him to the moſt renowned heroes of antiquity. The Romans diſcovering him, and knowing that his death would probably put an end to the battle, if not to the war itſelf, directed their whole force againſt him, ſome attacking him with ſpears, and others diſcharging againſt him ſhowers of darts and arrows. Teia maintained his ground with great intrepidity, received the miſſive weapons on his ſhield, and killed a great number of the enemy with his own hand. When his ſhield was ſo loaded with darts that he

30
And Teia.

he could not eaſily wield it, he called for another. Thus he ſhifted his ſhield three times; but as he attempted to change it another time, his breaſt being neceſſarily expoſed for a moment, a dart ſtruck him in that moment with ſuch force, that he immediately fell down dead in the place where he had ſtood from the beginning of the battle, and upon heaps of the enemy, whom he had killed. The Romans, ſeeing him fall, cut off his head and expoſed it to the ſight of the Goths, not doubting but they would be immediately diſheartened and retire. In this, however, they were diſappointed. The Goths maintained the fight with great vigour, till night put an end to the engagement. The next day the engagement was renewed early in the morning, and continued till night; but on the third day, the Goths deſpairing of being able to overcome an enemy ſo much ſuperior to them in numbers, ſent deputies to Narſes, offering to lay down their arms, provided ſuch of them as choſe to remain in Italy were allowed to enjoy their eſtates and poſſeſſions, without moleſtation, as ſubjects of the empire, and thoſe who were willing to retire elſewhere, were ſuffered to carry with them all their goods and effects. To theſe terms Narſes readily aſſented; and thus the empire of the Goths in Italy was finally deſtroyed, the country now becoming a province of the eaſtern Roman empire.

31
The end of the empire of the Goths in Italy.

In this conqueſt, Narſes had been aſſiſted, as already obſerved, by many barbarous nations, among whom were the Lombards, at that time ſettled in Pannonia. On the concluſion of the war, they were diſmiſſed with rich preſents, and the nation for ſome time continued faithful allies to the Romans. In the mean time Juſtinian dying, Narſes, who governed Italy with an abſolute ſway, was accuſed to the emperor Juſtin II. and to the empreſs Sophia, of aſpiring at the ſovereignty of the country. Hereupon he was recalled, and Longinus ſent to ſucceed him. As Narſes was an eunuch, the empreſs is reported to have ſaid, that his employment at Conſtantinople ſhould be to diſtribute in the apartment of her women the portion of wool which each was to ſpin. Narſes, enraged at this ſarcaſm, replied, that he ſhould begin ſuch a web as ſhe ſhould never be able to finiſh; and immediately diſpatched meſſengers to Alboinus king of the Lombards, inviting them into Italy. Along with the meſſengers he ſent ſome of the beſt fruits the country afforded, in order to tempt him the more to become maſter of ſuch a rich kingdom.

31
Narſes invites the Lombards.

Alboinus, highly pleaſed with the opportunity of invading a country with which his ſubjects were already well acquainted, began, without loſs of time, to make the neceſſary preparations for his journey. In the month of April 568, he ſet out with his whole nation, men, women, and children; carrying with them all their moveables. This promiſcuous multitude arrived by the way of Iſtria; and advancing through the province of Venetia, found the whole country abandoned, the inhabitants having fled to the neighbouring iſlands in the Adriatic. The gates of Aquileia were opened by the few inhabitants who had courage to ſtay: moſt of them, however, had fled with all their valuable effects; and among the reſt the Patriarch Paulinus, who had carried with him all the valuable ſacred utenſils of the churches. From Aquileia, Alboinus proceeded to Forum Julii, of which he likewiſe became maſter without oppoſition. Here he ſpent the winter; during which time he erected Friuli into a dukedom, which has continued ever ſince. In 569, he made himſelf maſter of Trivigi, Oderzo, Monte Selce, Vicenza, Verona, and Trent; in each of which cities he left a ſtrong garriſon of Lombards under the command of an officer, whom he diſtinguiſhed by the title of *duke*: but theſe dukes were only officers and governors of cities, who bore the title no longer than the prince thought droper to continue them in their command or government. Padua and ſome other cities Alboinus left behind him without attempting to reduce them, either becauſe they were too well garriſoned, or becauſe they lay too much out of his way. In 570, he entered Liguria. The inhabitants were ſo terrified at his approach, that they left their habitations with ſuch of their effects as they could carry off, and fled into the moſt mountainous and inacceſſible parts of the country. The cities of Breſcia, Bargamo, Lodi, Como, and others quite to the Alps, being left almoſt without inhabitants, ſubmitted of courſe; after which he reduced Milan, and was thereupon proclaimed king of Italy.

32
Who reduce the greateſt part of Italy.

But though the Lombards had thus conferred the title of king of Italy on their ſovereign, he was by no means poſſeſſed of the whole country, nor indeed was it ever in the power of the Lombards to get poſſeſſion of the whole. Alboinus having made himſelf maſter of Venetia, Liguria, Æmilia, Hetruria, and Umbria, applied himſelf to legiſlation and the civiliſation of his ſubjects. But before he could make any progreſs in this work, he was taken off by the treachery of his wife; and Clephis, one of the nobles, choſen king in his ſtead. Clephis rebuilt ſome cities which had been ruined during the wars between the Goths and Romans, and extended his conqueſts to the very gates of Rome; but as he behaved both to the Romans and Lombards with the greateſt cruelty, he was murdered, after a ſhort reign of 18 months. His cruelty gave the Lombards ſuch an averſion againſt regal power, that they changed their form of government, being governed only by their dukes for the ſpace of ten years. During this interregnum, they proved ſucceſsful in their wars with the Romans, and made themſelves maſters of ſeveral cities: but perceiving that their kingdom, thus divided, could not ſubſiſt, they reſolved once more to ſubmit to the authority of one man; and accordingly, in 585, Autharis was choſen king of the Lombards.

33
Subdued by Charlemagne.

The great object of ambition to the new race of Lombard monarchs was the conqueſt of all Italy; and this proved at laſt the ruin of their empire by Charles the Great, as related under the article France, n° 21. As the Lombards, however, had not been poſſeſſed of the whole territory of Italy, ſo the whole of it never came into the poſſeſſion of Charlemagne: neither, ſince the time of the Goths, hath the whole of this country been under the dominion of any ſingle ſtate. Some of the ſouthern provinces were ſtill poſſeſſed by the emperors of Conſtantinople; and the liberal grants of Pepin and Charlemagne himſelf to the pope, had inveſted him with a conſiderable ſhare of temporal power. The territories of the pope indeed were ſuppoſed to be held in vaſſalage from France; but this the popes themſelves

34 Extent of his Italian dominions.

ſelves always ſtiffly denied. The indiſputed territory of Charlemagne in Italy, therefore, was reſtricted to Piedmont, the Milaneſe, the Mantuan, the territory of Genoa, Parma, Modena, Tuſcany, Bologna, the dukedoms of Friuli, Spoleto, and Benevento; the laſt of which contained the greateſt part of the preſent kingdom of Naples.

The feudal government which the Lombards had introduced into Italy, naturally produced revolts and commotions, as the different dukes inclined either to change their maſters, or to ſet up for themſelves. Several revolts indeed happened during the life of Charlemagne himſelf; which, however, he always found means to cruſh: but after his death, the ſovereignty of Italy became an object of contention between the kings of France and the emperors of Germany. That great monarch had divided his extenſive dominions among his children; but they all died during his lifetime, except Lewis, whom he aſſociated with himſelf in the empire, and who ſucceeded to all his dominions after his death. From this time we may date the troubles with which Italy was ſo long overwhelmed; and of which, as they proceeded from the ambition of thoſe called kings of Italy and their nobles, of the kings of France, and of the emperors of Germany, it is difficult to have any clear idea. The following ſhort ſketch, however, may perhaps give ſome ſatisfaction on this perplexed ſubject.

35 Hiſtory of the diſturbances in Italy after the time of Charlemagne.

At the time Lewis the ſon of Charlemagne was declared emperor of the Weſt, Italy was held by Bernard the ſon of Pepin, brother to Lewis. Though this Bernard bore the title of *king*, yet he was only accounted a vaſſal of the emperor. His ambition, however, ſoon prompted him to rebel againſt his uncle; but being abandoned by his troops, he was taken priſoner, had his eyes pulled out, and died three days after. As the diſturbances ſtill continued, and the nobles of Lombardy were yet very refractory, Lothaire, eldeſt ſon to the emperor, was, in the year 823, ſent into Italy; of which country he was firſt crowned king at Rome, and afterwards emperor of the Weſt, during his father's life-time. But though his abilities were ſufficient to have ſettled every thing in a ſtate of tranquillity, his unbounded ambition prompted him to engage in rebellion againſt his father; whom he more than once took priſoner; though in the end he was obliged to ſubmit, and aſk pardon for his offences, which was obtained only on condition of his not paſſing the Alps without leave obtained from his father.

In the mean time, the Saracens, taking advantage of theſe inteſtine wars, landed on the coaſts of Italy, and committed ſuch ravages, that even the biſhops were obliged to arm themſelves for the defence of the country. Lothaire, however, after returning from his unnatural war with his father, was ſo far from attempting to put an end to theſe ravages, or to reſtore tranquillity, that he ſeized on ſome places belonging to the ſee of Rome, under pretence that they were part of his kingdom of Lombardy; nor would he forbear theſe encroachments, till expreſsly commanded to do ſo by his father. After having embroiled himſelf, and almoſt loſt all his dominions, in a war with his brothers after the death of Lewis, and declared his ſon, alſo called *Lewis*, king of Italy, this ambitious prince died, leaving to Lewis the title of *emperor*, as well as *king of Italy*, with which he had before inveſted him.

The new emperor applied himſelf to the reſtoration of tranquillity in his dominions, and driving out the Saracens from thoſe places which they had ſeized in Italy. This he fully accompliſhed, and obliged the infidels to retire into Africa; but in 875, he died, without naming any ſucceſſor. After his death, ſome of the Italian nobles, headed by the duke of Tuſcany, repreſented to the pope, that as Lewis had left no ſucceſſor, the regal dignity, which had ſo long been uſurped by foreigners, ought now to return to the Italians. The pope, however, finding that Charles the Bald, king of France, had ſuch an ambition for the imperial crown, that he would ſtick at nothing to obtain it, reſolved to gratify him, though at as high a price as poſſible. He accordingly crowned him emperor and king of Lombardy, on condition of his owning the independency of Rome, and that he himſelf only held the empire by the gift of the pope. This produced a conſpiracy among the diſcontented nobles; and at the ſame time the Saracens, renewing their incurſions, threatened the eccleſiaſtical territories with the utmoſt danger. The pope ſolicited the emperor's aſſiſtance, with the greateſt earneſtneſs; but he died before any thing effectual could be done: after which, being diſtreſſed by the Saracens on one hand, and the Lombard nobles on the other, the unhappy pontiff was forced to fly into France. Italy now fell into the utmoſt confuſion and anarchy; during which time many of the nobles and ſtates of Lombardy aſſumed an independence, which they have ever ſince retained.

In 879, the pope was reconducted to Italy with an army by Boſon ſon-in-law to Lewis II. of France: but though he inclined very much to have raiſed this prince to the dignity of king of Italy, he found his intereſt inſufficient for that purpoſe, and matters remained in their former ſituation. The nobles, who had driven out the pope, were now indeed reconciled to him: but notwithſtanding this reconciliation, the ſtate of the country was worſe than ever; the great men renouncing the authority of any ſuperior, and every one claiming to be ſovereign in his own territories. To add to the calamities, which enſued through the ambition of theſe deſpots, the Saracens committed every where the moſt terrible ravages; till at laſt the Italian nobles, deſpiſing the kings of the Carlovingian race, who had weakened themſelves by their mutual diſſentions, began to think of throwing off even all nominal ſubmiſſion to a foreign yoke, and retaining the imperial dignity among themſelves. Thus they hoped, that, by being more united among themſelves, they might be more able to reſiſt the common enemy. Accordingly, in 885, they went to pope Adrian; and requeſting him to join them in aſſerting the independency of Italy, they obtained of him the two following decrees, viz. That the popes, after their election, might be conſecrated without waiting for the preſence of the king or his ambaſſadors; and that, if Charles the Groſs died without ſons, the kingdom of Italy, with the title of *emperor*, ſhould be conferred on ſome of the Italian nobles.

Theſe decrees were productive of the worſt conſequences imaginable. The emperor complained of being

ing deprived of his right; and the diſſentions between the Italian nobles themſelves became more fatal than ever. The two moſt powerful of theſe noblemen, Berengarius duke of Friuli, and Guido or Vido duke of Spoleto, entered into an agreement, that, on the death of the emperor, the former ſhould ſeize on the kingdom of Italy, and the latter on the kingdom of France. Berengarius ſucceeded without oppoſition, but Vido was diſappointed, the French having already choſed Eudes or Otho for their king. Upon this he returned to Italy, and turned his arms againſt Berengarius. Vido proved victorious in an engagement, and drove his rival into Germany; where he ſought the aſſiſtance of Arnolphus, who had ſucceeded to the crown after the death of Charles. Having thus obtained the kingdom of Italy, Vido employed his time in reforming the abuſes of the ſtate, and confirming the grants formerly given to the pope out of gratitude for his having ſanctified his uſurpation and declared him lawful king of Italy. This tranquillity, however, was of ſhort duration. Arnolphus ſent an army into Italy; the Saracens from Spain ravaged the northern parts of the country, and, getting poſſeſſion of a caſtle near the Alps, held it for many years after, to the great diſtreſs of the neighbouring parts, which were expoſed to their continual incurſions; and at the ſame time Benevento was beſieged and taken by the forces of the eaſtern emperor, ſo that Vido found his empire very conſiderably circumſcribed in its dimenſions.

The new king, diſtreſſed by ſo many enemies, aſſociated his ſon Lambert with him in the government, and bribed the Germans to return to their own country. In 893, however, they again invaded Italy; but were ſuddenly obliged to leave the country, after having put Berengarius in poſſeſſion of Pavia. In the mean time, Vido died, and his ſon Lambert drove out Berengarius: but having joined a faction, headed by one Sergius, againſt pope Formoſus, the latter offered the kingdom of Italy to Arnolphus; who thereupon entered the country with an army, beſieged and took Rome, maſſacring the faction of Sergius with the moſt unrelenting cruelty.

Arnolphus thus maſter of Italy, and crowned emperor by the pope, began to form ſchemes of ſtrengthening himſelf in his new acquiſitions by putting out eyes of Berengarius: but the latter, having timely notice of this treachery, fled to Verona; and the Italians, were ſo provoked at this and the other cruelties of Arnolphus, that they drove him out of the country. His departure occaſioned the greateſt confuſion at Rome. Formoſus died ſoon after; and the ſucceſſors to the papal dignity, having now no army to fear, excited the greateſt diſturbances. The body of Formoſus was dug up and thrown into the Tiber by one pope, while that pope was ſtrangled, and Formoſus's body buried again in the Vatican, by order of another. At laſt the coronation of Arnolphus was declared void, the Sergian faction entirely demoliſhed, and the abovementioned decrees of Adrian annulled; it being now determined that the elected popes ſhould not be conſecrated but in preſence of the emperor or his ambaſſadors.

During theſe confuſions Lambert enjoyed the kingdom in quiet; but the nobles, hating him on account of his arbitrary and tyrannical government, began again to think of Berengarius. In the mean time, however, another faction offered the crown to Lewis king of Arles. This new competitor entered Italy with an army in 899; but was forced by Berengarius to renounce his claim upon oath, and to ſwear, that he would never again enter Italy, even though he ſhould be invited to be crowned emperor.—This oath, however, was ſoon forgot. Lewis readily accepted of another invitation, and was crowned king of Italy at Pavia in 901. The following year he forced Berengarius to fly into Bavaria; but having unadviſedly diſbanded his army, as thinking himſelf now ſecurely ſeated on the throne, Berengarius, who watched every opportunity, ſurpriſed him at Verona, and put out his eyes.

Thus Berengarius at laſt became king of Italy without a rival; and held his kingdom for 20 years afterwards, without any oppoſition from his ſubjects, who at laſt became ſenſible of the miſchiefs ariſing from civil diſcords. He was not yet, however, without troubles. The Hungarians invaded Italy with a formidable army, and advanced within a ſmall diſtance of Pavia. Berengarius armed the whole force of his dominions; and came againſt them with ſuch a multitude, that the Hungarians retired without venturing an engagement. A great many of their men were loſt in paſſing a river; upon which they ſent deputies to Berengarius, offering to reſtore all their booty, and never to come again into Italy, provided they were allowed a ſafe retreat. Theſe conditions were imprudently denied; upon which the Hungarians attacked the army of Berengarius in deſpair, and defeated them with great ſlaughter. After this they over-ran the whole country, and plundered the towns of Treviſo, Vicenza, and Padua, without reſiſtance, the inhabitants flying every where into fortified places. This devaſtation they continued for two years; nor could their departure be procured without paying them a large ſum of money: which, however, proved of little avail; for the following year they returned, and ravaged the territory of Friuli without controul. Scarcely were theſe invaders departed, when the Saracens, who had ſettled at the foot of the Alps, invaded Apulia and Calabria, and made an irruption as far as Acqui in the neighbourhood of Pavia; while the inhabitants, inſtead of oppoſing them, fled to ſome forts which had been erected in the time of the firſt irruption of the Hungarians. In 912, however, John, preſbyter of Ravenna, having attained the papal dignity by means of Theodora, wife of Adelbert count of Tuſcany, applied himſelf to regulate the affairs of the church, and to repreſs the inſults of the Saracens. While he was conſidering on the moſt proper methods of effecting this, one of the Saracens, who had received an injury from his countrymen, fled to Rome, and offered to deliver the Italians from their invaſions, if the Pope would but allow him a ſmall body of men. His propoſals being accepted, 60 young men were choſen, all well armed; who being conducted by the Saracen into by-paths, attacked the infidels as they were returning from their inroads, and ſeveral times defeated great parties of them. Theſe loſſes affecting the Saracens, a general alliance was concluded amongſt all their cities; and having fortified a town on the Garigliano, they abandoned the reſt, and retired thither. Thus they became much more formidable than before; which alarming the pope, he conſulted with Atenulphus prince of Benevento and Capua, ſending at the ſame time ambaſſadors to Conſtantine the Greek emperor, inviting him to an alliance againſt the infidels. The Saracens, unable to withſtand ſuch a powerful combination, were beſieged in their city: where being reduced to great ſtraits, they at laſt ſet fire to it, and ſallied out into the woods; but being purſued by the Italians, they were all cut off to a man.

In this expedition it is probable that Berengarius gave great aſſiſtance; for this very year, 915, he was crowned emperor by the pope. This gave diſpleaſure to many of the ambitious nobles; conſpiracies were repeatedly formed againſt him; in 922, Rodolphus king of Burgundy was crowned alſo king of Italy; and in 924, Berengarius was treacherouſly aſſaſſinated at Verona; of which diſturbances, the Hungarians taking the advantage, plundered the cities of Mantua, Breſcia, and Bergamo. Marching afterwards to Pavia, they inveſted it cloſely on all ſides; and about the middle of March 925, taking advantage of the wind, they ſet fire to the houſes next the walls, and during the confuſion broke open the gates, and, getting poſſeſſion of the city, treated the inhabitants with the greateſt barbarity. Having burnt the capital of the kingdom, they next proceeded to Placenza, where they plundered the ſuburbs; and then returned to Pannonia, laden with booty.

36
Pavia plundered and burnt by the Hungarians.

The affairs of Italy now fell into the utmoſt confuſion. A faction was formed againſt Rodolphus in favour of Hugh count of Arles. The latter prevailed, and was crowned king at Pavia in 927. The Italians, however, ſoon repented of their choice. The Romans firſt invited him to be their governor, and then drove him out with diſgrace; at the ſame time chooſing a conſul, tribunes, &c. as if they had deſigned to aſſert their ancient liberty. One faction, in the mean time, offered the crown to Rodolphus, and the other to Arnold duke of Bavaria, while the Saracens took this opportunity to plunder the city of Genoa.

Hugh, in the mean time, was not inactive. Having collected an army, he marched directly againſt Arnold, and entirely defeated him. Rodolphus delivered him from all apprehenſions on his part, by entering into an alliance with him, and giving his daughter Adelaide in marriage to Lotharius, Hugh's ſon. Being thus free from all danger from foreign enemies, he marched againſt the Romans; but with them he alſo came to an agreement, and even gave his daughter in marriage to Alberic, whom they had choſen conſul. In the mean time the country was infeſted by the Hungarians and Saracens, and at the ſame time depopulated by a plague. Endleſs conſpiracies were formed againſt Hugh himſelf; and at laſt, in 947, he was totally deprived of the regal power by Berengarius, grandſon to the firſt king of that name; ſoon after which he retired into Burgundy, and became a monk.

Though Berengarius was thus poſſeſſed of the ſupreme power, he did not aſſume the title of *king* till after the death of Lotharius, which happened in 950; but, in the mean time, Italy was invaded by Henry duke of Bavaria, and the Hungarians. The former took and plundered the city of Aquileia, and ravaged the neighbouring country; after which he returned without moleſtation into Germany: the latter made a furious irruption, and Berengarius being unable to oppoſe them, was at laſt obliged to purchaſe their departure by money. In raiſing the ſum agreed upon, however, Berengarius is ſaid to have been more oppreſſive than even the Hungarians themſelves. Every individual, without diſtinction of age or ſex, was obliged to pay ſo much for their head; not excepting even the poor. The churches were likewiſe robbed; by which means the king raiſed an immenſe ſum of money, 10 buſhels of which he gave to the Hungarians, but kept the much greater part to himſelf.

37
Italy oppreſſed by the Hungarians and Berengarius.

Berengarius, not yet ſatiſfied, wanted to be put in poſſeſſion of Pavia, which was held by Adelaide, the widow of Lotharius. In order to obtain his purpoſe, he propoſed a marriage between her and his ſon Adelbert. This propoſal was rejected; upon which Berengarius beſieged and took the city. The queen was confined in a neighbouring caſtle, from whence ſhe made her eſcape by a contrivance of her confeſſor. With him, and one female attendant, ſhe concealed herſelf for ſome days in a wood; but, being obliged to remove from thence for want of food, ſhe applied for protection to Adelard biſhop of Reggio. By him ſhe was recommended to his uncle Atho, who had a ſtrong caſtle in the neighbourhood of Canoza. Here ſhe was quickly beſieged by Berengarius; upon which meſſengers were diſpatched to Otho king of Germany, acquainting him, that, by expelling Berengarius, and marrying Adelaide, he might eaſily obtain the kingdom of Italy. This propoſal he readily accepted, and married Adelaide; but allowed Berengarius to retain the greateſt part of his dominions, upon condition of his doing homage for them to the kings of Germany. He deprived him, however, of the dukedom of Friuli, and marquiſate of Verona, which he gave to Henry duke of Bavaria.

38
Otho crowned king of Italy and emperor of the weſt.

Berengarius thus freed from all apprehenſion, not only oppreſſed his ſubjects in a moſt tyrannical manner, but revolted againſt Otho himſelf. This at laſt procured his ruin: for, in 961, Otho returned with an army into Italy, where he was crowned king by the archbiſhop of Milan; and the year following was crowned emperor by the pope. On this occaſion he received the imperial crown from his holineſs, and kiſſed his feet with great humility: after which they both went to the altar of St Peter, and bound themſelves by a ſolemn oath, the pope to be always faithful to the emperor, and to give no aſſiſtance to Berengarius or Adelbert his enemies; and Otho, to conſult the welfare of the church, and to reſtore to it all its patrimony granted by former emperors. Otho, beſides this, beſtowed very rich preſents on the church of St Peter. He ordained that the election of popes ſhould be according to the canons; that the elected pope ſhould not be conſecrated till he had publicly promiſed, in preſence of the emperor's commiſſaries, to obſerve every thing formerly ſpecified with regard to the rights of the emperors; that theſe commiſſaries ſhould conſtantly reſide at Rome, and make a report every year how juſtice was adminiſtered by the judges; and, in caſe of any complaints, the commiſſaries ſhould lay them before the pope; but if he neglected to intimate them, the imperial commiſſaries might then do what they pleaſed.

Thus we ſee that Otho, however much he might allow the pope's ſupremacy in ſpiritual matters, plainly aſſumed the ſovereignty in temporals to himſelf; and thus Italy was for upwards of 300 years accounted a part of the German empire. The popes, however, by no means reliſhed this ſuperiority of the emperor. The latter was hardly departed, when the pope (John XII.) broke the oath which he had juſt before ſworn with ſo much ſolemnity; and entered firſt into an alliance with Adelbert count of Tuſcany to expel the Germans, and then ſolicited the Hungarians to invade Italy. This treachery was ſoon puniſhed by Otho. He returned with part of his army, and aſſembled a council of biſhops. As the pope did not appear, Otho pretended great concern for his abſence. The biſhops replied, that the conſciouſneſs of his guilt made him afraid to ſhew himſelf. The emperor then inquired particularly into his crimes; upon which the biſhops accuſed him of filling the palace with lewd women, of ordaining a biſhop in a ſtable, caſtrating a cardinal, drinking the devil's health, &c.

39 He depoſes the pope.

As the pope ſtill refuſed to appear in order to juſtify himſelf from theſe charges, he was formally depoſed; and Leo the chief ſecretary, though a layman, elected in his ſtead.

The new pope, in compliment to the emperor, granted a bull, by which it was ordained that Otho and his ſucceſſors ſhould have a right of appointing the popes and inveſting archbiſhops and biſhops; and that none ſhould dare to conſecrate a biſhop without leave obtained from the emperor. Thus were the affairs of the Italians ſtill kept in the utmoſt confuſion even during the reign of Otho I. who appears to have been a wiſe and active prince. He was no ſooner gone, than the new pope was depoſed, all his decrees annulled, and John replaced. The party of Leo was now treated with great cruelty: but John was ſoon ſtopped in his career; for about the middle of May the ſame year (964) in which he had been reſtored, being ſurpriſed in bed with a Roman lady, he received a blow on the head from the devil (according to the authors of thoſe times) of which he died eight days after. After his death a cardinal-deacon, named *Benedict*, was elected by the Romans, but depoſed by Otho, and baniſhed to Hamburgh.

40 The Italians revolt, but are reduced.

The emperor was ſcarce returned to Germany, when his fickle Italians revolted, and ſent for Adlebert who had fled to Corſica. But being ſoon reduced, they continued quiet for about a year; after which they revolted again, and impriſoned the pope. Otho, however, provoked at their rebellious diſpoſition, ſoon returned, and puniſhed the rebels with great ſeverity; after which he made ſeveral laws for the better regulation of the city of Rome, granted ſeveral privileges to the Venetians, and cauſed his ſon Otho, then only 13 years of age, to be crowned emperor.

This ceremony being over, Otho diſpatched an ambaſſador to Nicephorus, emperor of Conſtantinople, demanding his ſtep-daughter Theophania in marriage for the young emperor; but upon this alliance being rejected, and that not without circumſtances of the moſt atrocious perfidy, Otho inſtantly invaded the countries of Apulia and Calabria, and entirely defeated the Greek army in thoſe parts. In the mean time, however, Nicephorus being killed, and his throne uſurped by John Zimiſces, Otho immediately entered into an alliance with the latter, and eaſily obtained Theophania for his ſon. She was crowned with great ſolemnity on the 8th of April 969: at the ſame time it is pretended by ſome authors, that the Greeks renounced their rights to Calabria and Apulia; though this is denied by others. After the celebration of this marriage, the emperor undertook an expedition againſt the Saracens, who ſtill reſided at the foot of the Alps; but being informed of the death of ſeveral nobles in Germany, he thought proper to return thither, where he died of an apoplexy in the year 973.

41 State of Italy at the death of Otho.

At the time of Otho's death Italy was divided into the provinces of Apulia, Calabria, the dukedom of Benevento, Campania, Terra Romana, the dukedom of Spoleto, Tuſcany, Romagna, Lombardy, and the marquiſates of Acona, Verona, Friuli, Treviſo, and Genoa. Apulia and Calabria were ſtill claimed by the Greeks; but all the reſt were either immediately ſubject to, or held of, the kings of Italy. Otho conferred Benevento (including the ancient Samnium) on the duke of that name. Campania and Lucania he gave to the dukes of Capua, Naples, and Salerno. Rome with its territory, Ravenna with the exarchate, the dukedom of Spoleto, with Tuſcany, and the marquiſate of Ancona, he granted to the pope; and retained the reſt of Italy under the form of a kingdom. Some of the cities were left free, but all tributary. He appointed ſeveral hereditary marquiſates and counties, but reſerved to himſelf the ſovereign juriſdiction in their territories. The liberty of the cities conſiſted in a freedom to chooſe their own magiſtrates, to be judged by their own laws, and to diſpoſe of their own revenues, on condition that they took the oath of allegiance to the king, and paid the cuſtomary tribute. The cities that were not free were governed by the commiſſaries, or lieutenants of the emperor; but the free cities were governed by two or more conſuls, afterwards called *poteſtates*, choſen annually, who took the oath of allegiance to the emperor, before the biſhop of the city, or the emperor's commiſſary. The tribute exacted was called *foderum, parata, et manſionaticum*. By the *foderum* was meant a certain quantity of corn which the cities were obliged to furniſh to the king, when marching with an army, or making a progreſs through the country; though the value of this was frequently paid in money. By the *parata* was underſtood the expence laid out in keeping the public roads and bridges in repair; and the *manſionaticum* included thoſe expences which were required for lodging the troops, or accommodating them in their camp. Under pretence of this laſt article the inhabitants were ſometimes ſtripped of all they poſſeſſed, except their oxen, and ſeed for the land. Beſides regulating what regarded the cities, Otho diſtributed honours and poſſeſſions to thoſe who had ſerved him faithfully. The honours conſiſted in the titles of *duke, marquis, count, captain, valvaſor*, and *valvaſin*; the poſſeſſions were, beſides land, the duties ariſing from harbours, ferries, roads, fiſh-ponds, mills, ſalt-pits, the uſes of rivers, and all pertaining to them, and ſuch like. The dukes, marquiſes, and counts, were thoſe who received dukedoms, marquiſates, and counties,

ties, from the king in ſiefs; the captains had the command of a certain number of men by a grant from the king, duke, marquis, or count; the valvaſors were ſubordinate to the captains, and the valvaſins to them.

42
Great diſturbances happen on the death of Otho I.

No ſooner was the death of Otho I. known in Italy, than, as if they had been now freed from all reſtraint, the nobles declared war againſt each other: ſome cities revolted, and choſe to themſelves conſuls; while the dominions of others were ſeized by the nobles, who confirmed their power by erecting citadels. Rome eſpecially was harraſſed by tumults, occaſioned chiefly by the ſeditious practices of one Cincius, who preſſed his fellow-citizens to reſtore the ancient republic. As the pope continued firm in the intereſts of the emperor, Cincius cauſed him to be ſtrangled by one Franco a cardinal deacon; who was ſoon after rewarded with the pontificate, and took upon him the name of *Boniface VII.* Another Pope was choſen by the faction of the count of Tuſcany; who being approved by the emperor, drove Cincius and Boniface out of the city. Diſturbances of a ſimilar kind took place in other cities, though Milan continued quiet and loyal in the midſt of all this uproar and confuſion.

In the mean time Boniface fled for refuge to Conſtantinople, where he excited the emperor to make war againſt Otho II. In 979 an army was accordingly ſent into Italy, which conquered Apulia and Calabria; but the next year Otho entered Italy with a formidable army, and, having taken a ſevere revenge on the authors of the diſturbances, drove the Greeks entirely out of the provinces they had ſeized. Having then cauſed his ſon Otho III. at that time a boy of ten years of age, to be proclaimed emperor, he died at Rome in the year 983. Among the regulations made by this emperor, one is very remarkable, and muſt give us a ſtrange idea of the inhabitants of Italy at that time. He made a law, That no Italian ſhould be believed upon his oath; and that in any diſpute which could not be decided otherwiſe than by witneſſes, the parties ſhould have recourſe to a duel.

Otho III. ſucceeded to the empire at twelve years of age; and, during his minority, the diſturbances in Italy revived. Cincius, called alſo *Creſcentius*, renewed his ſcheme of reſtoring the republic. The pope (John XV.) oppoſing his ſchemes, was driven out of the city; but was ſoon after recalled, on hearing that he had applied to the emperor for aſſiſtance. A few years after Creſcentius again revolted, and expelled Gregory V. the ſucceſſor of John XV.; raiſing to the papal dignity a creature of his own, under the name of *John* XVI. Otho, enraged at this inſult, returned to Rome with a powerful army in 998, beſieged and took it by aſſault; after which he cauſed Creſcentius to be beheaded, and the pope he had ſet up to be thrown headlong from the caſtle of St Angelo, after having his eyes pulled out, and his noſe cut off. Four years after, he himſelf died of the ſmall-pox; or, according to ſome, was poiſoned by the widow of Creſcentius, whom he had debauched under a promiſe of marriage, juſt as he was about to puniſh the Romans for another revolt.

43
Rome taken by Otho III.

Otho was ſucceeded in the imperial throne by Henry duke of Bavaria, and grandſon to Otho II. Henry had no ſooner ſettled the affairs of Germany, than he found it neceſſary to march into Italy againſt Ardouin marquis of Ivrea, who had aſſumed the title of *King of Italy*. Him he defeated in an engagement, and was himſelf crowned king of Italy at Pavia in 1005; but, a few years after, a new conteſt aroſe about the papal chair, which again required the preſence of the emperor. Before he arrived, however, one of the competitors (Benedict VIII.) had got the better of his rival, and both Henry and his queen received the imperial crown from his hands. Before the emperor entered the church, the pope propoſed to him the following queſtion: "Will you obſerve your fidelity to me and my ſucceſſors in every thing?" To which, tho' a kind of homage, he ſubmitted, and anſwered in the affirmative. After his coronation, he confirmed the privileges beſtowed on the Roman ſee by his predeceſſors, and added ſome others of his own; ſtill, however, reſerving for himſelf the ſovereignty and the power of ſending commiſſaries to hear the grievances of the people. Having repelled the incurſions of the Saracens, reduced ſome more rebellions of his ſubjects, and reduced the greateſt part of Apulia and Calabria, he died in the year 1024.

The death of this emperor was, as uſual, followed by a competition for the crown. Conrad being choſen emperor of Germany, was declared king of Italy by the archbiſhop of Milan; while a party of the nobles made offer of the crown to Robert king of France, or his ſon Hugh. But this offer being declined, and likewiſe another to William duke of Guienne, Conrad enjoyed the dignity conferred on him by the archbiſhop without moleſtation. He was crowned king of Italy at Monza, in 1026; and the next year he received the imperial crown from pope John XX. in preſence of Canute the Great, king of England, Denmark, and Norway, and Rodolph III. king of Burgundy. His reign was ſimilar to that of his predeceſſors. The Italians revolted, the pope was expelled, the malcontents were ſubdued, and the pope reſtored; after which the emperor returned to Germany, and died in 1039.

44
The diſorders increaſe under Henry III.

Under Henry III. who ſucceeded Conrad, the diſturbances were prodigiouſly augmented. Pope Sylveſter II. was driven out by Benedict; who in his turn was expelled by John biſhop of Sabinum, who aſſumed the title of *Sylveſter III.* Three months after, Benedict was reſtored, and excommunicated his rivals; but ſoon after reſigned the pontificate for a ſum of money. In a ſhort time he reclaimed it; and thus there were at once three popes, each of whom was ſupported on a branch of the papal revenue, while all of them made themſelves odious by the ſcandalous lives they led. At laſt a prieſt called *Gratian* put an end to this ſingular triumvirate. Partly by artifice, and partly by preſents, he perſuaded all the three to renounce their pretenſions to the papacy; and the people of Rome, out of gratitude for ſo ſignal a ſervice to the church, choſe him pope, under the name of *Gregory VI.* Henry III. took umbrage at this election, in which he had not been conſulted, and marched with an army into Italy. He depoſed Gregory, as having been guilty of ſimony; and filled the papal chair with his own chancellor, Heidiger, biſhop of Bamberg, who aſſumed the name of *Clement II.* and afterwards conſecrated Henry and the empreſs

Agnes.

45 He inveſts the Normans with ſome territories in Apulia and Calabria.

Agnes. This ceremony being over, and the Romans having ſworn never to elect a pope without the approbation of the reigning emperor, Henry proceeded to Capua, where he was viſited by Drago, Rainulphus, and other Norman adventurers; who, leaving their country at different times, had made themſelves maſters of great part of Apulia and Calabria, at the expence of the Greeks and Saracens. Henry entered into treaty with them; and not only ſolemnly inveſted them with thoſe territories which they had acquired by conqueſt, but prevailed on the pope to excommunicate the Beneventines, who had refuſed to open their gates to him, and beſtowed that city and its dependencies, as fiefs of the empire, upon the Normans, provided they took poſſeſſion by force of arms. The emperor was ſcarce returned to Germany, when he received intelligence of the death of Clement II. He was ſucceeded in the apoſtolic ſee by Damaſus II.; who alſo dying ſoon after his elevation, Henry nominated Bruno biſhop of Toul, to the vacant chair. This Bruno, who was the emperor's relation, immediately aſſumed the pontificals; but being a modeſt and pious prelate, he threw them off on his journey, by the perſuaſion of a monk of Cluny, named *Hildebrand*, afterwards the famous Gregory VII. and went to Rome as a private man. "The emperor alone," ſaid Hildebrand, "has no right to create a pope." He accompanied Bruno to Rome, and ſecretly retarded his election, that he might arrogate to himſelf the merit of obtaining it. The ſcheme ſucceeded to his wiſh: Bruno, who took the name of *Leo IX.* believing himſelf indebted to Hildebrand for the pontificate, favoured him with his particular friendſhip and confidence; and hence originated the power of this enterpriſing monk, of obſcure birth, but boundleſs ambition, who governed Rome ſo long, and whoſe zeal for the exaltation of the church occaſioned ſo many troubles to Europe.

46 Henry IV. declared king of the Romans.

Leo, ſoon after his elevation, waited on the emperor at Worms, to crave aſſiſtance againſt the Norman princes, who were become the terror of Italy, and treated their ſubjects with great ſeverity. Henry furniſhed the Pope with an army; at the head of which he marched againſt the Normans, after having excommunicated them, accompanied by a great number of biſhops and other eccleſiaſtics, who were all either killed or taken priſoners, the Germans and Italians being totally routed. Leo himſelf was led captive to Benevento, which the Normans were now maſters of, and which Henry had granted to the pope in exchange for the fief of Bamberg in Germany; and the apoſtolic ſee is to this day in poſſeſſion of Benevento, by virtue of that donation. The Normans, however, who had a right to the city by a prior grant, reſtored it, in the mean time, to the princes of Lombardy; and Leo was treated with ſo much reſpect by the conquerors, that he revoked the ſentence of excommunication, and joined his ſanction to the imperial inveſtiture for the lands which they held in Apulia and Calabria. Leo died ſoon after his releaſe; and the emperor, about the ſame time, cauſed his infant ſon, afterwards the famous Henry IV. to be declared king of the Romans, a title ſtill in uſe for the acknowledged heir of the empire. Gebehard, a German biſhop, was elected pope, under the name of *Victor II.* and confirmed by the addreſs of Hildebrand, who waited on the emperor in perſon for that purpoſe, though he diſdained to conſult him beforehand. Perhaps Hildebrand would not have found this taſk ſo eaſy, had not Henry been involved in a war with the Hungarians; who preſſed him hard, but whom he obliged at laſt to pay a large tribute, and furniſh him annually with a certain number of fighting men.

As ſoon as the emperor had finiſhed this war, and others to which it gave riſe, he marched into Italy to inſpect the conduct of his ſiſter Beatrice, widow of Boniface marquis of Mantua, and made her priſoner. She had married Gozelo, duke of Lorrain, without the emperor's conſent; and contracted her daughter Matilda, by the marquis of Mantua, to Godfrey duke of Spoleto and Tuſcany, Gozelo's ſon by a former marriage. This formidable alliance juſtly alarmed Henry: he therefore attempted to diſſolve it, by carrying his ſiſter into Germany, where he died ſoon after his return, in the 39th year of his age, and the 16th of his reign.

This emperor, in his laſt journey to Italy, concluded an alliance with Contarini, doge of Venice. That republic was already rich and powerful, though it had only been enfranchiſed in the year 998, from the tribute of a mantle of cloth of gold, which it formerly paid, as a mark of ſubjection, to the emperors of Conſtantinople. Genoa was the rival of Venice in power and in commerce, and was already in poſſeſſion of the iſland of Corſica, which the Genoeſe had taken from the Saracens. Theſe two cities ingroſſed at this time almoſt all the trade of Europe. There was no city in any reſpect equal to them either in France or Germany.

47 Increaſe of the pope's power.

Henry IV. was only five years old at his father's death. The popes made uſe of the reſpite given them by his minority, to ſhake off in a great meaſure their dependence upon the emperors. After a variety of conteſts about the pontificate, Nicholas II. a creature of Hildebrand's, was elected; who, among others, paſſed the following celebrated decree, viz. That, for the future, the cardinals only ſhould elect the pope; and that the election ſhould afterwards be confirmed by the reſt of the clergy and the people, "ſaving the honour (adds he) due to our dear ſon Henry, now king; and who, if it pleaſe God, ſhall be one day emperor, according to the right which we have already conferred upon him." After this he entered into a treaty with the Norman princes above-mentioned; who, though they had lately ſworn to hold their poſſeſſions from the emperor, now ſwore to hold them from the pope; and hence aroſe the pope's claim of ſovereignty over the kingdom of Naples and Sicily.

48 His conte with the emperor.

Thus was the power of the German emperors in Italy greatly diminiſhed, and that of the popes proportionally exalted; of which Henry ſoon had ſufficient evidence. For, having aſſumed the government into his own hands in the year 1072, being then 22 years of age, he was ſummoned by Alexander II. to appear before the tribunal of the holy ſee, on account of his looſe life, and to anſwer the charge of having expoſed the inveſtiture of biſhops to ſale; at the ſame time that the pope excited his German ſubjects to rebel againſt him. The rebels, however, were defeated, and peace was reſtored to Germany: but ſoon after, Hildebrand above-mentioned, being elected to the pontificate under the name of *Gregory VII.* openly aſſumed the ſuperiority over every earthly monarch whatever. He began with excommunicating every eccleſiaſtic who ſhould receive a benefice from the hands of a layman, and every layman who ſhould take upon him to confer ſuch a benefice. Henry, inſtead of reſenting this inſolence, ſubmitted, and wrote a penitential letter to the pope: who, upon this, condeſcended to take him into favour, after having ſeverely reprimanded him for his looſe life; of which the emperor now confeſſed himſelf guilty.

The quarrel between the church and the emperor was, however, ſoon brought to a criſis by the following accident. Solomon, king of Hungary, being depoſed by his brother Geyſa, had fled to Henry for protection, and renewed the homage of Hungary to the empire. Gregory, who favoured Geyſa, exclaimed againſt this act of ſubmiſſion, and ſaid in a letter to Solomon, "You ought to know that the kingdom of Hungary belongs to the Roman church; and learn that you will incur the indignation of the holy ſee, if you do not acknowledge that you hold your dominions of the pope and not of the emperor." Henry, though highly provoked at this declaration, thought proper to treat it with neglect; upon which Gregory reſumed the diſpute about inveſtitures. The predeceſſors of Henry had always enjoyed the right of nominating biſhops and abbots, and of giving them inveſtiture by the croſs and the ring. This right they had in common with almoſt all princes. The predeceſſors of Gregory VII. had been accuſtomed, on their part, to ſend legates to the emperors, in order to intreat their aſſiſtance, to obtain their confirmation, or deſire them to come and receive the papal ſanction; but for no other purpoſe. Gregory, however, ſent two legates to ſummon Henry to appear before him as a delinquent, becauſe he ſtill continued to beſtow inveſtitures, notwithſtanding the apoſtolic decree to the contrary; adding, that if he ſhould fail to yield obedience to the church, he muſt expect to be excommunicated and dethroned. Incenſed at this arrogant meſſage from one whom he conſidered as his vaſſal, Henry diſmiſſed the legates with very little ceremony, and in 1706 convoked an aſſembly of all the princes and dignified eccleſiaſtics at Worms; where, after mature deliberation, they concluded, that Gregory having uſurped the chair of St Peter by indirect means, infected the church of God with a great many novelties and abuſes, and deviated from his duty to his ſovereign in ſeveral ſcandalous attempts, the emperor, by that ſupreme authority derived from his predeceſſors, ought to diveſt him of his dignity, and appoint another in his place. In conſequence of this determination, Henry ſent an ambaſſador to Rome, with a formal deprivation of Gregory; who, in his turn, convoked a council, at which were preſent 110 biſhops, who unanimouſly agreed that the pope had juſt cauſe to depoſe Henry, to diſſolve the oath of allegiance which the princes and ſtates had taken in his favour, and to prohibit them from holding any correſpondence with him on pain of excommunication, which was immediately fulminated againſt the emperor and his adherents. "In the name of Almighty God, and by our authority, (ſaid Gregory), I prohibit Henry, the ſon of our emperor Henry, from governing the Teutonic kingdom, and Italy: I releaſe all Chriſtians from their oath of allegiance to him; and ſtrictly forbid all perſons from ſerving or attending him as king!" The circular letters written by this pontiff breathe the ſame ſpirit with his ſentence of depoſition. He there repeats, ſeveral times, that "biſhops are ſuperior to kings, and made to judge them?" expreſſions alike artful and preſumptuous, and calculated for bringing in all the churchmen of the world to his ſtandard.

49 The empe-ror depoſes the pope.

50 nd he the mperor.

Gregory knew well what conſequences would follow the thunder of the church. The German biſhops came immediately over to his party, and drew along with them many of the nobles: the flame of civil war ſtill lay ſmothering, and a bull properly directed was ſufficient to ſet it in a blaze. The Saxons, Henry's old enemies, made uſe of the papal diſpleaſure as a pretence for rebelling againſt him. Even Guelfe, to whom the emperor had given the duchy of Bavaria, ſupported the malcontents with that power which he owed to his ſovereign's bounty: nay, thoſe very princes and prelates who had aſſiſted in depoſing Gregory, gave up their monarch to be tried by the pope; and his holineſs was ſolicited to come to Augſburg for that purpoſe.

51 Who is at laſt obliged to ſubmit.

Willing to prevent this odious trial at Augſburg, Henry took the unaccountable reſolution of ſuddenly paſſing the Alps at Tirol, accompanied only by a few domeſtics, to aſk abſolution of pope Gregory his oppreſſor; who was then in Canoza, on the Appennine mountains; a fortreſs belonging to the counteſs or ducheſs Matilda, abovementioned. At the gates of this place the emperor preſented himſelf as an humble penitent. He alone was admitted without the outer court; where, being ſtripped of his robes, and wrapped in ſack-cloth, he was obliged to remain three days, in the month of January, bare-footed and faſting, before he was permitted to kiſs the feet of his holineſs; who all that time was ſhut up with the devout Matilda, whoſe ſpiritual director he had long been, and, as ſome ſay, her gallant. But be that as it may, her attachment to Gregory, and her hatred to the Germans, was ſo great, that ſhe made over all her eſtates to the apoſtolic ſee; and this donation is the true cauſe of all the wars which ſince that period have raged between the emperors and the popes. She poſſeſſed in her own right, great part of Tuſcany, Mantua, Parma, Reggio, Placentia, Ferrara, Modena, Verona, and almoſt the whole of what is now called the *patrimony of St Peter*, from Viterbo to Orvieto; together with part of Umbria, Spoleto, and the Marche of Ancona.

The emperor was at length permitted to throw himſelf at the pontiff's feet; who condeſcended to grant him abſolution, after he had ſworn obedience to him in all things, and promiſed to ſubmit to his ſolemn deciſion at Augſburg: ſo that Henry got nothing but diſgrace by his journey; while Gregory, elated by his triumph, and now looking upon himſelf (not altogether without reaſon) as the lord and maſter of all the crowned heads in Chriſtendom, ſaid in ſeveral of his letters, that it was his duty "to pull down the pride of kings."

This extraordinary accommodation gave much diſguſt to the princes of Italy. They never could forgive the inſolence of the pope, nor the abject humility of the emperor. Happily however for Henry, their indignation

52
Rodolph choſen emperor of Germany.

dignation at Gregory's arrogance overbalanced their deteſtation of his meanneſs. He took advantage of this temper; and by a change of fortune, hitherto unknown to the German emperors, he found a ſtrong party in Italy, when abandoned in Germany. All Lombardy took up arms againſt the pope, while he was raiſing all Germany againſt the emperor. Gregory, on the other hand, made uſe of every art to get another emperor elected in Germany; and Henry, on his part, left nothing undone to perſuade the Italians to elect another pope. The Germans choſe Rhodolph, duke of Suabia, who was ſolemnly crowned at Mentz; and Gregory, heſitating on this occaſion, behaved truly like the ſupreme judge of kings. He had depoſed Henry, but ſtill it was in his power to pardon that prince: he therefore affected to be diſpleaſed that Rodolph was conſecrated without his order; and declared, that he would acknowledge as emperor and king of Germany, him of the two competitors who ſhould be moſt ſubmiſſive to the holy ſee.

Henry, however, truſting more to the valour of his troops, than to the generoſity of the pope, ſet out immediately for Germany, where he defeated his enemies in ſeveral engagements: and Gregory, ſeeing no hopes of ſubmiſſion, thundered out a ſecond ſentence of excommunication againſt him, confirming at the ſame time the election of Rodolph, to whom he ſent a golden crown, on which the following well-known verſe, equally haughty and puerile, was engraved:

Petra dedit Petro, Petrus diadema Rodolpho.

This donation was alſo accompanied with a moſt enthuſiaſtic anathema againſt Henry. After depriving him of *ſtrength in combat*, and condemning him *never to be victorious*, it concludes with the following remarkable apoſtrophe to St Peter and St Paul: "Make all men ſenſible, that as you can bind and looſe every thing in heaven, you can alſo upon earth take from or give to every one, according to his deſerts, empires, kingdoms, principalities—let the kings and the princes of the age then inſtantly feel your power, that they may not dare to deſpiſe the orders of your church; let your juſtice be ſo ſpeedily executed upon Henry, that nobody may doubt but he falls by your means, and not by chance."

53
Defeated and killed.

In order to avoid the effects of this ſecond excommunication, Henry aſſembled at Brixen, in the county of Tirol, about 20 German biſhops: who acting alſo for the biſhops of Lombardy, unanimouſly reſolved, that the pope, inſtead of having power over the emperor, owed him obedience and allegiance; and that Gregory VII. having rendered himſelf unworthy of the papal chair by his conduct and rebellion, ought to be depoſed from a dignity he ſo little deſerved. They accordingly degraded Hildebrand; and elected in his room Guibert, archbiſhop of Ravenna, a perſon of undoubted merit, who took the name of *Clement* III. Henry promiſed to put the new pope in poſſeſſion of Rome; but he was obliged, in the mean time, to employ all his forces againſt his rival Rodolph, who had re-aſſembled a large body of troops in Saxony. The two armies met near Merſburg, and both fought with great fury; but the fortune of the day ſeemed inclined to Rodolph, when his hand was cut off by the famous Godfrey of Bouillon, then in the ſervice of Henry, and afterwards renowned for his conqueſt of Jeruſalem. Diſcouraged by the misfortune of their chief, the rebels immediately gave way; and Rodolph perceiving his end approaching, ordered the hand that was cut off to be brought him, and made a ſpeech to his officers on the occaſion, which could not fail to have an influence on the emperor's affairs. "Behold, (ſaid he), the hand with which I took the oath of allegiance to Henry; and which oath, at the inſtigation of Rome, I have violated, in perfidiouſly aſpiring at an honour that was not my due."

54
Rome taken by Henry IV.

Thus delivered from this formidable antagoniſt, Henry ſoon diſperſed the reſt of his enemies in Germany, and ſet out for Italy in order to ſettle Clement in the papal chair. But the gates of Rome being ſhut againſt him, he was obliged to attack it in form. The ſiege continued upwards of two years; Henry, during that time, being obliged to quell ſome inſurrections in Germany. The city was at length carried by aſſault, and with difficulty ſaved from being pillaged; but Gregory was not taken: he retired into the caſtle of St Angelo, and thence defied and excommunicated the conqueror. The new pope was, however, conſecrated with the uſual ceremonies; and expreſſed his gratitude by crowning Henry, with the concurrence of the Roman ſenate and people. Mean while the ſiege of St Angelo was going on; but the emperor being called about ſome affairs into Lombardy, Robert Guiſcard took advantage of his abſence to releaſe Gregory, who died ſoon after at Salerno. His laſt words, borrowed from the Scripture, were worthy of the greateſt ſaint: "I have loved juſtice, and hated iniquity; therefore I die in exile!"

Henry, however, did not enjoy all the advantages which might have been expected from the death of Gregory. The ſubſequent popes trod in the paths of their predeceſſor. In 1101, Paſcal II. excited young Henry to rebel againſt his father. The emperor did all in his power to diſſuade him from proceeding to extremities, but in vain. The young prince perſiſted in his rebellious intentions; and having by feigned ſubmiſſions prevailed on the emperor to diſband his army, he treacherouſly ſeized and confined him. Henry, however, found means to eſcape from his confinement, and attempted to engage all the ſovereigns of Europe in his quarrel; but before any thing effectual could be done, he died at Liege in the year 1106.

55
Diſpute between the pope and Henry V.

The diſpute about inveſtitures was not terminated by the depoſition and death of Henry IV. His ſon Henry V. purſued the very ſame conduct for which he had depoſed his father. Paſcal oppoſed him with violence: upon which Henry gave him an invitation into Germany, to end the diſpute in an amicable manner. Paſcal did not think proper to accept of this invitation; but put himſelf under the protection of Philip I. king of France, who undertook to mediate between the contending parties. His mediation, however, proved ineffectual, and Henry was prevented by the wars in Hungary and Poland from paying any further attention to the affair of inveſtitures. At laſt, having ſettled his affairs in Germany, he took a reſolution of going to Rome, in order to ſettle the diſpute perſonally with the pope. To give his arguments the greater weight, however, he marched at the head of an army of 80,000 men. Paſcal received him with great appearance of friendſhip, but would not renounce the claim of inveſtitures; and Henry finding himſelf deceived in his expectations, ordered the pope to be ſeized. The conſul put the citizens in arms to defend the pope, and a battle was fought within the walls of Rome. The ſlaughter was ſo great, that the waters of the Tiber were tinged with blood. The Romans were defeated, and Paſcal was taken priſoner. The latter renounced his right of inveſtiture; ſolemnly ſwore never to reſume it, and broke his oath as ſoon as Henry was gone, by fulminating the ſentence of excommunication againſt him. In 1114 died the counteſs Matilda, who had bequeathed all her dominions to the pope, as we have already obſerved; but Henry thinking himſelf the only lawful heir, alleged, that it was not in Matilda's power to alienate her eſtates, which depended immediately on the empire. He therefore ſet out for Lombardy, and ſent ambaſſadors to the pope, beſeeching him to revoke the ſentence of excommunication abovementioned. Paſcal, however, would not even favour the ambaſſadors with an audience; but, dreading the approach of Henry himſelf, he took refuge among the Norman princes in Apulia. Henry arrived at Rome in 1117; but being ſoon after obliged to leave it in order to ſettle ſome affairs in Tuſcany, the pope returned to Rome, but died in a few days. On the third day after his deceaſe, cardinal Cajetan was elected his ſucceſſor, without the privity of the emperor, under the name of *Gelaſius II.* The new pope was inſtantly depoſed by Henry; who ſet up the archbiſhop of Prague, under the name of *Gregory VIII.* Gelaſius, though ſupported by the Norman princes, was obliged to take refuge in France, where he died; and the archbiſhop of Vienna was elected by the cardinals then preſent, under the name of *Calixtus II.*

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56
Determination of the affair of inveſtitures.

The new pope attempted an accommodation with Henry; which not ſucceeding, he excommunicated the emperor, the antipope, and his adherents. He next ſet out for Rome, where he was honourably received; and Gregory VIII. was forced to retire to Sutri, a ſtrong town garriſoned by the emperor's troops. Here he was beſieged by Calixtus and the Norman princes. The city was ſoon taken, and Gregory thrown into priſon by his competitor; but at laſt, the ſtates of the empire, being quite wearied out with ſuch a long quarrel, unanimouſly ſupplicated Henry for peace. He referred himſelf entirely to their deciſion; and a diet being aſſembled at Wurtzburg, it was decreed, that an embaſſy ſhould be immediately ſent to the pope, deſiring that he would convoke a general council at Rome, by which all diſputes might be determined. This was accordingly done, and the affair of inveſtitures at length regulated in the following manner, viz. That the emperor ſhould leave the communities and chapters at liberty to fill up their own vacancies, without beſtowing inveſtitures with the croſs and ring; that he ſhould reſtore all that he had unjuſtly taken from the church; that all elections ſhould be made in a canonical manner, in preſence of the emperor or his commiſſaries; and whatever diſputes might happen, ſhould be referred to the deciſion of the emperor, aſſiſted by the metropolitan and his ſuffragans; that the perſon elected ſhould receive from the emperor the inveſtiture of the fiefs and ſecular rights, not with the croſs, but with the ſceptre; and ſhould pay allegiance to him for theſe rights only.

After the death of Henry, the uſual diſorders took place in Italy; during which, Roger duke of Apulia conquered the iſland of Sicily, and aſſumed the right of creating popes, of whom there were two at that time, viz. Innocent II. and Anacletus. Roger drove out the former, and Lothario emperor of Germany the latter, forcing Roger himſelf at the ſame time to retire into Sicily. The emperor then conducted Innocent back to Rome in triumph, and having ſubdued all Apulia, Calabria, and the reſt of Roger's Italian dominions, erected them into a principality, and beſtowed it, with the title of *duke*, upon Renaud a German prince, and one of his own relations.

57
Italy invaded by Frederic Barbaroſſa.

In the reign of Conrad III. who ſucceeded Lothario, the celebrated factions called the *Guelphs* and *Gibelins* *, aroſe, which for many years deluged the cities of Italy with blood. They took their origin during a civil war in Germany, in which the enemies of the emperor were ſtyled *Guelphs*, and his friends *Gibelines*; and theſe names were quickly received in Italy as well as other parts of the emperor's dominions. Of this civil war many of the cities in Italy took the advantage to ſet up for themſelves; neither was it in the power of Conrad, who during his whole reign was employed in unſucceſsful cruſades, to reduce them; but, in 1158, Frederic Barbaroſſa, ſucceſſor to Conrad, entered Italy at the head of a very numerous and well diſciplined army. His army was divided into ſeveral columns for the conveniency of entering the country by as many different routes. Having paſſed the Alps, he reduced the town of Breſcia; where he made ſeveral ſalutary regulations for the preſervation of good order and military diſcipline. Continuing to advance, he beſieged Milan, which ſurrendered at diſcretion. He was crowned king of Lombardy at Monza; and having made himſelf maſter of all the other cities of that country, he ordered a minute inquiry to be ſet on foot concerning the rights of the empire, and exacted homage of all thoſe who held of it, without excepting even the biſhops. Grievances were redreſſed; magiſtracies reformed; the rights of regality diſcuſſed and aſcertained; new laws enacted for the maintenance of public tranquillity and the encouragement of learning, which now began to revive in the ſchool of Bologna; and, above all, ſubvaſſals were not only prohibited from alienating their lands, but alſo compelled, in their oath to their lords paramount, to except the emperor nominally, when they ſwore to ſerve and aſſiſt them againſt all their enemies. The pope took umbrage at this behaviour towards the eccleſiaſtics: but Frederic juſtified what he had done, telling his deputies it was but reaſonable they ſhould do homage for the fiefs they poſſeſſed; as Jeſus Chriſt himſelf, though the lord of all the ſovereigns upon earth, had deigned to pay for himſelf and St Peter the tribute which was due to Cæſar.

Frederic having ſent commiſſaries to ſuperintend the election of new magiſtrates at Milan, the inhabitants were ſo much provoked at this infringement of their old privileges, that they inſulted the imperialiſts, revolted, and refuſed to appear before the emperor's tribunal. This he highly reſented, and reſolved to chaſtiſe them ſeverely: for which purpoſe he ſent for a reinforcement from Germany, which ſoon after arrived with the empreſs, while he himſelf ravaged Liguria, declared the Milaneſe rebels to the empire, and plundered and burnt the city of Crema which was in alliance with that of Milan.

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* See *Guelphs* and *Gibelines*.

In the mean time, pope Adrian IV. dying, two oppoſite factions elected two perſons known by the names of *Victor II.* and *Alexander III.* The emperor's allies neceſſarily acknowledged the pope choſen by him; and thoſe princes who were jealous of the emperor, acknowledged the other. Victor II. Frederic's pope, had Germany, Bohemia, and one half of Italy, on his ſide; while the reſt ſubmitted to Alexander III. 58 He takes and deſtroys Milan, &c. The emperor took a ſevere revenge on his enemies; Milan was razed from the foundation, and ſalt ſtrewed on its ruins; Breſcia and Placentia were diſmantled; and the other cities which had taken part with them, were deprived of their privileges. Alexander III. however, who had excited the revolt, returned to Rome after the death of his rival; and at his return the civil war was renewed. The emperor cauſed another pope, and after his death a third, to be elected. Alexander then fled to France, the common aſylum of every pope who was oppreſſed by the emperors; but the flames of civil diſcord which he had raiſed, continued daily to ſpread. In 1168, the cities of Italy, ſupported by the Greek emperor and the king of Sicily, entered into an aſſociation for the defence of their liberties; and the pope's party at length prevailed. In 1176, the imperial army, worn out by fatigues and diſeaſes, was defeated by the confederates, and Frederic himſelf narrowly eſcaped. About the ſame time, he was defeated at ſea by the Venetians; and his eldeſt ſon Henry, who commanded his fleet, fell into the hands of the enemy. The pope, in honour of this victory, ſailed out into the open ſea, accompanied by the whole ſenate; and after having pronounced a thouſand benedictions on that element, threw into it a ring as a mark of his gratitude and affection. Hence the origin of that ceremony which is annually performed by the Venetians, under the notion of eſpouſing the Adriatic. Theſe misfortunes diſpoſed the emperor towards a reconciliation with the pope: but, reckoning it below his dignity to make an advance, he rallied his troops, and exerted himſelf with ſo much vigour in repairing his loſs, that the confederates were defeated in a battle; after which he made propoſals of peace, which were now joyfully accepted, and Venice was the place appointed for a reconciliation. 59 Submits to the pope. The emperor, the pope, and a great many princes and cardinals, attended; and there the emperor, in 1177, put an end to the diſpute, by acknowledging the pope, kiſſing his feet, and holding his ſtirrup while he mounted his mule. This reconciliation was attended with the ſubmiſſion of all the towns of Italy which had entered into an aſſociation for their mutual defence. They obtained a general pardon, and were left at liberty to uſe their own laws and forms of government, but were obliged to take the oath of allegiance to the emperor as their ſuperior lord. Calixtus, the antipope, finding himſelf abandoned by the emperor in conſequence of this treaty, made alſo his ſubmiſſion to Alexander, who received him with great humanity; and in order to prevent, for the future, thoſe diſturbances which had ſo often attended the elections of the popes, he called a general council, in which it was decreed, that no pope ſhould be deemed duely elected, without having two thirds of the votes in his favour.

The affairs of Italy being thus ſettled, Barbaroſſa returned to Germany; and having quieted ſome diſturbances which had ariſen during his abſence in Italy, at laſt undertook an expedition into the Holy Land; where having performed great exploits, he was drowned as he was ſwimming in the river Cydnus, in the year 1190. 60 Frederic ſucceeded by Henry VI. He was ſucceeded by his ſon Henry VI. who at the ſame time became heir to the dominions of Sicily by the right of his wife, daughter of William king of that country. After ſettling the affairs of Germany, the new emperor marched with an army into Italy, in order to be crowned by the pope, and to recover the ſucceſſion of Sicily, which was uſurped by Tancred his wife's natural brother. For this purpoſe, he endeavoured to conciliate the affections of the Lombards, by enlarging the privileges of Genoa, Piſa, and other cities, in his way to Rome; where the ceremony of the coronation was performed by Celeſtin III. on the day after Eaſter in the year 1191. The pope, then in the 86th year of his age, had no ſooner placed the crown upon Henry's head than he kicked it off again, as a teſtimony of the power reſiding in the ſovereign pontiff to make and unmake emperors at his pleaſure.

The coronation being over, Henry prepared for the conqueſt of Naples and Sicily; but in this he was oppoſed by the pope: for though Celeſtin conſidered Tancred as an uſurper, and deſired to ſee him deprived of the crown of Sicily, which he claimed as a fief of the ſee, yet he was much more averſe to the emperor's being put in poſſeſſion of it, as that would render him too powerful in Italy for the intereſt of the church. Henry, however, without paying any regard to the threats and remonſtrances of his holineſs, took almoſt all the towns of Campania, Calabria, and Apulia; inveſted the city of Naples; and ſent for the Genoeſe fleet, which he had before engaged, to come and form the blockade by ſea: but before its arrival, he was obliged to raiſe the ſiege, in conſequence of a dreadful mortality among his troops: and all future attempts upon Sicily were ineffectual during the life of Tancred.

61 His perfidy and cruelty.

The whole reign of Henry from this time ſeems to have been a continued train of the moſt abominable perfidies and cruelties. Having treacherouſly ſeized and impriſoned Richard I. of ENGLAND, in the manner related under that article, n° 128,—130. he had no ſooner received the ranſom paid for his royal captive, than he made new preparations for the conqueſt of Sicily. As Tancred died about this time, the emperor, with the aſſiſtance of the Genoeſe, accompliſhed his purpoſe. The queen dowager ſurrendered Salerno, and her right to the crown, on condition that her ſon William ſhould poſſeſs the principality of Tarentum; but Henry no ſooner found himſelf maſter of the place, than he ordered the infant-king to be caſtrated, to have his eyes put out, and to be confined in a dungeon. The royal treaſure was tranſported to Germany, and the queen and her daughter confined in a convent.

In the mean time, the empreſs, though near the age of 50, was delivered of a ſon, named *Frederic*; and Henry ſoon after aſſembled a diet of the princes of Germany, to whom he explained his intentions of rendering the imperial crown hereditary, in order to prevent thoſe diſturbances which uſually attended the election of emperors. A decree paſſed for this purpoſe; and Frederic, yet in his cradle, was declared king of the Romans. Soon after, the emperor being ſolicited to undertake a cruſade, obeyed the injunctions of the pope, but in ſuch a manner as to make it turn out to his own advantage. He convoked a general diet at Worms, where he ſolemnly declared his reſolution of employing his whole power, and even of hazarding his life, for the accompliſhment of ſo holy an enterpriſe; and he expatiated upon the ſubject with ſo much eloquence, that almoſt the whole aſſembly took the croſs. Nay, ſuch multitudes from all the provinces of the empire enliſted themſelves, that Henry divided them into three large armies; one of which, under the command of the biſhop of Mentz, took the route of Hungary, where it was joined by Margaret, queen of that country, who entered herſelf in this pious expedition, and actually ended her days in Paleſtine: the ſecond was aſſembled in Lower Saxony, and embarked in a fleet furniſhed by the inhabitants of Lubec, Hamburg, Holſtein, and Friezland: and the emperor in perſon conducted the third into Italy, in order to take vengeance on the Normans in Naples and Sicily, who had riſen againſt his government.

The rebels were humbled; and their chiefs were condemned to periſh by the moſt excruciating tortures. One Jornandi, of the houſe of the Norman princes, was tied naked on a chair of red-hot iron, and crowned with a circle of the ſame burning metal, which was nailed to his head. The empreſs ſhocked at ſuch cruelty, renounced her faith to her huſband, and encouraged her countrymen to recover their liberties. Reſolution ſprung from deſpair. The inhabitants betook themſelves to arms; the empreſs Conſtantia headed them; and Henry, having diſmiſſed his troops, no longer thought neceſſary to his bloody purpoſes, and ſent them to purſue their expedition to the Holy Land, was obliged to ſubmit to his wife, and to the conditions which ſhe was pleaſed to impoſe on him in favour of the Sicilians. He died at Meſſina in 1197, ſoon after this treaty; and, as was ſuppoſed, of poiſon adminiſtered by the empreſs.

62
Diſturbances in the beginning of the reign of Frederic II.

The emperor's ſon Frederic had already been declared king of the Romans, and conſequently became emperor on the death of his father; but as Frederic II. was yet a minor, the adminiſtration was committed to his uncle the duke of Suabia, both by the will of Henry and by an aſſembly of the German princes. Other princes, however, incenſed to ſee an elective empire become hereditary, held a new diet at Cologne, and choſe Otho duke of Brunſwick, ſon of Henry the Lion. Frederic's title was confirmed in a third aſſembly, at Arnſburg; and his uncle, Philip duke of Suabia, was elected king of the Romans, in order to give greater weight to his adminiſtration. Theſe two elections divided the empire into two powerful factions, and involved all Germany in ruin and deſolation. Innocent III. who had ſucceeded Celeſtin in the papal chair, threw himſelf into the ſcale of Otho, and excommunicated Philip and all his adherents. This able and ambitious pontiff was a ſworn enemy of the houſe of Suabia; not from any perſonal animoſity, but out of a principle of policy. That houſe had long been terrible to the popes, by its continual poſſeſſion of the imperial crown; and the acceſſion of the kingdom of Naples and Sicily, made it ſtill more to be dreaded: Innocent, therefore, gladly ſeized the preſent favourable opportunity for diveſting it of the empire, by ſupporting the election of Otho, and ſowing diviſions among the Suabian party. Otho was alſo patroniſed by his uncle, the king of England; which naturally inclined the king of France to the ſide of his rival. Faction claſhed with faction; friendſhip, with intereſt: caprice, ambition, or reſentment, gave the ſway; and nothing was beheld on all hands, but the horrors and the miſeries of civil wars.

Meanwhile, the empreſs Conſtantia remained in Sicily, where all was peace, as regent and guardian for her infant ſon, Frederic II. who had been crowned king of that iſland, with the conſent of pope Celeſtin III. But ſhe alſo had her troubles. A new inveſtiture from the holy ſee being neceſſary, on the death Celeſtin, Innocent III. his ſucceſſor, took advantage of the critical ſituation of affairs for aggrandizing the papacy, at the expence of the kings of Sicily. They poſſeſſed, as has been already obſerved, the privilege of filling up vacant benefices, and of judging all eccleſiaſtical cauſes in the laſt appeal: they were really popes in their own iſland, though vaſſals of his holineſs. Innocent pretended that theſe powers had been ſurrepitiouſly obtained; and demanded, that Conſtantia ſhould renounce them in the name of her ſon, and do liege, pure and ſimple homage for Sicily. But before any thing was ſettled relative to this affair, the empreſs died, leaving the regency of the kingdom to the pope; ſo that he was enabled to preſcribe what conditions he thought proper to young Frederic. The troubles of Germany ſtill continued; and the pope redoubled his efforts, to detach the princes and prelates from the cauſe of Philip, notwithſtanding the remonſtrances of the king of France, to whom he proudly replied, "Either Philip muſt loſe the empire, or I the papacy." But all theſe diſſentions and troubles in Europe, did not prevent the formation of another cruſade, or expedition into Aſia, for the recovery of the Holy Land. Thoſe who took the croſs were principally French and Germans: Baldwin, count of Flanders, was their commander; and the Venetians, as greedy of wealth and power as the ancient Carthaginians, furniſhed them with ſhips, for which they took care to be amply paid both in money and territory. The Chriſtian city of Zara, in Dalmatia, had withdrawn itſelf from the government of the republic: the army of the croſs undertook to reduce it to obedience; and it was beſieged and taken, notwithſtanding the threats and excommunications of the pope.

While the cruſaders were ſpreading deſolation thro' the eaſt, Philip and Otho were in like manner deſolating the weſt. At length Philip prevailed; and Otho, obliged to abandon Germany, took refuge in England. Philip, elated with ſucceſs, confirmed his election by a ſecond coronation, and propoſed an accommodation with the pope, as the means of finally eſtabliſhing his throne; but before it could be brought about, he fell a ſacrifice to private revenge, being aſſaſſinated by the count Palatine of Bavaria, whoſe daughter he had promiſed to marry, and afterwards rejected. Otho returned to Germany on the death of Philip; married that prince's daughter; and was crowned at Rome by pope Innocent III. after yielding to the holy ſee the long diſputed inheritance of the counteſs Matilda, and confirming the rights and privileges of the Italian cities. But theſe conceſſions, as far at leaſt as regarded the pope, were only a ſacrifice to preſent policy: Otho, therefore, no ſooner found himſelf in a condition to act offenſively, than he reſumed his grant; and, in 1210, not only recovered the poſſeſſions of the empire, but made hoſtile incurſions into Apulia, ravaging the dominions of young Frederic, king of Naples and Sicily, who was under the protection of the holy ſee. For this reaſon he was excommunicated by Innocent, and Frederic, now 17 years of age, was elected emperor by a diet of the German princes. Otho, however, on his return to Germany, finding his party ſtill conſiderable, and not doubting but he ſhould be able to humble his rival by means of his ſuperior force, entered into an alliance with his uncle, John king of England, againſt Philip Auguſtus king of France, A. D. 1213. The unfortunate battle of Bouvines, where the confederates were defeated, compleated the fate of Otho. He attempted to retreat into Germany, but was prevented by young Frederic; who had marched into the empire at the head of a powerful army, and was every where received with open arms. Thus abandoned by all the princes of Germany, and altogether without reſource, Otho retired to Brunſwick, where he lived four years as a private man, dedicating his time to the duties of religion.

Frederic II. being now univerſally acknowledged emperor, was crowned at Aix-la-Chapelle in 1215, with great magnificence; when, in order to preſerve the favour of the pope, he added to the other ſolemnities of his coronation, a vow to go in perſon to the Holy Land.

63
His quarrel with the pope.

The bad ſucceſs of this expedition hath been already taken notice of, under the article Croisade. The emperor had, on various pretences, refuſed to go into the eaſt; and in 1225, the pope, incenſed at the loſs of Damietta, wrote a ſevere letter to him, taxing him with having ſacrificed the intereſts of Chriſtianity by delaying ſo long the performance of his vow, and threatening him with immediate excommunication if he did not inſtantly depart with an army into Aſia. Frederic, exaſperated at theſe reproaches, renounced all correſpondence with the court of Rome; renewed his eccleſiaſtical juriſdiction in Sicily; filled up vacant ſees and benefices; and expelled ſome biſhops, who were creatures of the pope, on pretence of their being concerned in practices againſt the ſtate.

The pope at firſt threatened the emperor with the thunder of the church, for preſuming to lift up his hand againſt the ſanctuary; but finding Frederic not to be intimidated, he became ſenſible of his own imprudence in wantonly incurring the reſentment of ſo powerful a prince, and thought proper to ſoothe him by ſubmiſſive apologies and gentle exhortations. They were accordingly reconciled, and conferred together at Veroli in 1226; where the emperor, as a proof of his ſincere attachment to the church, publiſhed ſome very ſevere edicts againſt hereſy, which ſeem to have authoriſed the tribunal of the inquiſition. A ſolemn aſſembly was afterwards held at Ferentino, where both the pope and the emperor were preſent, together with John de Brienne, titular king of Jeruſalem, who was come to Europe to demand ſuccours againſt the ſoldan of Egypt. John had an only daughter, named *Yolanda*, whom he propoſed as a wife to the emperor, with the kingdom of Jeruſalem as her dower, on condition that Frederic ſhould, within two years, perform the vow he had made to lead an army into the holy land. Frederic married her on theſe terms, becauſe he choſe to pleaſe the pope; and ſince that time the kings of Sicily have taken the title of *king of Jeruſalem*. But the emperor was in no hurry to go and conquer his wife's portion, having buſineſs of more importance on his hands at home. The chief cities of Lombardy had entered into a ſecret league, with a view to renounce his authority. He convoked a diet at Cremona, where all the German and Italian noblemen were ſummoned to attend. A variety of ſubjects were there diſcuſſed; but nothing of conſequence was ſettled. An accommodation, however, was ſoon after brought about by the mediation of the pope; who, as umpire of the diſpute, decreed, that the emperor ſhould lay aſide his reſentment againſt the confederate towns, and that the towns ſhould furniſh and maintain 400 knights for the relief of the holy land.

Peace being thus concluded, Honorius reminded the emperor of his vow: Frederic promiſed compliance: but his holineſs died before he could ſee the execution of a project which he ſeemed to have ſo much at heart. He was ſucceeded in the papal chair by Gregory IX. brother of Innocent III.; who, purſuing the ſame line of policy, urged the departure of Frederic for the holy land; and finding the emperor ſtill backward, declared him incapable of the imperial dignity, as having incurred the ſentence of excommunication. Frederic, incenſed at ſuch inſolence, ravaged the patrimony of St Peter; and was actually excommunicated. The animoſity between the Guelphs and Ghibellines revived; the pope was obliged to quit Rome; and Italy became a ſcene of war and deſolation, or rather of an hundred civil wars; which, by inflaming the minds and exciting the reſentment of the Italian princes, accuſtomed them but too much to the horrid practices of poiſoning and aſſaſſination.

64
His expedition to the Holy Land.

During theſe tranſactions, Frederic, in order to remove the cauſe of all theſe troubles, and gratify the prejudices of a ſuperſtitious age, by the advice of his friends, reſolved to perform his vow; and he accordingly embarked for the Holy Land, leaving the affairs of Italy to the management of Renaldo duke of Spoleto. The pope prohibited his departure before he ſhould be abſolved from the cenſures of the church; but Frederic went in contempt of the church, and ſucceeded better than any perſon who had gone before him. He did not indeed deſolate Aſia, and gratify the barbarous zeal of the times by ſpilling the blood of infidels; but he concluded a treaty with Miliden, ſoldan of Egypt and maſter of Syria; by which the end of his expedition ſeemed fully anſwered. The ſoldan ceded to him Jeruſalem and its territory, as far as Joppa; Bethlem, Nazareth, and all the country between Jeruſalem and Ptolemais; Tyre, Sidon, and the neighbouring territories: in return for which, the emperor granted the Saracens a truce of ten years; and, in 1230, prudently returned to Italy, where his preſence was much wanted.

Frederic's reign, after his return from the eaſt, was one continued quarrel with the popes. The cities of Lombardy had revolted during his abſence, at the inſtigation of Gregory IX.; and before they could be reduced, the ſame pontiff excited the emperor's ſon Henry, who had been elected king of the Romans, to rebel againſt his father. The rebellion was ſuppreſſed, the prince was confined, and the emperor obtained a complete victory over the aſſociated towns. But his troubles were not yet ended. The pope excommunicated him anew, and ſent a bull, filled with the moſt abſurd and ridiculous language, into Germany, in order to ſow diviſion between Frederic and the princes of the empire.

Frederic retorted in the ſame ſtrain, in his apology to the princes of Germany, calling Gregory the *Great Dragon*, the *Antichriſt*, &c. The emperor's apology was ſuſtained in Germany; and finding he had nothing to fear from that quarter, he reſolved to take ample vengeance on the pope and his aſſociates. For that purpoſe he marched to Rome, where he thought his party was ſtrong enough to procure him admiſſion: but this favourite ſcheme was defeated by the activity of Gregory, who ordered a cruſade to be preached againſt the emperor, as an enemy of the Chriſtian faith; a ſtep which incenſed Frederic ſo much, that he ordered all his priſoners, who wore the croſs, to be expoſed to the moſt cruel tortures. The two factions of the Guelphs and Ghibellines continued to rage with greater violence than ever, involving cities, diſtricts, and even private families, in troubles, diviſions, and civil butchery; no quarter being given on either ſide. Meanwhile Gregory IX. died, and was ſucceeded in the ſee of Rome by Celeſtin IV. and afterwards by Innocent IV. formerly cardinal Fieſque, who had always expreſſed the greateſt regard for the emperor and his intereſt. Frederic was accordingly congratulated upon this occaſion: but having more penetration than thoſe about him, he ſagely replied, "I ſee little reaſon to rejoice; the cardinal was my friend, but the pope will be my enemy." Innocent ſoon proved the juſtice of this conjecture. He attempted to negociate a peace for Italy; but not being able to obtain from Frederic his exorbitant demands, and in fear for the ſafety of his own perſon, he fled into France, aſſembled a general council at Lyons, and, in 1245, depoſed the emperor.

65
Is depoſed by the pope.

Conrad, the emperor's ſecond ſon, had already been declared king of the Romans, on the death of his brother Henry, which ſoon followed his confinement: but the empire being now declared vacant by the pope, the German biſhops, (for none of the princes were preſent), at the inſtigation of his holineſs, proceeded to the election of a new emperor; and they choſe Henry landgrave of Thuringia, who was ſtyled in deriſion, *The king of prieſts*. Innocent now renewed the cruſade againſt Frederic. It was proclaimed by the preaching friars, ſince called *Dominicans*, and the minor friars, known by the name of *Cordeliers* or *Franciſcans*. The pope, however, did not confine himſelf to theſe meaſures only, but engaged in conſpiracies againſt the life of an emperor, who had dared to reſiſt the decree of a council, and oppoſe the whole body of monks and zealots. Frederick's life was ſeveral times in danger from plots, poiſonings, and aſſaſſinations; which induced him, it is ſaid, to make choice of Mahometan guards, who, he was certain, would not be under the influence of the prevailing ſuperſtition.

About this time the landgrave of Thuringia dying, the ſame prelates who had taken the liberty of creating one emperor made another; namely, William count of Holland, a young nobleman of twenty years of age, who bore the ſame contemptuous title with his predeceſſor. Fortune, which had hitherto favoured Frederic, ſeemed now to deſert him. He was defeated before Parma, which he had long beſieged; and to complete his misfortune, he ſoon after learned, that his natural ſon Entius, whom he had made king of Sardinia, was worſted and taken priſoner by the Bologneſe.

In this extremity, Frederic retired to his kingdom of Naples, in order to recruit his army; and there died of a fever, in the year 1250. After his death, the affairs of Germany fell into the utmoſt confuſion, and Italy continued long in the ſame diſtracted ſtate in which he had left it. The clergy took arms againſt the laity; the weak were oppreſſed by the ſtrong; and all laws divine and human were diſregarded. After the death of Frederic's ſon Conrad who had aſſumed the imperial dignity as ſucceſſor to his father, and the death of his competitor William of Holland, a variety of candidates appeared for the empire, and ſeveral were elected by different factions; among whom was Richard earl of Cornwall, brother to Henry II. king of England: but no emperor was properly acknowledged till the year 1273, when Rodolph, count of Hapſburg, was unanimouſly raiſed to the vacant throne. During the interregnum which preceded the election of Rodolph, Denmark, Holland, and Hungary, entirely freed themſelves from the homage they were wont to pay to the empire; and much about the ſame time ſeveral German cities erected a municipal form of government, which ſtill continues. Lubec, Cologne, Brunſwic, and Dantzic, united for their mutual defence againſt the encroachments of the great lords, by a famous aſſociation, called the *Hanſeatic league*; and theſe towns were afterwards joined by eighty others, belonging to different ſtates, which formed a kind of commercial republic. Italy alſo, during this period, aſſumed a new plan of government. That freedom for which the cities of Lombardy had ſo long ſtruggled, was confirmed to them for a ſum of money: they were emancipated by the fruits of their induſtry. Sicily likewiſe changed its government and its prince; of which revolution a particular account is given under the article SICILY.

66
Decline of the power of the German emperors.

From the time of Frederic II. we may date the ruin of the German power in Italy. The Florentines, the Piſans, the Genoeſe, the Luccans, &c. became independent, and could not again be reduced. The power of the emperor, in ſhort, was in a manner annihilated, when Henry VII. undertook to reſtore it in the beginning of the 14th century. For this purpoſe a diet was held at Francfort, where proper ſupplies being granted for the emperor's journey, well known by the name of the *Roman expedition*, he ſet out for

67
Expedition of Henry VII. into Italy.

Italy, accompanied by the dukes of Auſtria and Bavaria, the archbiſhop of Triers, the biſhop of Liege, the counts of Savoy and Flanders, and other noblemen, together with the militia of all the imperial towns. Italy was ſtill divided by the factions of the Guelphs and Gibelines, who butchered one another without humanity or remorſe. But their conteſt was no longer the ſame: it was not now a ſtruggle between the empire and the prieſthood, but between faction and faction, inflamed by mutual jealouſies and animoſities. Pope Clement V. had been obliged to leave Rome, which was in the anarchy of popular government. The Colonnas, the Urſini, and the Roman barons, divided the city; and this diviſion was the cauſe of a long abode of the popes in France, ſo that Rome ſeemed equally loſt to the popes and the emperors. Sicily was in the poſſeſſion of the houſe of Arragon, in conſequence of the famous maſſacre called the *Sicilian veſpers*, which delivered that iſland from the tyranny of the French *. Carobert, king of Hungary, diſputed the kingdom of Naples with his uncle Robert, ſon of Charles II. of the houſe of Anjou. The houſe of Eſte had eſtabliſhed itſelf at Ferrara; and the Venetians wanted to make themſelves maſters of that country. The old league of the Italian cities no longer ſubſiſted. It had been formed with no other view than to oppoſe the emperors; and ſince they had neglected Italy, the cities were wholly employed in aggrandizing themſelves, at the expence of each other. The Florentines and the Genoeſe made war upon the republic of Piſa. Every city was alſo divided into factions within itſelf. In the midſt of theſe troubles Henry VII. appeared in Italy in the year 1311, and cauſed himſelf to be crowned king of Lombardy at Milan. But the Guelphs had concealed the old iron crown of the Lombard kings, as if the right of reigning were attached to a ſmall circlet of metal. Henry ordered a new crown to be made, with which the ceremony of inauguration was performed.

Cremona was the firſt place that ventured to oppoſe the emperor. He reduced it by force, and laid it under heavy contributions. Parma, Vicenza, and Placentia, made peace with him on reaſonable conditions. Padua paid 100,000 crowns, and received an imperial officer as governor. The Venetians preſented Henry with a large ſum of money, an imperial crown of gold enriched with diamonds, and a chain of very curious workmanſhip. Breſcia made a deſperate reſiſtance, and ſuſtained a very ſevere ſiege; in the courſe of which the emperor's brother was ſlain, and his army diminiſhed to ſuch a degree, that the inhabitants marched out under the command of their prefect, Thibault de Druſſati, and gave him battle; but they were repulſed with great loſs, after an obſtinate engagement; and at laſt obliged to ſubmit, and their city was diſmantled. From Breſcia Henry marched to Genoa, where he was received with expreſſions of joy, and ſplendidly entertained. He next proceeded to Rome; where, after much bloodſhed, he received the imperial crown from the hands of the cardinals. Clement V. who had originally invited Henry into Italy, growing jealous of his ſucceſs, had leagued with Robert king of Naples, and the Urſini faction, to oppoſe his entrance into Rome. He entered it in ſpite of them, by the aſſiſtance of the Colonnas. Now maſter of that ancient city, Henry appointed it a governor; and ordered, that all the cities and ſtates of Italy ſhould pay him an annual tribute. In this order he comprehended the kingdom of Naples, to which he was going to make good his claim of ſuperiority by arms, when he died at Benevento in 1313, as is commonly ſuppoſed, of poiſon given him by a Dominican friar, in the conſecrated wine of the ſacrament.

68 State of Italy ſince that time.

The efforts of Henry VII. were unable to reſtore the imperial power in Italy. From this time the authority of the emperor in that country conſiſted in a great meaſure in the conveniency which the Gibelines found in oppoſing their enemies under the ſanction of his name. The power of the pope was much of the ſame nature. He was leſs regarded in Italy than in any other country in Chriſtendom. There was indeed a great party who called themſelves *Guelphs;* but they affected this diſtinction only to keep themſelves independent of the imperialiſts; and the ſtates and princes who called themſelves *Guelphs* paid little more acknowledgement to his holineſs, than ſheltering themſelves under his name and authority. The moſt deſperate wars were carried on by the different cities againſt each other; and in theſe wars Caſtruccio Caſtraccani, and Sir John Hawkwood an Engliſhman, are celebrated as heroes. A detail of theſe tranſactions would furniſh materials for many volumes; and after all ſeems to be but of little importance, ſince nothing material was effected by the utmoſt efforts of valour, and the belligerant ſtates were commonly obliged to make peace without any advantage on either ſide. By degrees, however, this martial ſpirit ſubſided; and in the year 1492, the Italians were ſo little capable of reſiſting an enemy, that Charles VIII. of France conquered the whole kingdom of Naples in ſix weeks, and might eaſily have ſubdued the whole country had it not been for his own imprudence. Another attempt on Italy was made by Lewis XII and a third by Francis I. But for an account of the bad ſucceſs of theſe expeditions, ſee the article FRANCE n° 68—75. In the reigns of Lewis XIII. and XIV. an obſtinate war was carried on between the French and Spaniards, in which the Italian ſtates bore a very conſiderable ſhare. The war concluded in 1660, with very little advantage to the French, who have been always unſucceſsful in their Italian wars. The like bad ſucceſs attended them in that part of the world, in the war which commenced between Britain and Spain in the year 1740. But the particulars of theſe wars with regard to the different ſtates of Italy, naturally fall to be conſidered under the hiſtory of thoſe ſtates into which the country is now divided; viz. Sardinia, Milan or the Milaneſe, Genoa, Venice, Tuſcany or Florence, Lucca, St Marino, Parma, Mantua, Modena, Rome, and Naples.

69 Air, &c. of Italy.

The air of Italy is very different, according to the different ſituations of the ſeveral countries contained in it. In thoſe on the north of the Apennines it is more temperate, but on the ſouth it is generally very warm. The air of the Campania of Rome, and of the Ferrareſe, is ſaid to be unhealthful; which is owing to the lands not being duly cultivated, nor the marſhes drained. That of the other parts is generally pure, dry, and

* See *Sicily*.

and healthy. In ſummer, the heat is very great in the kingdom of Naples; and would be almoſt intolerable, if it was not ſomewhat alleviated by the ſea-breezes. The ſoil of Italy in general is very fertile, being watered by a great number of rivers. It produces a great variety of wines, and the beſt oil in Europe; excellent ſilk in abundance; corn of all ſorts, but not in ſuch plenty as in ſome other countries; oranges, lemons, citrons, pomegranates, almonds, raiſins, ſugar, mulberry-trees without number, figs, peaches, nectarines, apricots, pears, apples, filberts, cheſnuts, &c. Moſt of theſe fruits were at firſt imported by the Romans from Aſia Minor, Greece, Africa, and Syria, and were not the natural products of the ſoil. The tender plants are covered in winter on the north ſide of the Apennines, but on the ſouth ſide they have no need of it. This country alſo yields good paſture; and abounds with cattle, ſheep, goats, buffaloes, wild boars, mules, and horſes. The foreſts are well ſtored with game; and the mountains yield not only mines of iron, lead, alum, ſulphur, marble of all ſorts, alabaſter, jaſper, porphyry, &c. but alſo gold and ſilver; with a great variety of aromatic herbs, trees, ſhrubs, and ever-greens, as thyme, lavender, laurel, and bays, wild olive-trees, tamarinds, juniper, oaks, and pines.

A very extenſive trade is carried on in many places in Italy, particularly at Leghorn, Genoa, Bologna, Venice, and Naples; the country having a great variety of commodities and manufactures for exportation, eſpecially wine, oil, perfumes, fruits, and ſilks. Travellers alſo bring large ſums of money into Italy, beſides what they lay out in pictures, curioſities, relics, antiquities, &c.

70 Dreſs, diſpoſition, &c. of the inhabitants.

The Italians are generally well proportioned, tho' their complexions are none of the beſt. As to dreſs, they follow the faſhions of the countries on which they border, or to which they are ſubject, namely, thoſe of France, Spain, and Germany. With reſpect to their genius and taſte in architecture, painting, carving, and muſic, they are thought to excel greatly, and to leave the other nations of Europe far behind them: but their muſic ſeems too ſoft and effeminate to deſerve all the praiſe beſtowed on it; and their houſes are far inferior to thoſe of England in reſpect of convenience. No country hath produced better politicians, hiſtorians, poets, painters, and ſculptors, we mean ſince the revival of the arts and ſciences, excluſive of thoſe of ancient times. The Italians are very affable, courteous, ingenious, ſober, and ready-witted; but extremely jealous, vindictive, laſcivious, ceremonious, and ſuperſtitious. In reſpect to jealouſy, indeed, we are told, that a very extraordinary change hath lately taken place; and that the Italians are now no leſs indulgent and complaiſant to their wives, than the moſt polite huſbands in France itſelf. In their tempers, the Italians ſeem to be a good medium between the French and Spaniards; neither ſo gay and volatile as the one, nor ſo grave and ſolemn as the other. Boiled ſnails, ſerved up with oil and pepper, or fried in oil, and the hinder parts of frogs, are reckoned dainty diſhes. Kites, jackdaws, hawks, and magpies, are alſo eaten, not only by the common people, but the better ſort. Wine is drank here both in ſummer and winter cooled by ice or ſnow. The women affect yellow hair, as the Roman ladies and courtezans formerly did. They alſo uſe paint and waſhes, both for their hands and faces. The day here is reckoned from ſun-ſet to ſun-ſet, as the Athenians did of old.

ITCH, a cutaneous diſeaſe, appearing in ſmall watery puſtules on the ſkin; commonly of a mild nature, though ſometimes attended with obſtinate and dangerous ſymptoms. See (the *Index* ſubjoined to) MEDICINE.

ITCH-*Inſect*. See ACARUS.

ITEA, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants. There is but one ſpecies, a native of North-America. It grows by the ſides of rivers, and in other parts where the ground is moiſt. It riſes to the height of eight or 10 feet, ſending out many branches garniſhed with ſpear-ſhaped leaves placed alternately, and ſlightly ſawed on their edges, of a light green colour. At the extremity of the branches are produced fine ſpikes of white flowers three or four inches long, ſtanding erect. When theſe ſhrubs are in vigour, they will be entirely covered with flowers, ſo that they make a beautiful appearance during the flowering ſeaſon, which is in July. They are propagated by layers, and are not injured by the cold of this climate; but are apt to die in ſummer, if they are planted on a dry gravelly ſoil. The ſhoots ſhould be laid down in autumn, and will be rooted in one year.

ITHACA (anc. geogr.), an iſland in the Ionian Sea on the coaſt of Epirus; the country of Ulyſſes near Dulichium, with a town and port ſituated at the foot of mount Neius. According to Pliny, it is about 25 miles in compaſs; according to Artemidorus, only 10; and is now found to be only eight miles round. It is now uninhabited, and called *Jathaco*.

ITINERARY, ITINERARIUM; a journal, or an account of the diſtances of places. The moſt remarkable is that which goes under the names of *Antoninus* and *Æthicus*; or, as Barthius found in his copy, *Antoninus Æthicus*; a Chriſtian writer, poſterior to the times of Conſtantine. Another, called *Hieroſolymitanum*, from Bourdeaux to Jeruſalem, and from Heraclea through Aulona and Rome to Milan, under Conſtantine.——*Itinerarium* denotes a day's march.

ITIUS PORTUS (anc. geogr.), the *crux geographorum*, ſuch being the difficulty of aſcertaining its poſition. It would be endleſs to recite the ſeveral opinions concerning it, with the ſeveral reaſons advanced in ſupport of them. Three ports are mentioned by Cæſar; two without any particular name, viz. the Higher and the Lower, with reſpect to the *Portus Itius*. Calais, Boulogne, St Omer, and Whitſand, have each in their turn had their ſeveral advocates. Cæſar gives two diſtinctive characters or marks which ſeem to agree equally to Boulogne and Whitſand, namely, the ſhortneſs of the paſſage, and the ſituation between two other ports; therefore nothing can with certainty be determined about the ſituation of the *Portus Itius*.

ITTIGIUS (Thomas), a learned profeſſor of divinity at Leipſic, and ſon of John Ittigius, profeſſor of phyſic in the ſame univerſity. He firſt publiſhed *A treatiſe upon burning mountains*; after which he became a miniſter, and exerciſed that function in various churches there. He furniſhed ſeveral papers in the Leipſic acts, beſides publiſhing ſome hiſtorical works and diſſertations. He died in 1710.

ITZEHOA, an ancient and handſome town of Germany, in the circle of Lower Saxony, and duchy of Holſtein. It belongs to the king of Denmark, and is ſeated on the river Stoer, in E. Long. 9. 25. N. Lat. 54. 8.

JUAN (St) DE LA FRONTERA, a town of South-America, in Chili, in the province of Chiquito, near the lake Guanacho. The territory of this town is inhabited by 20,000 native Americans, who are tributary to Spain. It contains mines of gold, and produces a kind of almonds that are very delicate. It is ſeated at the foot of the Andes, in W. Long. 66. 35. S. Lat. 23. 25.

JUAN *de Porto Ricco*, an iſland of America, and one of the Caribbees, being 100 miles in length, and 50 in breadth. It belongs to the Spaniards; and is full of very high mountains, and extremely fertile valleys, interſperſed with woods, and well watered with ſprings and rivulets. It produces ſugar, rum, ginger, corn, and fruits; partly proper to the climate, and partly introduced from Spain. Beſides, there are ſo many cattle, that they often kill them for the ſake of the ſkins alone. Here are a great number of uncommon trees, and there is a little gold in the north part of the iſland. It is commonly ſaid that the air is healthy; and yet the earl of Cumberland, when he had taken this iſland, loſt moſt of his men by ſickneſs, and for that reaſon was forced to abandon it. This happened in the reign of queen Elizabeth. It is ſubject to ſtorms and hurricanes, like the reſt of theſe iſlands. It lies to the eaſt of Hiſpaniola, at the diſtance of 50 miles.

JUAN *de Porto Ricco*, the capital town of the iſland of Porto Ricco, with a good harbour defended by ſeveral forts, and a biſhop's ſee. It is ſeated on the north coaſt of the iſland, in W. Long. 65. 35. N. Lat. 18. 30.

JUAN *Fernandez*, an iſland in the great South Sea, in S. Lat. 33. 40. and W. Long. 78. 30. from London. It was formerly a place of reſort for the buccaniers who annoyed the weſtern coaſt of the Spaniſh continent. They were led to reſort hither from the multitude of goats which it nouriſhed; to deprive their enemies of which advantage, the Spaniards tranſported a conſiderable number of dogs, which increaſing greatly, have almoſt extirpated the goats, who now only find ſecurity among the ſteep mountains in the northern parts, which are inacceſſible to their purſuers. There are inſtances of two men living, at different times, alone on this iſland for many years; the one a Muſquito Indian; the other Alexander Selkirk, a Scotchman, who was, after five years, taken on board an Engliſh ſhip, which touched here in about 1710, and brought back to Europe. From the hiſtory of this recluſe, Daniel de Foe is ſaid to have conceived the idea of writing the adventures of Robinſon Cruſoe. This iſland was very propitious to the remains of commodore Anſon's ſquadron in 1741, after having been buffeted with tempeſts, and debilitated by an inveterate ſcurvy, during a three months paſſage round Cape Horn: they continued here three months; during which time the dying crews, who on their arrival could ſcarcely with one united effort heave the anchor, were reſtored to perfect health. Captain Carteret, in the Swallow, in 1767, having met with many difficulties and impediments in his paſſage into the South Sea, by the Straits of Magelhaens, attempted to make this iſland in order to recruit the health of his men; but he found it fortified by the Spaniards, and therefore choſe rather to proceed to the iſland of Maſafuero. But M. de Bougainville, that ſame year, is ſaid to have touched here for refreſhments, although in the narrative of the voyage the fact is cautiouſly ſuppreſſed. This iſland is not quite 15 miles long, and about ſix broad; its only ſafe harbour is on the north ſide. It is ſaid to have plenty of excellent water, and to abound with a great variety of eſculent vegetables highly antiſcorbutic; beſides which, commodore Anſon ſowed a variety of garden-ſeeds, and planted the ſtones of plums, apricots, and peaches, which he was many years afterwards informed had thriven greatly; and now doubtleſs furniſh a very valuable addition to the natural productions of this ſpot. Vaſt ſhoals of fiſh of various kinds frequent this coaſt, particularly cod of a prodigious ſize; and, it is ſaid, in not leſs abundance than on the banks of Newfoundland. There are but few birds here, and thoſe few are of ſpecies well known and common.

JUAN *Blanco*. See PLATINA.

JUBILEE, a time of public and ſolemn feſtivity among the ancient Hebrews. This was kept every 50th year: it began about the autumnal equinox, and was proclaimed by ſound of trumpet throughout all the country. At this time all ſlaves were releaſed, all debts annihilated, and all lands, houſes, wives and children, however alienated, were reſtored to their firſt owners. During this whole year all kind of agriculture was forbidden; and the poor had the benefit of the harveſt, vintage, and the other productions of the earth, in the ſame manner as in the ſabbatic or ſeventh year. As this was deſigned to put the Iſraelites in mind of their Egyptian ſervitude, and to prevent their impoſing the like upon their brethren, it was not obſerved by the Gentile proſelytes.

The Chriſtians, in imitation of the Jews, have likewiſe eſtabliſhed *jubilees*, which began in the time of pope Boniface VIII. in the year 1300, and are now practiſed every 25 years: but theſe relate only to the pretended forgiveneſs of ſins, and the indulgences granted by the church of Rome; together with the privilege of performing a thouſand frolics in maſquerade. The ceremony of the *jubilee* obſerved at Rome, begins in the following manner: The pope goes to St Peter's church, to open the holy gate, which is walled up, and opened only on this occaſion; and, holding a golden hammer in his hand, he knocks at the gate three times, repeating theſe words, *Aperite mihi portas juſtitiæ, &c.* “ Open to me the gates of “ righteouſneſs; I will go into them, and I will praiſe “ the Lord, (Pſal. cxviii. 19.)” Upon which the maſons fall to work, and break down the wall that ſtops up the gate: which done, the pope kneels down before it, and the penitentiaries ſprinkle him with holy water. Then, taking up the croſs, he begins to ſing *Te Deum;* and enters the church, followed by the clergy. In the mean time, three cardinal-legates are ſent to open the three other holy gates which are in the churches of St John of Lateran, St Paul, and St Mary the Greater. When the holy year is expired, the holy gates are ſhut in this manner: The pope, after he has bleſſed the ſtones and mortar, lays the firſt ſtone, and leaves there 12 boxes of gold and ſilver medals; after which the holy gates are walled up as before, and continue ſo till the next *jubilee*.

JUCATAN, or **YUCATAN**, a large province of North-America, in New Spain, which is a peninſula. It is over-againſt the iſland of Cuba, and contains a large quantity of timber, proper for building ſhips; as alſo ſugar, caſſia, and Indian corn. The original inhabitants are few, they having been very ill uſed by the Spaniards. Merida is the capital town. It is a flat, level country; and is very unhealthy, which may be owing to the frequent inundations.

JUDAH, the fourth ſon of Jacob, and father of the chief of the tribes of the Jews, diſtinguiſhed by his name, and honoured by giving birth to the Meſſiah, died 1636 B. C.

JUDAH *Hakkadoſh*, or the Saint, a rabbi celebrated for his learning and riches, lived in the time of the emperor Antoninus, and was the friend and preceptor of that prince. Leo of Modena, a rabbi of Venice, tells us, that rabbi Judah, who was very rich, collected about 26 years after the deſtruction of the temple, in a book which he called the *Miſna*, the conſtitutions and traditions of the Jewiſh magiſtrates who preceded him. But as this book was ſhort and obſcure, two Babyloniſh rabbis, Rabbena and Aſe, collected all the interpretations, diſputes, and additions, that had been made until their time upon the Miſna, and formed the book called the *Babyloniſh Talmud* or *Gemara*; which is preferable to the Jeruſalem Talmud, compoſed ſome years before by rabbi Jochanan of Jeruſalem. The Miſna is the text of the Talmud; of which we have a good edition in Hebrew and Latin by Surenhuſius, with notes, in 3 vols folio. It were to be wiſhed the ſame had been done to the Gemara.

The kingdom of **JUDAH** was of ſmall extent, compared with that of the kingdom of Iſrael; conſiſting only of two tribes, Benjamin and Judah: its eaſt boundary, the Jordan; the Mediterranean its weſt, in common with the Danites, if we except ſome places recovered by the Philiſtines, and others taken by the kings of Iſrael: on the ſouth, its limits ſeem to have been contracted under Hadad of the royal progeny of Edom, (1 Kings xi. 14.)

Tribe of **JUDAH**, one of the 12 diviſions of Paleſtine by tribes, (Joſh. xv.) having Idumea on the ſouth, from the extremity of the Lacus Aſphaltites, alſo the Wilderneſs of Zin, Cadeſbarnea, and the brook or river of Egypt; on the eaſt, the ſaid lake; on the weſt, the Mediterranean; and on the north, the mouth of the ſaid lake; where it receives the Jordan, Bethſemes, Thimna, quite to Ekron on the ſea.

JUDEA, (anc. geog.) taken largely, either denotes all Paleſtine, or the greater part of it; and thus it is generally taken in the Roman hiſtory: Ptolemy, Rutilius, Jerome, Origen, and Euſebius, take it for the whole of Paleſtine. Here we conſider it as the third part of it on this ſide the Jordan, and that the ſouthern part, diſtinct from Samaria and Galilee; under which notion it is often taken, not only in Joſephus, but alſo in the New Teſtament. It contained four tribes; Judah, Benjamin, Dan, and Simeon, together with Philiſtia and Idumea; ſo as to be compriſed between Samaria on the north, Arabia Petræa on the ſouth, and to be bounded by the Mediterranean on the weſt, and by the Lacus Aſphaltites, with part of Jordan, on the eaſt. Joſephus divides it into 11 toparchies; Pliny into 10; by which it has a greater extent than that juſt mentioned. See PALESTINE.

JUDAISM, the religious doctrines and rites of the JEWS.

JUDAS MACCABEUS, a celebrated general of the Jews, renowned for his many victories over his enemies, at laſt ſlain in battle, 261 B. C. See (*Hiſtory* of the) JEWS, n° 13.

JUDE (St), brother of St James the younger, and ſon of Joſeph, (Mat. xiii. 55.) He preached in Meſopotamia, Arabia, Syria, Idumea; and died in Berytus for the confeſſion of Chriſt. He writ that epiſtle which goes under his name, and after the death of moſt of the apoſtles. He was cruelly put to death for reproving the ſuperſtition of the Magi.

JUDE, *or the General Epiſtle of Jude*, a canonical book of the New Teſtament, written againſt the heretics, who, by their diſorderly lives and impious doctrines, corrupted the faith and good morals of the Chriſtians. St Jude draws them in lively colours, as men given up to their paſſions, full of vanity, conducting themſelves by worldly wiſdom, and not by the ſpirit of God.

JUDENBURG, a handſome and conſiderable town of Germany, in the circle of Auſtria, and capital of Upper Styria, with a handſome caſtle; the public buildings with the ſquare are very magnificent. It is ſeated on the river Meur. E. Long. 15. 20. N. Lat. 47. 20.

JUDEX (Matthew), one of the principal writers of the centuries of Magdeburg, was born at Tippleſwolde in Miſnia, in 1528. He taught theology with great reputation; but met with many diſquiets in the exerciſe of his miniſtry from party-feuds. He wrote ſeveral works, and died in 1564.

JUDGE, a chief magiſtrate of the law, appointed to hear cauſes, to explain the laws, and to paſs ſentence.

Book of **JUDGES**, a canonical book of the Old Teſtament, ſo called from its relating the ſtate of the Iſraelites under the adminiſtration of many illuſtrious perſons who were called *judges*, from being both the civil and military governors of the people, and who were raiſed up by God upon ſpecial occaſions, after the death of Joſhua, till the time of their making a king. In the time of this peculiar polity, there were ſeveral remarkable occurrences, which are recorded in this book. It acquaints us with the groſs impiety of a new generation which ſprung up after the death of Joſhua; and gives us a ſhort view of the diſpenſations of heaven towards this people, ſometimes relieving and delivering them, and at others ſeverely chaſtiſing them by the hands of their enemies.

JUDGMENT, among logicians, a faculty or rather act of the human ſoul, whereby it compares its ideas, and perceives their agreement or diſagreement. See METAPHYSICS, n° 242—245; and LOGIC, Part II.

JUDGMENT, in law, is the ſentence pronounced by

Judgment.

the court upon the matter contained in the record. Judgments are of four ſorts. Firſt, where the facts are confeſſed by the parties, and the law determined by the court; as in caſe of judgment upon *demurrer:* ſecondly, where the law is admitted by the parties, and the facts diſputed; as in a caſe of judgment on *verdict:* thirdly, where both the fact and the law ariſing thereon are admitted by the defendant; which is the caſe of judgments by *confeſſion* or *default*: or, laſtly, where the plaintiff is convinced that either fact, or law, or both, are inſufficient to ſupport his action, and therefore abandons or withdraws his proſecution; which is the caſe in judgments upon a *nonſuit* or *retraxit*.

The judgment, though pronounced or awarded by the judges, is not their determination or ſentence, but the determination and ſentence of the *law*. It is the concluſion that naturally and regularly follows from the premiſes of law and fact, which ſtand thus: Againſt him who hath rode over my corn, I may recover damages by law; but A hath rode over my corn; therefore I ſhall recover damages againſt A. If the major propoſition be denied, this is a demurer in law: if the minor, it is then an iſſue of fact: but if both be confeſſed (or determined) to be right, the concluſion or judgment of the court cannot but follow. Which judgment or concluſion depends not therefore on the arbitrary caprice of the judge, but on the ſettled and invariable principles of juſtice. The judgment, in ſhort, is the remedy preſcribed by law for the redreſs of injuries; and the ſuit or action is the vehicle or means of adminiſtering it. What that remedy may be, is indeed the reſult of deliberation and ſtudy to point out; and therefore the ſtyle of the judgment is, not that it is decreed or reſolved by the court, for then the judgment might appear to be their own; but, "it is conſidered," *conſideratum eſt per curiam*, that the plaintiff do recover his damages, his debt, his poſſeſſion, and the like: which implies that the judgment is none of their own; but the act of law, pronounced and declared by the court, after due deliberation and inquiry. See *Blackſt. Comment.* iii. 396.

Judgment, in criminal caſes, is the next ſtage of proſecution, after trial and conviction are paſt, in ſuch crimes and miſdemeanors as are either too high or too low to be included within the benefit of clergy. For when, upon a capital charge, the jury have brought in their verdict guilty in the preſence of the priſoner; he is either immediately, or at a convenient time ſoon after, aſked by the court, if he has any thing to offer why judgment ſhould not be awarded againſt him. And in caſe the defendant be found guilty of a miſdemeanor, (the trial of which may, and does uſually, happen in his abſence, after he has once appeared), a *capias* is awarded and iſſued, to bring him in to receive his judgment; and, if he abſconds, he may be proſecuted even to outlawry. But whenever he appears in perſon, upon either a capital or inferior conviction, he may at this period, as well as at his arraignment, offer any exceptions to the indictment, in *arreſt* or ſtay of judgment: as for want of ſufficient certainty in ſetting forth either the perſon, the time, the place, or the offence. And, if the objections be valid, the whole proceedings ſhall be ſet aſide; but the party may be indicted again. And we may take notice, 1. That none of the ſtatutes of *jeofails*, for amendment of errors, extend to indictments or proceedings in criminal caſes; and therefore a defective indictment is not aided by a verdict, as defective pleadings in civil caſes are. 2. That, in favour of life, great ſtrictneſs has at all times been obſerved, in every point of an indictment. Sir Matthew Hale indeed complains, "that this ſtrictneſs is grown to be a blemiſh and inconvenience in the law, and the adminiſtration thereof: for that more offenders eſcape by the over eaſy ear given to exceptions in indictments, than by their own innocence; and many times groſs murders, burglaries, robberies, and other heinous and crying offences, remain unpuniſhed by theſe unſeemly niceties: to the reproach of the law, to the ſhame of the government, to the encouragement of villany, and to the diſhonour of God." And yet, notwithſtanding this laudable zeal, no man was more tender of life than this truly excellent judge.

Blackſt. Comment.

A pardon alſo may be pleaded in arreſt of judgment: and it has the ſame advantage when pleaded here, as when pleaded upon arraignment; viz. the ſaving the attainder, and, of courſe, the corruption of blood: which nothing can reſtore but parliament, when a pardon is not pleaded till after ſentence. And certainly, upon all accounts, when a man hath obtained a pardon, he is in the right to plead it as ſoon as poſſible. See Pardon.

Praying the benefit of clergy may alſo be ranked among the motions in arreſt of judgment. See *Benefit of* Clergy.

If all theſe reſources fail, the court muſt pronounce that judgment which the law hath annexed to the crime. Of theſe ſome are capital, which extend to the life of the offender, and conſiſt generally in being hanged by the neck till dead; though in very atrocious crimes other circumſtances of terror, pain, or diſgrace, are ſuperadded: as, in treaſons of all kinds, being drawn or dragged to the place of execution; in high treaſon affecting the king's perſon or government, embowelling alive, beheading, and quartering; and in murder, a public diſſection. And, in caſe of any treaſon committed by a female, the judgment is to be burned alive. But the humanity of the Engliſh nation has authoriſed, by a tacit conſent, an almoſt general mitigation of ſuch parts of theſe judgments as ſavour of torture or cruelty: a ſledge or hurdle being uſually allowed to ſuch traitors as are condemned to be drawn; and there being very few inſtances (and thoſe accidental or by negligence) of any perſon's being embowelled or burned, till previouſly deprived of ſenſation by ſtrangling. Some puniſhments conſiſt in exile or baniſhment, by abjuration of the realm, or tranſportation to the American colonies: others in loſs of liberty, by perpetual or temporary impriſonment. Some extend to confiſcation, by forfeiture of lands, or moveables, or both, or of the profits of lands for life: others induce a diſability, of holding offices or employments, being heirs, executors, and the like. Some, though rarely, occaſion a mutilation or diſmembering, by cutting off the hand or ears: others fix a laſting ſtigma on the offender, by ſlitting the noſtrils, or branding in the hand or face. Some are merely pecuniary, by ſtated or diſcretionary fines: and laſtly, there are others, that conſiſt principally in their ignominy, though moſt of them are mixed with ſome degree of corporal pain; and theſe are inflicted chiefly for ſuch crimes, as either ariſe from indigence, or render even opulence diſgraceful. Such as whipping, hard labour in the houſe of correction, the pillory, the ſtocks, and the ducking-ſtool.

Diſguſting as this catalogue may ſeem, it will afford pleaſure to a Britiſh reader, and do honour to the Britiſh laws, to compare it with that ſhocking apparatus of death and torment to be met with in the criminal codes of almoſt every other nation in Europe. And it is moreover one of the glories of our law, that the nature, tho' not always the quantity or degree, of puniſhment is aſcertained for every offence; and that it is not left in the breaſt of any judge, nor even of a jury, to alter that judgment, which the law has beforehand, ordained, for every ſubject alike, without reſpect of perſons. For, if judgments were to be the private opinions of the judge, men would then be ſlaves to their magiſtrates; and would live in ſociety, without knowing exactly the conditions and obligations which it lays them under. And beſides, as this prevents oppreſſion on the one hand; ſo, on the other, it ſtifles all hopes of impunity or mitigation, with which an offender might flatter himſelf if his puniſhment depended on the humour or diſcretion of the court. Whereas, where an eſtabliſhed penalty is annexed to crimes, the criminal may read their certain conſequence in that law, which ought to be the unvaried rule, as it is the inflexible judge, of his actions.

Judgment *of God, (Judicium Dei)*, in law, a term applied to the trial by combat, by ordeal, &c. See the articles Duel, Combat, Ordeal, &c.

JUDICIAL combat. See Battel.

JUDOIGNE, a town of the Auſtrian Netherlands, in Brabant. Near this town the duke of Marlborough gained that ſignal victory over the French in 1706, called the *battle of Ramilies*. It is ſeated on the river Gete, 13 miles ſouth-eaſt of Louvain, and 16 north of Namur.

IVES, or Yves, (St.), a celebrated biſhop of Chartres, born in the territory of Beauvais in the 11th century. His merit procured his election to the ſee of Chartres in 1092, or 1093, under the pontificate of Urban II. who had depoſed Geoffroy his predeceſſor for ſundry accuſations againſt him. Ives particularly ſignalized himſelf by his zeal againſt Philip I. who had put away his wife Bertha of Holland, and had taken Bertrade of Montford, wife of Fouques count of Anjou. Afterward he devoted himſelf wholly to the functions of his miniſtry; made ſeveral religious foundations; and died in 1115. Pope Pius V. permitted the monks of the congregation of Lateran, to celebrate the feſtival of St Ives on the 20th of May. We have a collection of decrees of his compiling, *Exceptiones eccleſiaſticarum regularum*, a *Chronicon*, and 22 ſermons; all very valuable pieces, which were collected and publiſhed in one volume folio, in 1647, by John Baptiſt Souciet, canon of Chartres.

Ives (St.), a ſea-port town of Cornwall, in England, ſeated on a bay of the ſame name; which being unſafe, it is only frequented by fiſhermen, for the taking of pilchards. However, it is a corporation, and ſends two members to parliament. W. Long. 6. 15. N. Lat. 50. 15.

Ives (St.), a town of Huntingdonſhire, in England. It is an ancient, large, and handſome place, ſeated on the river Ouſe, over which is a fine ſtone bridge. Here was a priory, which is now in ruins. It has one large church, two diſſenting, and a Popiſh meeting, with about 500 houſes; the ſtreets are pretty wide, and tolerably well paved. W. Long. 0. 7. N. Lat. 52. 20.

JUGERUM, in Roman antiquity, a ſquare of 120 Roman feet; its proportion to the Engliſh acre being as 10,000 to 16,097.

JUGLANS, a genus of the polyandria order, belonging to the monœcia claſs of plants. There are five ſpecies, the moſt remarkable of which is the regia or common walnut. This riſes 50 feet high or more, with a large upright trunk, branching into a very large ſpreading head, with large pinnated leaves, of two or three pair of oval, ſmooth, ſomewhat ſerrated lobes, terminated by an odd one; and monœcious flowers, ſucceeded by cluſters of large green fruit, incloſing furrowed nuts of different ſhapes and ſizes in the varieties, ripening in September and October. Other two ſpecies, called the *nigra* and *alba*, or black and white Virginian walnut, are alſo cultivated in this country, though they are leſs proper for fruit, having very ſmall kernels.

Culture. All the ſorts are propagated by planting their nuts, which will grow in any common ſoil. The nuts, being procured in the proper ſeaſon, in their outer covers or huſks if poſſible, they ſhould be preſerved in dry ſand until February, and then planted. After two years growth in the ſeed-bed, they are to be taken out, and planted in the nurſery, where they muſt remain till grown five or ſix feet high, when they muſt be tranſplanted where they are finally to remain; but if intended for timber as well as fruit-trees, they ought to be finally tranſplanted when they have attained the height of three or four feet.

Uſes. The fruit is uſed at two different ſtages of growth; when green to pickle; and, when ripe, to eat raw. As a pickle, the nuts may be uſed when about half or three-fourths grown, before the outer coat or ſhell becomes hard; ſuch nuts ſhould be choſen as are moſt free from ſpecks, and for this purpoſe they muſt be gathered by hand. Walnuts are ready for pickling in July and Auguſt. They are fully ripe in September and October; and are then commonly beat down with long poles, eſpecially on large trees; for, as the walnuts grow moſtly at the extremities of the branches, it would be troubleſome and tedious to gather them by hand. As ſoon as gathered, lay them in heaps a few days to heat and ſweat, to cauſe their outer huſks, which adhere cloſely, to ſeparate from the ſhell of the nuts; then clean them from the rubbiſh, and depoſit them in ſome dry room for uſe, covering them over cloſe with dry ſtraw half a foot thick, and they will keep three or four months. They are always readily ſold at market, eſpecially in London; where, at their firſt coming in, they are ſold with the huſks on, by the ſack or buſhel; but afterwards are bought clean, and ſold both by meaſure and by the thouſand. The wood of the walnut-tree is alſo very valuable; not indeed where ſtrength is neceſſary, it being of a very brittle nature; but the cabinet-makers and joiners eſteem it highly for ſeveral ſorts of houſhold furniture and other light works; for, being beautifully veined, it takes a fine poliſh, and the more knotty it is, the more it is valued for particular purpoſes. Walnut-trees are alſo well adapted for planting round the borders of orchards, where, by their large ſpreading heads, they will alſo guard the leſſer fruit-trees from boiſterous winds. The kernels of the nuts are ſimilar in quality to almonds; but are not, like them, uſed in medicine.

JUGORA, a conſiderable province of Muſcovy, depending on the government of Archangel. It has the title of a duchy; and is inhabited by a kind of Tartars, who are very ſavage, and much of the ſame diſpoſition with the Samoiedes.

IVICA, or YVICA, the name of an iſland in the Mediterranean. See YVICA.

JUICE, denotes the ſap of vegetables, or the liquors of animals. See ANATOMY, BLOOD, PLANTS, SAP, &c.

The juices of ſeveral plants are expreſſed to obtain their eſſential ſalts, and for ſeveral medicinal purpoſes, with intention either to be uſed without further preparation, or to be made into ſyrups and extracts. The general method of extracting theſe juices is, by pounding the plant in a marble mortar, and then by putting it into a preſs. Thus is obtained a muddy and green liquor, which generally requires to be clarified, as we ſhall ſoon obſerve. The juices of all plants are not extracted with equal eaſe. Some plants, even when freſh, contain ſo little juice, that water muſt be added while they are pounded, otherwiſe ſcarcely any juice would be obtained by expreſſion. Other plants, which contain a conſiderable quantity of juice, furniſh by expreſſion but a ſmall quantity of it, becauſe they contain alſo much mucilage, which renders the juice ſo viſcid that it cannot flow. Water muſt alſo be added to theſe plants to obtain their juice. The juices thus obtained from vegetables by a mechanical method, are not, properly ſpeaking, one of their principles, but rather a collection of all the proximate principles of plants which are ſoluble in water; ſuch as the ſaponaceous extractive matter, the mucilage, the odoriferous principle, all the ſaline and ſaccharine ſubſtances; all which are diſſolved in the water of the vegetation of the plants. Beſides all theſe matters, the juice contains ſome part of the reſinous ſubſtance, and the green colouring matter, which in almoſt all vegetables is of a reſinous nature. Theſe two latter ſubſtances, not being ſoluble in water, are only interpoſed between the parts of the other principles which are diſſolved in the juice, and conſequently diſturbs its tranſparency. They nevertheleſs adhere together in a certain degree, and ſo ſtrongly in moſt juices, that they cannot be ſeparated by filtration alone. When therefore theſe juices are to be clarified, ſome previous preparations muſt be uſed by which the filtration may be facilitated. Juices which are acid, and not very mucilaginous, are ſpontaneouſly clarified by reſt and gentle heat. The juices of moſt antiſcorbutic plants abounding in ſaline volatile principles, may be diſpoſed to filtration merely by immerſion in boiling water; and as they may be contained in cloſed bottles while they are thus heated in a water-bath, their ſaline volatile part, in which their medicinal qualities chiefly conſiſt, may thus be preſerved. Fermentation is alſo an effectual method of clarifying juices which are ſuſceptible of it; for all liquors which have fermented, clarify ſpontaneouſly after fermentation. But this method is not uſed to clarify juices, becauſe many of them are ſuſceptible of only an imperfect fermentation, and becauſe the qualities of moſt of them are injured by that proceſs. The method of clarification moſt generally uſed, and indiſpenſably neceſſary for thoſe juices which contain much mucilage, is boiling with the white of an egg. This matter, which has the property of coagulating in boiling water, and of uniting with mucilage, does accordingly, when added to the juice of plants, unite with, and coagulate, their mucilage, and ſeparates it from the juice in form of ſcum, together with the greateſt part of the reſinous and earthy matters which diſturb its tranſparency. And as any of theſe reſinous matters which may remain in the liquor, after this boiling with the whites of eggs, are no longer retained by the mucilage, they may eaſily be ſeparated by filtration. See FILTRATION.

The juices, eſpecially before they are clarified, contain almoſt all the ſame principles as the plant itſelf; becauſe in the operation by which they are extracted, no decompoſition happens, but every thing remains, as to its nature, in the ſame ſtate as in the plant. The principles contained in the juice are only ſeparated from the groſſer oily, earthy, and reſinous parts, which compoſe the ſolid matter that remains under the preſs. Theſe juices, when well prepared, have therefore the ſame medicinal qualities as the plants from which they are obtained. They muſt evidently differ from each other as to the nature and proportions of the principles with which they are impregnated, as much as the plants from which they are extracted differ from each other in thoſe reſpects.

Moſt vegetable juices coagulate when they are expoſed to the air, whether they are drawn out of the plant by wounds, or naturally run out; tho' what is called *naturally running out*, is generally the effect of a wound in the plant, from a ſort of canker, or ſome other internal cauſe. Different parts of the ſame plant yield different juices. The ſame veins in their courſe through the different parts of the plant yield juices of a different appearance. Thus the juice in the root of the cow parſnep is of a brimſtone colour; but in the ſtalk it is white.

Among thoſe juices of vegetables which are clammy and readily coagulate, there are ſome which readily break with a whey. The great wild lettuce, with the ſmell of opium yields the greateſt plenty of milky juice of any known Britiſh plant. When the ſtalk is wounded with a knife, the juice flows readily out like a thick cream, and is white and ropy; but if theſe wounds are made at the top of the ſtalks, the juice that flows out of them is daſhed with a purple tinge, as if cream had been ſprinkled over it with a few drops of red wine. Some little time after letting this out, it becomes much more purple, and thickens; and finally, the thicker part of it ſeparates, and the thin whey ſwims at top. The whey or thin part of this ſeparated matter is eaſily preſſed out from the curd by ſqueezing between the fingers, and the curd will then remain white; and on waſhing with water, it becomes like rags. The purple whey, for in this is contained all the colour, ſoon dries into a purple cake, and may be crumbled between the fingers into a powder of the ſame colour. The white curd being dried and kept for ſome time, becomes hard and brittle. It breaks with a ſhining ſurface like reſin, and is inflammable; taking fire at a candle, and burning all away with a ſtrong flame. The ſame thick part being held over a gentle heat, will draw out into tough long threads, melting like wax. The purple cake made from the whey is quite different from this; and when held to a candle ſcarce flames at all, but burns to a black coal. The whole virtue of the plant ſeems alſo to conſiſt in this thin part of its juice: for the coagulum or curd, though looking like wax or reſin, has no taſte at all; whereas the purple cake made from the ſerum is extremely bitter, and of a taſte ſomewhat reſembling that of opium.

Of the ſame kind with the wild lettuce are the throatwort, ſpurge, and many other plants. Theſe are all replete with a milky juice which ſeparates into curds and whey like that already deſcribed. But this, though a common law of nature, is not univerſal; for there are many plants which yield the like milky juices, without any ſeparation enſuing upon their extravaſation. The white juice of the ſonchus never ſeparates, but dries into an uniform cake: the common red wild poppy bleeds freely with a milky juice; and the heads or capſules of ſeed bleed not leſs freely than the reſt of the plant, even after the flower is fallen. This juice, on being received into a ſhell or other ſmall veſſel, ſoon changes its white to a deep yellow colour, and dries it into a cake which ſeems reſinous and oily, but no whey ſeparates from it. The tragopogon, or goat's-beard, when wounded, bleeds freely a milky juice; it is at firſt white, but becomes immediately yellow, and then more and more red; till at length it is wholly of a duſky red. It never ſeparates, but dries together into one cake; and is oily and reſinous, but of an inſipid taſte. The great bindweed alſo bleeds freely a white juice; the flowers, as well as the ſtalks and leaves, affording this liquor. It is of a ſharp taſte; and as many of the purging plants are of this claſs, it would be worth trying whether this milk is not purgative.

Theſe juices, as well as the generality of others which bleed from plants, are white like milk; but there are ſome of other colours. The juice of the great celandine is of a fine yellow colour; it flows from the plant of the thickneſs of cream, and ſoon dries into a hard cake, without any whey ſeparating from it. Another yellow juice is yielded by the ſeed-veſſels of the yellow centaury in the month of July, when the ſeeds are full grown. This is very clammy; it ſoon hardens altogether into a cake without any whey ſeparating from it. It ſticks to the fingers like birdlime, is of the colour of pale amber, and will never become harder than ſoft wax, if dried in the ſhade; but if laid in the ſun, it immediately becomes hard like reſin. Theſe cakes burn like wax, and emit a very pleaſant ſmell. The great angelica alſo yields a yellowiſh juice on being wounded; and this will not harden at all, but if kept ſeveral years will ſtill be ſoft and clammy, drawing out into threads, or half melted reſin.

Another kind of juices very different from all theſe, are thoſe of a gummy nature. Some of theſe remain liquid a long time, and are not to be dried without the aſſiſtance of heat; the others very quickly harden of themſelves, and are not inflammable. The gum of the juice of rhubarb-leaves ſoon hardens; and is afterwards ſoluble in common water, and ſparkles when put into the flame of a candle. The cluſters of the common honeyſuckle are full of a liquid gum. This they frequently throw out, and it falls upon the leaves, where it retains its own form. The red hairs of the ros ſolis are all terminated by large bladders of a thin watery fluid. This is alſo a liquid gum; it ſticks to the fingers, draws out into long threads, and ſtands the force of the ſun all day. In the centre of each of theſe dew-drops there is a ſmall red bladder, which ſtands immediately on the ſummit of the red hair, and contains a purple juice which may be ſqueezed out of it. The pinguicula, or butter-wort, has alſo a gummy matter on its leaves in much greater quantity than the ros ſolis.

Some plants yield juices which are manifeſtly of an oily nature. Theſe, when rubbed, are not at all of a clammy nature, but make the fingers glib and ſlippery, and do not all harden on being expoſed to the air. If the ſtalk of elecampane be wounded, there flows out an oily juice ſwimming upon a watery one. The ſtalks of the hemlock alſo afford a ſimilar oily liquor ſwiming upon the other; and in like manner the white mullein, the berries of ivy, the bay, juniper, dog-berry tree, and the fruit of the olive, when wounded, ſhew their oil floating on the watery juice. Some of theſe oily juices, however, harden into a kind of reſin. Our ivy yields ſuch a juice very abundantly; and the juice of the ſmall purple-berried juniper is of the ſame kind, being hard and fat, and not very gummy. If the bark of the common ivy is wounded in March, there will ooze out a tough and greaſy matter of a yellowiſh colour, which, taken up between the fingers, feels not at all gummy or ſticking, but melts in handling into a ſort of oil, which, in proceſs of time, hardens and cruſts upon the wounds, and looks like brown ſugar. It burns with a laſting flame, and ſmells very ſtrong. The tops of the wild lettuce, and the leaves growing near the tops, if examined with a magnifying glaſs, ſhew a great number of ſmall bladders, or drops of an oily juice of a browniſh colour, hardening into a kind of reſin; they are eaſily wiped off when of any ſize, and are truly an oily juice a little hardened. It is probable alſo, that the fine blue flour or powder, called the *bloom*, upon the ſurface of our common plums, is no other than ſuch an oily juice exſudating from their pores in ſmall particles, and hardening into a ſort of reſin.

JUJUBES, in the materia medica, the name of a fruit of the pulpy kind, produced on a tree which Linnæus makes a ſpecies of rhamnus. See RHAMNUS.

The jujubes have been made a general ingredient in pectoral decoctions; but they are now ſeldom uſed on theſe occaſions, and are ſcarce at all heard of in preſcription, or to be met with in our ſhops.

JULEP, in pharmacy, a medicine compoſed of ſome proper liquor and a ſyrup or ſugar, of extemporaneous preparation, without decoction. See PHARMACY, n° 917, &c.

JULIAN, the famous Roman emperor, ſtyled *the Apoſtate*, becauſe he profeſſed the Chriſtian religion before he aſcended the throne, but afterwards openly embraced Paganiſm, and endeavoured to aboliſh Chriſtianity. He made no uſe of violence, however, for this purpoſe; for he knew that violent meaſures had always rendered it more flouriſhing: he therefore behaved with a politic mildneſs to the Chriſtians; recalled all who had been baniſhed on account of religion under the reign of Conſtantius; and undertook to pervert them by his careſſes, and by temporal advantages and mortifications covered over by artful pretences: but he forbad Chriſtians to plead before courts of juſtice, or to enjoy any public employments. He even prohibited their teaching polite literature; well knowing the great advantages they drew from profane authors in their attacks upon Paganiſm and irreligion. Though he on all occaſions ſhewed a ſovereign contempt for the Chriſtians, whom he always called *Galileans*, yet he was ſenſible of the advantage they obtained by their virtue and the purity of their manners; and therefore inceſſantly propoſed their example to the Pagan prieſts. At laſt, however, when he found that all other methods failed, he gave public employments to the moſt cruel enemies of the Chriſtians, when the cities in moſt of the provinces were filled with tumults and ſeditions, and many of them were put to death: Though it has been pleaded by Julian's apologiſts, that the behaviour of the Chriſtians furniſhed ſufficient pretence for moſt of his proceedings againſt them, and the animoſities among themſelves furniſhed him with the means; that they were continually prone to ſedition, and made a merit of inſulting the public worſhip; and, finally, that they made no ſcruple of declaring, that want of numbers alone prevented them from engaging in an open rebellion. Hiſtorians mention, that Julian attempted to prove the falſehood of our Lord's prediction with reſpect to the temple of Jeruſalem; and reſolved to have that edifice rebuilt by the Jews, about 300 years after its deſtruction by Titus: but all their endeavours ſerved only the more perfectly to verify what had been foretold by Jeſus Chriſt; for the Jews, who had aſſembled from all parts to Jeruſalem, digging the foundations, flames of fire burſt forth, and conſumed the workmen *. However, the Jews, who were obſtinately bent on accompliſhing that work, made ſeveral attempts; but it is ſaid, that all who endeavoured to lay the foundations periſhed by theſe flames, which at laſt obliged them entirely to abandon the work. Julian being mortally wounded in a battle with the Perſians, it is ſaid, that he then catched in his hand ſome of the blood which flowed from his wound, and throwing it towards heaven, cried, "Thou Galilean haſt conquered." But notwithſtanding this popular report, Theodoret relates, that Julian diſcovered a different diſpoſition, and employed his laſt moments in converſing with Maximus the philoſopher, on the dignity of the ſoul. He died the following night, aged 32. For a particular account of his reign and exploits, ſee (*Hiſtory of*) CONSTANTINOPLE, n° 7. 33.—70.

No prince was ever more differently repreſented by different authors; on which account it is difficult to form a true judgement of his real character. It muſt, however, be acknowledged, that he was learned, liberal, temperate, brave, vigilant, and a lover of juſtice: but, on the other hand, he had apoſtatized to Paganiſm; was an enemy to the Chriſtian religion; and was, in fact, a perſecutor, though not of the moſt ſanguinary claſs. We have ſeveral of his diſcourſes or orations; ſome of his letters; a treatiſe, intitled *Miſopogon*, which is a ſatire on the inhabitants of Antioch; and ſome other pieces, all written in an elegant ſtyle. They were publiſhed in Greek and Latin by father Petau, in 1630, in quarto; and of which Spanheimius gave a fine edition in folio, in 1696. His moſt famous work was that compoſed againſt the Chriſtians, of which there are ſome fragments in Cyril's refutation of it.

JULIAN *Period*, in chronology, a period ſo called, as being adapted to the Julian year.

It is made to commence before the creation of the world. Its principal advantage lies here, that the ſame years of the cycles of the ſun, moon, and indiction, of which three cycles it was made to conſiſt by Joſeph Scaliger in 1580, belonging to any year of this period, will never fall together again till after the expiration of 7980 years. There is taken for the firſt year of this period that which hath the firſt of the cycle of the ſun, the firſt of the cycle of the moon, and the firſt of the indiction cycle, and ſo reckoning on.

The firſt year of the Chriſtian æra is always, in our ſyſtems of Chronology, the 4714th of the Julian period.

To find what year of the Julian period any given year of Chriſt anſwers to; To the given year of Chriſt add 4713, becauſe ſo many years of the Julian period were expired A. D. 1; and the ſum gives the year of the Julian period ſought.

On the contrary, having the year of the Julian period given, to find what year of Chriſt anſwers thereto; From the year of the Julian period given ſubſtract 4713, and the remainder will be the year ſought.

JULIAN (St.), a harbour on the ſouth of Patagonia, in South America, where ſhips uſually touch that are bound to the ſouth ſeas. S. Lat. 48. 15.

JULIERS, a duchy in the circle of Weſtphalia, in Germany, ſeated between the rivers Maeſe and Rhine, and bounded by Pruſſian Guelderland on the north, by the electorate of Triers on the ſouth, by the electorate of Cologne on the eaſt, and by the Netherlands on the weſt. It is about 60 miles long, and 30 broad; and is a very plentiful country, abounding in cattle, corn, and fine meadows, and is well ſupplied with wood; but it is moſt remarkable for a fine breed of horſes, and woad for dying, which is gathered here in abundance. The chief towns are Juliers, Aix-la-Chapelle, Duren, Munſter-Eifel, Bedbur, Weſinburgh, and Laſteren. It is ſubject to the elector Palatine, with the conſent of the kings of Pruſſia and Poland.

JULIERS, a city, capital of the duchy of Juliers in Weſtphalia; ſome think this city was founded by Julius Cæſar, or Julia Agrippina; but this is much queſtioned by others, becauſe it is not mentioned before Antoninus's Itinerary and Theodoſius's Tables. The town is ſmall, but well fortified, and neatly built; the houſes are of brick, and the ſtreets broad and regular. The citadel is large and very ſtrong, containing a palace of the ancient dukes, and a ſpacious piazza. In the ſuburbs there is a monaſtery of Carthuſians,

* See *Jeruſalem*.

nobly endowed by ſeveral dukes of Juliers. The town is but poorly inhabited, though they have a fine woollen manufactory in this country, and likewiſe another of linen. It was taken by Prince Maurice of Naſſau in 1610, and by the Spaniards in 1622. It is ſeated on the river Roer, in E. Lon. 6. 35. N. Lat. 50. 55.

JULIO ROMANO. See ROMANO.

JULIUS CÆSAR. See CÆSAR.

JULIUS II. (Julian de la Rovere) pope, remarkable for his warlike diſpoſition, and his political negociations: by the latter, he engaged the principal powers of Europe to league with him againſt the republic of Venice, called *the league of Cambray*, ſigned in 1508. The Venetians having purchaſed peace by the ceſſion of part of Romania, Julius turned his arms againſt Louis XII. king of France, and appeared in perſon, armed cap-a-pee, at the ſiege of Mirandola; which place he took by aſſault in 1511. But proceeding to excommunicate Louis, the king wiſely turned his own weapons againſt him, by calling a general council at Piſa: at which the pope refuſing to appear, was declared to be ſuſpended from the holy ſee; and Louis, in his turn, excommunicated the pope, who died ſoon after in 1512. He built the famous church of St Peter at Rome, and was a patron of the polite arts.

JULIUS *Pollux*. See POLLUX.

JULY, the ſeventh month of the year; during which the ſun enters the ſign Leo. The word is derived from the Latin *Julius*, the ſurname of C. Cæſar the dictator, who was born in it. Mark Antony firſt gave this month the name *July*, which before was called *Quintilis*, as being the fifth month of the year in the old Roman kalendar eſtabliſhed by Romulus, which begun in the month of March. For the ſame reaſon, Auguſt was called *Sextilis*; and September, October, November, and December, ſtill retain the name of their firſt rank:

Quæ ſequitur, numero turba notata ſuo. OVID. Faſt.

On the 19th day of this month the dog-days are commonly ſuppoſed to begin; when, according to Hippocrates and Pliny, the ſea boils, wine turns ſour, dogs go mad, the bile is increaſed and irritated, and all animals decline and languiſh.

JUMIEGE, a town of Normandy, in France, and in the territory of Caux, with a celebrated Benedictine abbey. It is ſeated on the river Seine, in E. Long. 0. 55. N. Lat. 49. 25.

JUNCTURE, in compoſition, See ORATORY, n° 46.

JUNCUS, the RUSH; a genus of the monogynia order, belonging to the hexandria claſs of plants. There are many ſpecies, which are univerſally known, being very troubleſome weeds, and difficult to be eracated. The pith of two kinds, called the *conglomeratus* and *effuſus*, or round-headed and ſoft ruſhes, are uſed for wicks to lamps and ruſh-lights. The *conglomeratus*, and *aculus* or marine ruſh, are planted with great care on the banks of the ſea in Holland, in order to prevent the water from waſhing away the earth; which would otherwiſe be removed every tide, if it were not for the roots of thoſe ruſhes, which faſten very deep in the ground, and mat themſelves near the ſurface in ſuch a manner as to hold the earth cloſely together. Therefore, whenever the inhabitants perceive that the roots of theſe ruſhes are deſtroyed, they are very aſſiduous in repairing them. In the ſummer-time, when the ruſhes are fully grown, they are cut and tied up in bundles, which are dried, and afterwards carried into the larger towns and cities, where they are wrought into baſkets, and ſeveral other uſeful things, which are frequently ſent into England. Theſe ſorts do not grow ſo ſtrong in this country as on the Maeſe, where they ſometimes arrive at the height of four feet and upwards.

A ſpecies of ruſh termed *juncus odoratus*, "ſweet ruſh, or camel's hay," is ſometimes brought to us from Turky and Arabia, tied up in bundles about a foot long. The ſtalk, in ſhape and colour, ſomewhat reſembles a barley-ſtraw; it is full of fungous pith like that of our common ruſhes: the leaves are like thoſe of wheat, and ſurround the ſtalk with ſeveral coats, as in the reed. The flowers are of a carnation colour, ſtriped with a lighter purple. The whole plant, when in perfection, has a hot, bitteriſh, not unpleaſant, aromatic taſte, and a very fragrant ſmell: by long keeping it loſes greatly its aromatic flavour. Diſtilled with water, it yields a conſiderable quantity of an eſſential oil. It was formerly often uſed in medicine as an aromatic, and in obſtructions of the viſcera, &c. but is very little employed at preſent.

JUNE, the ſixth month of the year, during which the ſun enters the ſign of Cancer. The word comes from the Latin *Junius*, which ſome derive *à Junone*. Ovid, in the 6th of his *Faſti*, makes the goddeſs ſay,

Junius à noſtro nomine nomen habet.

Others rather derive it *à junioribus*, this being for young people, as the month of May was for old ones. *Junius eſt juvenum, qui fuit antè ſenum.* In this month is the ſummer ſolſtice.

JUNGERMANNIA, a genus of the order of algæ, belonging to the cryptogamia claſs of plants. There are 29 ſpecies, all natives of Britain, growing in woods, ſhady places, by the ſides of ditches, &c. Many of them are beautiful objects for the microſcope.

JUNIPERUS, the JUNIPER TREE; a genus of the monadelphia order, belonging to the dioecia claſs of plants.

Species. 1. The *communis*, or common juniper, grows naturally in many parts of Britain, upon dry barren commons, where it ſeldom riſes above the height of a low ſhrub. Mr Evelyn aſſures us, that "the juniper, though naturally of the growth of England, is very little known in many parts of the country: for it grows naturally only in dry, chalky, or ſandy land; and, where the ſoil is oppoſite to this, the plant is rarely found. Thoſe who have been uſed to ſee it in its wild ſtate, on ſandy barren commons, &c. will have little inducement to plant it; as there they will ſee it procumbent, ſeldom ſhewing a tendency to aſpire: but when planted in a good ſoil, it will riſe to the height of 15 or 16 feet, and produce numerous branches from the bottom to the top, forming a well-looking buſhy plant. Theſe branches are exceeding tough, and covered with a ſmooth bark of a reddiſh colour, having a tinge of purple. The leaves are narrow and ſharp-pointed, growing by threes on the branches: their upper ſurface has a greyiſh ſtreak down the middle;

but their under ſurface is of a fine green colour, and they garniſh the ſhrub in great plenty. The flowers are ſmall, and of a yellowiſh colour. They are ſucceeded by the berries, which are of a blueiſh colour when ripe." Of this ſpecies there is a variety called *Swediſh juniper*, which grows 10 or 12 feet high, very branchy the whole length, with the branches growing more erect, and leaves, flowers, and fruit, like the former. But Mr Miller affirms the Swediſh juniper to be a diſtinct ſpecies. A proſtrate and very dwarfiſh variety is mentioned by Mr Lightfoot, under the name of *dwarf Alpine juniper*. It is frequently found in the mountains in the Highlands of Scotland, and has broader and thicker leaves than the former; the berries are alſo larger, or more oval than ſpherical. 2. The *oxycedrus*, or Spaniſh juniper, riſes from 10 to 15 feet high, cloſely branched from bottom to top; having ſhort, awl-ſhaped, ſpreading leaves by threes, and ſmall diœcious flowers, ſucceeded by large reddiſh-brown berries. 3. The *thurifera*, or blue-berried Spaniſh juniper, grows 20 feet high or more, branching in a conic form, with acute imbricated leaves growing by fours, and ſmall diœcious flowers, ſucceeded by large blue flowers. 4. The *Virginiana*, or Virginia cedar, grows 30 or 40 feet high, branching from bottom to top in a conic manner, ſmall leaves by threes adhering at their baſe; the younger ones imbricated, and the old ones ſpreading; with diœcious flowers, ſucceeded by ſmall blue berries. 5. The *Lycia*, or Lycian cedar, grows 20 feet high, branching erect; garniſhed with ſmall obtuſe oval leaves, every-where imbricated; having diœcious flowers, ſucceeded by large oval brown berries, It is a native of Spain and Italy. 6. The *Phœnicia*, or Phenician cedar, grows about 20 feet high, branching pyramidally; adorned with ternate and imbricated obtuſe leaves; and diœcious flowers, ſucceeded by ſmall yellowiſh berries. It is a native of Portugal. 7. The *Bermudiana*, or Bermudian cedar, grows 20 or 30 feet high, has ſmall acute leaves by threes below, the upper ones awl-ſhaped, acute, and decurrent, by pairs or fours, ſpreading outward, and diœcious flowers, ſucceeded by purpliſh berries. It is a native of Bermudas. 8. The *Sabina*, or ſavin tree; of which there are the following varieties, viz. ſpreading, upright, and variegated ſavin. The firſt grows three or four feet high, with horizontal and very ſpreading branches; with ſhort, pointed, decurrent, erect, oppoſite leaves; and diœcious flowers, ſucceeded by blueiſh berries, but very rarely producing either flowers or fruit. The ſecond grows eight or ten feet high, with upright branches, dark-green leaves like the former, and diœcious flowers, ſucceeded by plenty of berries. The third has the ends of many of the ſhoots and young branches variegated with white, and the leaves finely ſtriped; ſo that it makes a beautiful appearance.

Culture. The propagation of all the junipers is by ſeed, and of the ſavins by layers and cuttings; but theſe laſt may alſo be raiſed from the berries, if they can be procured. They may all be ſowed in beds of common light earth; except the cedar of Bermudas, which muſt be ſowed in pots, to have ſhelter in winter. When the hardy kinds have had two or three years growth in the ſeed-bed, they may be planted out in autumn or in ſpring, in nurſery-rows two feet aſunder, there to remain till of due ſize for final tranſplantation into the ſhrubbery. The Bermudas cedar muſt be ſheltered under a frame for the firſt year or two; when they muſt be ſeparated into ſmall pots, to be ſheltered alſo in winter for three or four years, till they have acquired ſome ſize and ſtrength; then turned out into pots in the full ground, where they are to remain in a warm ſituation; though a ſhelter of mats for the firſt winter or two during hard froſts will be of great ſervice. The ſeaſon for tranſplanting all the ſorts is either in autumn, October or November, or in March, and early in April.

Uſes, &c. Juniper-berries have a ſtrong, not diſagreeable ſmell; and a warm, pungent, ſweet taſte; which, if they are long chewed, or previouſly well bruiſed, is followed by a bitteriſh one. The pungency ſeems to reſide in the bark; the ſweet in the juice; the aromatic flavour in oily veſicles ſpread through the ſubſtance of the pulp, and diſtinguiſhable even by the eye; and the bitter in the ſeeds. The freſh berries yield, on expreſſion, a rich, ſweet, honey-like aromatic juice; if previouſly pounded ſo as to break the ſeeds, the juice proves tart and bitter.—Theſe berries are uſeful carminatives and ſtomachics: for theſe purpoſes a ſpirituous water and eſſential oil are prepared from them, and they are alſo ingredients in various medicines. The liquor remaining after the diſtillation of the oil paſſed through a ſtrainer, and gently exhaled to the conſiſtence a rob, proves likewiſe a medicine of great utility, and in many caſes is perhaps preferable to the oil or the berry itſelf. Hoffman is expreſsly of this opinion, and recommends the rob of juniper in debility of the ſtomach and inteſtines, and ſays it is particularly ſerviceable to old people who are ſubject to theſe diſorders, or labour under a difficulty with regard to the urinary ſecretion. This rob is of a dark browniſh-yellow colour, a balſamic ſweet taſte, with a little of the bitter, more or leſs, according as the ſeeds in the berry have been more or leſs bruiſed. The Swedes prepare an extract from the berries, probably of the nature of the rob above mentioned, which ſome people eat for breakfaſt. In Germany the berries are bruiſed and put into the ſauce made uſe of for a wild boar; and are frequently alſo eaten with other pork, to give it a wild-boar flavour. In Carniola and ſome other diſtricts, the inhabitants make a kind of wine of them ſteeped in water; but it is difficult to prevent this liquor from growing ſour. Thruſhes and grous feed on the berries, and diſſeminate the ſeed in their dung.—It is remarkable that the berries of the juniper are two years in ripening. They ſometimes appear in an uncommon form; the leaves of the cup grow double the uſual ſize, approaching, but not cloſing; and the three petals ſit exactly cloſe, ſo as to keep the air from the *tipulæ juniperi* which inhabit them.—The whole plant has a ſtrong aromatic ſmell. The wood when burnt emits a fragrant odour like incenſe. It is of a reddiſh colour, very hard and durable; and, when large enough, is uſed in marquetry and vaneering, and in making cups, cabinets, &c. From the clefts of the bark, in warm climates, there ſometimes exſudes a reſinous gum called by the Arabs *Sandaracha* *. This reſin, or as it is improperly called *gum*, is brought to us from Africa,

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* See Sandarach.

where the trees grow very large, and in great numbers.—Graſs will not grow beneath juniper, but this tree itſelf is ſaid to be deſtroyed by the meadow-oat. The oil of juniper mixed with that of nuts makes an excellent varniſh for pictures, wood-work, and preſerving iron from ruſting. The reſin powdered and rubbed into paper prevents the ink from ſinking through it, for which it is frequently uſed under the name of POUNCE.—The charcoal made from this wood endures longer than any other, inſomuch that live embers are ſaid to have been found in the aſhes, after being a year covered.

JUNIUS (Adrian), one of the moſt learned men of the age in which he lived, was born at Horn in Holland in 1511. He travelled into all parts of Europe, and practiſed phyſic with reputation in England; where, among other works, he compoſed a Greek and Latin Lexicon, to which he added above 6500 words; an Epithalamium on the marriage of queen Mary with king Philip of Spain; and *Animadverſa & de Coma Commentarius*, which is the moſt applauded of all his works. He died in 1575.

JUNIUS (Francis), profeſſor of divinity at Leyden, was born at Bourges in 1545, of a noble family, and ſtudied ſome time at Lyons. Bartholomew Aneau, who was principal of the college in that city, gave him excellent inſtructions with regard to the right method of ſtudying. He was remarkable for being proof againſt all temptations to lewdneſs; but a libertine ſo far overpowered him by his ſophiſtry, that he made him an atheiſt: however, he ſoon returned to his firſt faith; and, averſe as he was to unlawful love, he had no averſion to matrimony, but was married no leſs than four times. He was employed in public affairs by Henry IV.; and at laſt was invited to Leyden to be profeſſor of divinity, which employment he diſcharged with honour, till he was ſnatched away by the plague in 1602. Du Pin ſays, he was a learned and judicious critic. He wrote, in conjunction with Emmanuel Tremellius, a Latin verſion of the Hebrew text of the Bible. He alſo publiſhed Commentaries on a great part of the Holy Scriptures; and many other works, all in Latin.

JUNIUS (Francis), or *Francis du Jon*, the ſon of the preceding, was born at Heidelberg, in 1589. He at firſt deſigned to devote himſelf to a military life; but after the truce concluded in 1609, he applied himſelf entirely to ſtudy. He came to England in 1620, and lived 30 years in the earl of Arundel's family. He was greatly eſteemed, not only for his profound erudition, but alſo for the purity of his manners; and was ſo paſſionately fond of the ſtudy of the Northern languages, that, being informed there were ſome villages in Frieſland where the ancient language of the Saxons was preſerved, he went and lived two years in that country. He returned to England in 1675; and after ſpending a year at Oxford, retired to Windſor, in order to viſit Voſſius, at whoſe houſe he died in 1677. The univerſity of Oxford, to which he bequeathed his manuſcripts, erected a very handſome monument to his memory. He wrote, 1. *De Pictura Veterum*, which is admired by all the learned; the beſt edition of it is that of Rotterdam in 1694. He publiſhed the ſame work at London, in Engliſh. 2. An explication of the old Gothic manuſcript, called the *Silver one*, becauſe the four Goſpels are there written in ſilver Gothic letters; this was publiſhed with notes by Thomas Mareſchal, or Marſhal. 3. A large Commentary on the Harmony of the four Goſpels by Tatian, which is ſtill in manuſcript. 4. A Gloſſary in five languages, in which he explains the origin of the Northern languages; publiſhed at Oxford in 1745, in folio, by Mr Edward Lee.

JUNK, in the ſea-language, old cables cut into ſhort pieces, and given to boatſwains for making ſwabs, plats, and nippers; as alſo to the ſhip-carpenters, and to poor people, to be pricked into oakum, for caulking ſhips, &c.

JUNO, in pagan worſhip, was the ſiſter and wife of Jupiter, and the goddeſs of kingdoms and riches; and alſo ſtyled the *queen of heaven:* ſhe preſided over marriage and child-birth, and was repreſented as the daughter of Saturn and Rhea. She married Jupiter; but was not the moſt complaiſant wife; for, according to Homer, that god was ſometimes obliged to make uſe of all his authority to keep her in due ſubjection; and the ſame author obſerves, that on her entering into a conſpiracy againſt him, he puniſhed her by ſuſpending her in the air with two anvils faſtened to her feet, and golden manacles on her hands, which all the other deities looked on without a poſſibility of helping her. However, her jealouſy made her frequently find opportunities of interrupting her huſband in the courſe of his amours, and prompted her to puniſh with unrelenting fury Europa, Semele, Io, Latona, and the reſt of his miſtreſſes. Jupiter himſelf having conceived without any commerce with a female, Juno, in revenge, conceived Vulcan by the wind, Mars by touching a flower pointed out to her by the goddeſs Flora, and Hebe by eating greedily of lettuces.

Juno, as the queen of heaven, preſerved great ſtate: her uſual attendants were Terror and Boldneſs, Caſtor, Pollux, and 14 nymphs; but her moſt faithful attendant was the beautiful Iris, or the rainbow. Homer deſcribes her in a chariot adorned with precious ſtones, the wheels of which were of ebony, and which was drawn by horſes with reins of gold. But ſhe is more commonly painted drawn by peacocks. She was repreſented in her temple at Corinth, ſeated on a throne, with a crown on her head, a pomegranate in one hand, and in the other a ſceptre with a cuckoo on its top. This ſtatue was of gold and ivory.

Some mythologiſts ſuppoſe, that Juno ſignifies the air: others, that ſhe was the Egyptian Iſis; who being repreſented under various figures, was by the Greeks and Romans repreſented as ſo many diſtinct deities.

JUNTO, in matters of government, denotes a ſelect council for taking cognizance of affairs of great conſequence, which require ſecrecy.

In Spain and Portugal, it ſignifies much the ſame with convention, aſſembly, or board among us: thus we meet with the junto of the three eſtates, of commerce, of tobacco, &c. See BOARD, &c.

IVORY, in natural hiſtory, &c. a hard, ſolid, and firm ſubſtance, of a white colour, and capable of a very good poliſh. It is the tuſk of the elephant *; and is hollow from the baſe to a certain height, the cavity being filled up with a compact medullary ſubſtance,

* See *Elephas*.

ſeeming to have a great number of glands it it. It is obſerved, that the Ceylon ivory, and that of the iſland of Achem, do not become yellow in the wearing, as all other ivory does; for this reaſon the teeth of theſe places bear a larger price than thoſe of the coaſt of Guinea.

Hardening, Soſtening, and Staining, of Ivory. See Bones and Horns.

JUPITER, in pagan worſhip, the greateſt of their deities, was the ſon of Saturn and Rhea. That goddeſs perceiving that her huſband devoured her children as faſt as ſhe brought them forth; and being in pain for Jupiter, ſhe ſubſtituted a ſtone in his room, which Saturn immediately ſwallowed. He was educated on mount Ida by the Corybantes. Virgil tells us, that he was fed by the bees; out of gratitude for which, he changed them from an iron to a golden colour. Some ſay, that his nurſes were Amalthæa and Meliſſa, who gave him goats milk and honey; and others, that Amalthæa was the name of the goat which nouriſhed him, and which, as a reward for her great ſervices, was changed into a conſtellation. According to others, he was fed by wild pigeons, who brought him ambroſia from Oceanus; and by an eagle, who carried nectar in his beak from a ſteep rock: for which he rewarded the former, by making them the foretellers of winter and ſummer; and the laſt, by giving him immortality, and making him his thunderbearer. When grown up, he defeated the Titans, dethroned his father Saturn, and divided his kingdom with his two brothers; Jupiter had the earth, Neptune the ſea, and Pluto hell. Jupiter had ſeveral wives: the firſt of whom, named *Metis*, he is ſaid to have devoured when big with child, by which he himſelf became pregnant; and Minerva iſſued out of his head, completely armed and fully grown. His ſecond was Themis; the name of his third is not known; his fourth was the celebrated Juno, whom he deceived under the form of a cuckoo, which to ſhun the violence of a ſtorm fled for ſhelter to her lap. He was the father of the Muſes and Graces; and had a prodigious number of children by his miſtreſſes. He metamorphoſed himſelf into a ſatyr to enjoy Antiope; into a bull, to carry off Europa; into a ſwan, to abuſe Leda; into a ſhower of gold, to corrupt Danäe; and into ſeveral other forms to gratify his paſſions. He had Bacchus by Semele, Pallas by Thetis, Diana and Apollo by Latona; and was the father of Mercury and the other gods.

He had a multiplicity of names, either from the places where he was worſhipped, or the attributes aſcribed to him; and is uſually repreſented ſeated on a throne of ivory or gold, ſurrounded with clouds, veſted in a purple robe, graſping his thunder in the right hand and holding a ſceptre in his left, with the eagle at his feet.

The ridiculous ſtories which the poets had publiſhed concerning this god, ſerved as a foundation to the religion of the heathens; but ſome perſons of a graver character endeavour to explain them, either by allegories, or the principles of natural philoſophy.

JURA, one of the Hebrides, or Weſtern Iſlands of Scotland, lying oppoſite to Knapdale in Argyleſhire, is ſuppoſed to be about 34 miles long, and 10 broad. It is the moſt rugged of all the Hebrides; and is compoſed chiefly of vaſt mountains, naked, and without a poſſibility of cultivation. Some of the ſouth and weſtern ſides only are improveable, and in good ſeaſons as much bear and oats are raiſed as will maintain the inhabitants; though by the diſtillation, as Mr Pennant ſuppoſes, of their grain, they ſometimes want. Bear produces four or five fold, and oats three fold. Sloes are the only fruits of the iſland. An acid for punch is here made from the berries of the mountain-aſh; and a kind of ſpirit is alſo diſtilled from them. Neceſſity hath inſtructed the inhabitants in the uſe of native dyes. Thus, the juice of the tops of heath boiled, ſupplies them with a yellow; the roots of the white water-lily, with a dark-brown; thoſe of the yellow water-iris, with a black; and the galium verum, *ru* of the iſlanders, with a very fine red, not inferior to madder. On the hills is ſome paſture for cattle; and the produce, when Mr Pennant viſited the iſland, amounted to about 300 or 400 head of black cattle, ſold annually, at 3l. each, to graziers who come for them; about 100 horſes, alſo ſold annually; a few ſheep with fleeces of a moſt excellent quality, and great numbers of goats. The other animals of Jura are about 100 ſtags; though theſe muſt formerly have been much more numerous, as the original name of the iſland was *Deir-ay*, or the *iſle of deer*, ſo called by the Norwegians on account of the abundance of deer found in it. Here alſo Mr Pennant had ſome obſcure account of a worm that, in a leſs pernicious degree, reſembles the *furia infernalis* * of Linnæus. The *fillan*, a little worm of Jura, ſmall as a thread, and not an inch in length, inſinuates itſelf under the ſkin, cauſes a redneſs and great pain, flies ſwiftly from place to place; but is cured by a poultice of cheeſe and honey. Of the mountains of Jura, thoſe from their ſhape called the *paps*, are the moſt remarkable. There are only three very large ones; the biggeſt, called *Beinn-an-oir*, or *the mountain of gold*, lies fartheſt to the north; the ſecond is called *Beinn-ſheunta*, or *the hallowed mountain*; and the third, *Beinn-a-chaolois*, or *the mountain of the ſound*, is the leaſt of the three. Mr Pennant aſcended the firſt with great labour and difficulty. It is compoſed of vaſt ſtones, covered with moſſes near the baſe; but all above, bare and unconnected with each other. The whole, he ſays, ſeems a *cairn*, the work of the ſons of Saturn. The grandeur of the proſpect from the top abundantly made amends for the fatigue of aſcending the mountain. Jura itſelf afforded a ſtupendous ſcene of rock, varied with innumerable little lakes. From the weſt ſide of the hill ran a narrow ſtripe of rock terminating in the ſea, and called *the ſlide of the old hag*. To the ſouth appeared Ilay extended like a map beneath his feet; and beyond that the north of Ireland; to the eaſt two other iſlands, Cantyre, Arran, and the frith of Clyde bounded by Ayrſhire; an amazing tract of mountains to the north-eaſt as far as *Ben-lomond*; *Skarba* finiſhed the northern view; and over the weſtern ocean were ſcattered Colonſay and Oranſay, Mull, Iona, and its neighbouring iſles; and ſtill further, the long extents of Tirey and Col, juſt apparent. The other paps are ſeen very diſtinctly, but all of them inferior in height. Mr Banks and his friends mounted that to the ſouth, and found the height to be 2359 feet; but this is far overtopped by *Beinn-an-oir*. The ſtones of this mountain are white,

* See *Furia*, in the Appendix.

white, a few red, quartzy, and compoſed of ſmall grains; but ſome are *breciated*, or filled with cryſtalline kernels of an amethyſtine colour. The other ſtones of the iſland are, a cinereous ſlate, veined with red, and uſed here as a whet-ſtone; a micaceous ſand-ſtone; and between the ſmall iſles and Ardfin, a micaceous quartzy rock-ſtone. On the weſt ſide of the iſland there is an anchoring-place called *Whitſarlan;* towards the north end is a bay called *Da'l yaul;* and on the ſame coaſt is formed another riding-place for veſſels among ſeveral ſmall iſlands. Between the north end of Jura and the ſmall iſle of Skarba, there is a famous whirlpool, called *Cory-Vrekan*, from Brecan, ſon to a king of Denmark, who periſhed in this gulph. His body being caſt aſhore on the north ſide of Jura, was buried in a cave, and his grave is ſtill diſtinguiſhed by a tombſtone and altar. In this vortex, which extends about a mile in breadth, the ſea begins to boil and ferment with the tide of flood, increaſing gradually to a number of whirlpools, which, in the form of pyramids, ſpout up the water with a great noiſe, as high as the maſt of a ſmall veſſel, agitated into ſuch a foam as makes the ſea appear white even at the diſtance of two leagues. About half flood the violence begins to decreaſe, and continues to do ſo till about half an hour after high-water: then it boils as before, till within an hour of low-water, when the ſmalleſt fiſhing-boat may croſs it without danger.

Jura is furniſhed with many rivulets and ſprings of excellent water, and the air is remarkably healthy; its ſalubrity being increaſed by the high ſituation, perpetually fanned by breezes. It is, however, but ill-peopled; and did not contain above 700 or 800 inhabitants at the time it was viſited by Mr Pennant. The women are prolific, and very often bear twins. The inhabitants live to a great age, and are liable to few diſtempers. Men of 90 can work; and there was then living a woman of 80, who could run down a ſheep. Then inhabitants are all Proteſtants, but addicted to ſome ſuperſtitions. The pariſh is ſuppoſed to be the largeſt in Great Britain, and the duty the moſt dangerous and troubleſome: it conſiſts of Jura, Oranſay, Colonſay, Skarba, and ſeveral little iſles divided by narrow and dangerous ſounds; forming a length of not leſs than 60 miles; ſupplied by only one miniſter and an aſſiſtant.

The very old clans of Jura are the *Mac-ilvuys*, and the *Mac-raines:* but it ſeems to have changed maſters more than once. In 1549, Donald of Cantyre, Mac-guillayne of Doward, Mac-guillayne of Kinloch-buy, and Mac-duffie of Colonſay, were the proprietors: Mac-lean of Mull had alſo a ſhare in 1586. At preſent it belongs to the duke of Argyle, Mr Macneil of Colonſay, and Mr Campbell of Shawfield.

IVREA, an ancient and ſtrong town of Italy, in Piedmont, and capital of Canavez, with a ſtrong fort, a biſhop's ſee, the title of a marquiſate, and an ancient caſtle. It is ſubject to the king of Sardinia, and ſeated on the river Doria between two hills, in E. Long. 7. 48. N. Lat. 45. 12.

JURIEU (Peter), an eminent French Proteſtant divine, called ironically by the papiſts the *Goliath* of the Proteſtants, was born in 1637. He was educated in England under his maternal uncle Peter du Moulin, and took orders in the Engliſh church: but, returning to ſucceed his father as paſtor of a reformed congregation at Mer in the dioceſe of Blois, he was made profeſſor of divinity and Hebrew at Sedan, where he acquired great reputation. This univerſity being taken from the Proteſtants, a profeſſorſhip of divinity was founded for him at Rotterdam; and he was alſo appointed miniſter of the Walloon church in the ſame town: being now in a place of liberty, he gave full ſcope to an imagination naturally warm, and applied himſelf to ſtudy the book of Revelation, of which he fancied he had by a kind of inſpiration diſcovered the true meaning; a notion that led him to many enthuſiaſtical conjectures. He was moreover ſo unfortunate as to quarrel with his beſt friends for oppoſing his viſionary opinions, which produced violent diſputes between him and Meſſrs Bayle and de Beauval. He died in 1713; and left a great number of eſteemed works behind him.

JURISCONSULTUS, (*ICtus*,) among the Romans, was a perſon learned in the law; a maſter of the Roman juriſprudence; who was conſulted on the interpretation of the laws and cuſtoms, and on the difficult points in law-ſuits. The fifteen books of the digeſts were compiled wholly from the anſwers or reports of the ancient juriſconſulti. Tribonianus, in deſtroying the 2000 volumes from whence the code and digeſt were taken, has deprived the public of a world of things, which would have given them light into the ancient office of the juriſconſulti. We ſhould ſcarce have known any thing beyond their bare names, had not Pomponius, who lived in the ſecond century, taken care to preſerve ſome circumſtances of their office.

The Roman juriſconſulti ſeem to have been the ſame with our chamber-counſellors, who arrived at the honour of being conſulted, through age and experience, but never pleaded at the bar. Their pleading advocates, or lawyers, never became juriſconſulti. See ADVOCATE.

In the times of the commonwealth, the advocati had by much the more honourable employment, as being in the ready way to attain the higheſt preferments. They then deſpiſed the juriſconſulti, calling them in deriſion *formularii* and *legulei*, as having invented certain forms and monoſyllables, in order to give their anſwers the greater appearance of gravity and myſtery. But in proceſs of time they became ſo much eſteemed, that they were called *prudentes* and *ſapientes*, and the emperors appointed the judges to follow their advice. Auguſtus advanced them to be public officers of the empire; ſo that they were no longer confined to the petty councils of private perſons.—Bern. Rutilius has written the lives of the moſt famous juriſconſulti who have lived within theſe 2000 years.

JURISPRUDENCE, the ſcience of what is juſt or unjuſt; or the knowledge of laws, rights, cuſtoms, ſtatutes, &c. neceſſary for the adminiſtration of juſtice. See LAW.

JURY, a certain number of men ſworn to inquire into and try a matter of fact, and to declare the truth upon ſuch evidence as ſhall appear before them.

Juries are, in theſe kingdoms, the ſupreme judges in all courts and in all cauſes in which either the life, property, or reputation, of any man is concerned: this is the diſtinguiſhing privilege of every Briton, and one of the moſt glorious advantages of our conſtitution; for as every one is tried by his peers, the meaneſt ſubject is as ſafe and as free as the greateſt. See the article Trial.

Jury-*Maſt*, whatever is ſet up in room of a maſt that has been loſt in a ſtorm or in an engagement, and to which a leſſer yard, ropes, and ſails, are affixed.

JUS coronæ. See Hereditary *Right*, and Succession.

Jus *Deliberandi*, in Scots law, that right which an heir has, by law, of deliberating for a certain time whether he will repreſent his predeceſſor. See Law, N° clxxx. 23.

Jus *Devolutum*, in Scots law, the right of the church, of preſenting a miniſter to a vacant pariſh, in caſe the patron ſhall neglect to uſe that right within the time limited by law. See Law, N° clix. 9.

Jus *Mariti*, in Scots law, the right the huſband acquires to his wife's moveable eſtate, in virtue of the marriage. See Law, N° clx. 7.—11.

Jus *Relictæ*, in Scots law, the right the wife has in the goods in communion, in caſe of the previous deceaſe of the huſband. See Law, *ibid*.

Jus *Præventionis*, in Scots law, the preferable right of juriſdiction acquired by a court, in any cauſe to which other courts are equally competent, by having exerciſed the firſt act of juriſdiction. See Law, N° clvi. 5.

JUST, a ſportive kind of combat on horſeback, man againſt man, armed with lances. The word is by ſome derived from the French *jouſte*, of the Latin *juxta*, becauſe the combatants fought near one another. Salmaſius derives it from the modern Greek *zouſtra*, or rather τζȣςρα, which is uſed in this ſenſe by Nicephorus Gregorius. Others derive it from *juſta*, which in the corrupt age of the Latin tongue was uſed for this exerciſe, by reaſon it was ſuppoſed a more juſt and equal combat than the tournament.

The difference between juſts and tournaments conſiſts in this, that the latter is the genus, of which the former is only a ſpecies. Tournaments included all kinds of military ſports and engagements made out of gallantry and diverſion: Juſts were thoſe particular combats where the parties were near each other, and engaged with lance and ſword. Add, that the tournament was frequently performed by a number of cavaliers, who fought in a body: The juſt was a ſingle combat of one man againſt another.—Though the juſts were uſually made in tournaments, after a general rencounter of all the cavaliers, yet they were ſometimes ſingly, and independent of any tournament. See Tournament.

He who appeared for the firſt time at a juſt, forfeited his helm or caſque, unleſs he had forfeited before at a tournament.

JUSTEL (Chriſtopher), a learned counſellor, and ſecretary to the French king, was born at Paris, in 1580, and applied himſelf to the ſtudy of eccleſiaſtical hiſtory. He maintained a correſpondence with the moſt learned men of his time, as archbiſhop Uſher, Sir Henry Spelman, Blondel, &c. till his death, which happened in 1649. He wrote, 1. The code of the canons of the church univerſal, and the councils of Africa, with notes. 2. A genealogical hiſtory of the houſe of Auvergne. And, 3. Collections of Greek and Latin canons, from ſeveral manuſcripts, which formed the *Bibliotheca juris canonici veteris*, publiſhed in 2 vols folio, by William Voet and our author's ſon.

Justel (Henry), ſon of the foregoing, was born at Paris in 1620. He became ſecretary and counſellor to the king; and was as diſtinguiſhed for his own learning, as remarkable for encouraging it in others. He came to London in 1681, on the perſecution of the Proteſtants; and was made keeper of the royal library at St James's: which office he held till his death in 1693, when he was ſucceeded by the famous Dr Bentley. He wrote ſeveral books, the titles of which may be ſeen in the Catalogue of the Bodleian library.

JUSTICE, in a moral ſenſe, is one of the four cardinal virtues, which gives every perſon his due.

Justice, in a legal ſenſe, a perſon deputed by the king to adminiſter juſtice to his ſubjects, whoſe authority ariſes from his deputation, and not by right of magiſtracy.

Fountain of Justice, one of the characters or attributes of the king. See Prerogative.

By the fountain of juſtice the law does not mean the *author* or *original*, but only the *diſtributor*. Juſtice is not derived from the king, as from his *free gift*; but he is the ſteward of the public, to diſpenſe it to whom it is *due*. He is not the ſpring, but the reſervoir; from whence right and equity are conducted, by a thouſand channels, to every individual. The original power of judicature, by the fundamental principles of ſociety, is lodged in the ſociety at large: but as it would be impracticable to render complete juſtice to every individual, by the people in their collective capacity, therefore every nation has committed that power to certain ſelect magiſtrates, who with more eaſe and expedition can hear and determine complaints; and in England this authority has immemorially been exerciſed by the king or his ſubſtitutes. He therefore has alone the right of erecting courts of judicature: for, though the conſtitution of the kingdom hath entruſted him with the whole executive power of the laws, it is impoſſible, as well as improper, that he ſhould perſonally carry into execution this great and extenſive truſt: it is conſequently neceſſary, that courts ſhould be erected, to aſſiſt him in executing this power; and equally neceſſary, that, if erected, they ſhould be erected by his authority. And hence it is, that all juriſdictions of courts are either mediately or immediately derived from the crown, their proceedings run generally in the king's name, they paſs under his ſeal, and are executed by his officers.

It is probable, and almoſt certain, that in very early times, before our conſtitution arrived at its full perfection, our kings in perſon often heard and determined cauſes between party and party. But at preſent, by the long and uniform uſage of many ages, our kings have delegated their whole judicial power to the judges of their ſeveral courts; which are the grand depoſitary of the fundamental laws of the kingdom, and have gained a known and ſtated juriſdiction, regulated by certain and eſtabliſhed rules, which the crown itſelf cannot now alter but by act of parliament. And, in order to maintain both the dignity and independence of the judges in the ſuperior courts, it is enacted by the ſtatute 13 W. III. c. 2. that their commiſſions ſhall be made (not, as formerly, *durante bene placito,* but) *quamdiu bene ſe geſſerint,* and their ſalaries aſcertained and eſtabliſhed; but that it may be lawful to remove them on the addreſs of both houſes of parliament. And now, by the noble improvements of that law in the ſtatute of 1 Geo. III. c. 23. enacted at the earneſt recommendation of the king himſelf from the throne, the judges are continued in their offices during their good behaviour, notwithſtanding any demiſe of the crown (which was formerly held immediately to vacate their ſeats), and their full ſalaries are abſolutely ſecured to them during the continuance of their commiſſions; his majeſty having been pleaſed to declare, that "he looked upon the independence and uprightneſs of the judges, as eſſential to the impartial adminiſtration of juſtice; as one of the beſt ſecurities of the rights and liberties of his ſubjects; and as moſt conducive to the honour of the crown."

In criminal proceedings, or proſecutions for offences, it would ſtill be a higher abſurdity, if the king perſonally ſat in judgment; becauſe in regard to theſe he appears in another capacity, that of *proſecutor.* All offences are either againſt the king's peace, or his crown and dignity; and are ſo laid in every indictment. For though in their conſequences they generally ſeem (except in the caſe of treaſon and a very few others) to be rather offences againſt the kingdom than the king; yet, as the public, which is an inviſible body, has delegated all its power and rights, with regard to the execution of the laws, to one viſible magiſtrate, all affronts to that power, and breaches of thoſe rights, are immediately offences againſt him, to whom they are ſo delegated by the public. He is therefore the proper perſon to proſecute for all public offences and breaches of the peace, being the perſon injured in the eye of the law. And this notion was carried ſo far in the old Gothic conſtitution, (wherein the king was bound by his coronation oath to conſerve the peace), that in caſe of any forcible injury offered to the perſon of a fellow-ſubject, the offender was accuſed of a kind of perjury, in having violated the king's coronation oath; *dicebatur fregiſſe juramentum regis juratum.* And hence alſo ariſes another branch of the prerogative, that of *pardoning* offences; for it is reaſonable, that he only who is injured ſhould have the power of forgiving. See PARDON.

In this diſtinct and ſeparate exiſtence of the judicial power, in a peculiar body of men, nominated indeed, but not removeable at pleaſure, by the crown, conſiſts one main preſervative of the public liberty; which cannot ſubſiſt long in any ſtate, unleſs the adminiſtration of common juſtice be in ſome degree ſeparated both from the legiſlative and alſo from the executive power. Were it joined with the legiſlative, the life, liberty, and property, of the ſubject would be in the hands of arbitrary judges, whoſe deciſions would be then regulated only by their own opinions, and not by any fundamental principles of law; which, though legiſlators may depart from, yet judges are bound to obſerve. Were it joined with the executive, this union might ſoon be an over-balance for the legiſlative. For which reaſon, by the ſtatute of 16 Car. I. c. 10. which aboliſhed the court of ſtar-chamber, effectual care is taken to remove all judicial power out of the hands of the king's privy-council; who, as then was evident from recent inſtances, might ſoon be inclined to pronounce that for law, which was moſt agreeable to the prince or his officers. Nothing therefore is more to be avoided in a free conſtitution, than uniting the provinces of a judge and a miniſter of ſtate. And indeed, that the abſolute power, claimed and exerciſed in a neighbouring nation, is more tolerable than that of the eaſtern empires, is in a great meaſure owing to their having veſted the judicial power in their parliaments, a body ſeparate and diſtinct from both the legiſlative and executive: and, if ever that nation recovers its former liberty, it will owe it to the efforts of thoſe aſſemblies. In Turky, where every thing is centered in the ſultan or his miniſters, deſpotic power is in its meridian, and wears a more dreadful aſpect.

A conſequence of this prerogative is the legal ubiquity of the king. His majeſty, in the eye of the law, is always preſent in all his courts, though he cannot perſonally diſtribute juſtice. His judges are the mirror by which the king's image is reflected. It is the regal office, and not the royal perſon, that is always preſent in court, always ready to undertake proſecutions, or pronounce judgment, for the benefit and protection of the ſubject. And from this ubiquity it follows, that the king can never be nonſuit; for a nonſuit is the deſertion of the ſuit or action by the non-appearance of the plaintive in court. For the ſame reaſon alſo, in the forms of legal proceedings, the king is not ſaid to appear by his attorney, as other men do; for he always appears, in contemplation of law, in his own proper perſon.

From the ſame original, of the king's being the fountain of juſtice, we may alſo deduce the prerogative of iſſuing proclamations, which is veſted in the king alone. See PROCLAMATION.

JUSTICIA, MALABAR-NUT; a genus of the monogynia order, belonging to the diandra claſs of plants. There are 19 ſpecies, all of them natives of the Eaſt Indies, growing many feet high; ſome adorned with fine large leaves, others with ſmall narrow ones, and all of them with monopetalous ringent flowers. Only two ſpecies are cultivated in our gardens, viz. the adhatoda or common Malabar-nut, and the hyſſopifolia or ſnap-tree. The firſt grows ten or twelve feet high, with a ſtrong woody ſtem, branching out widely all around; having large, lanceolate, oval leaves, placed oppoſite; and from the ends of the branches ſhort ſpikes of white flowers, with dark ſpots, having the helmet of the corolla concave. The ſecond hath a ſhrubby ſtem branching from the bottom pyramidally three or four feet high; ſpear-ſhaped, narrow, entire leaves, growing oppoſite; and white flowers, commonly by threes, from the ſides of the branches; ſucceeded by capſules, which burſt open with elaſtic force for the diſcharge of the ſeeds; whence the name of *ſnap-tree.* Both ſpecies flower here in ſummer, but never produce any fruit. They are propagated by layers and cuttings, and require the ſame treatment with other tender exotics.

JUSTICIAR, in the old Engliſh laws, an officer inſtituted by William the Conqueror, as the chief officer of ſtate, who principally determined in all caſes civil and criminal. He was called in Latin *Capitalis Juſticiarius totius Angliæ.* For JUSTICIAR in Scotland, ſee LAW, N° clvi. 10.—12.

JUSTICIARY, or *Court of* Justiciary, in Scotland. See Law, N° clvi. 10—12.

JUSTIN, a celebrated hiſtorian, lived, according to the moſt probable opinion, in the ſecond century, under the reign of Antoninus Pius. He wrote, in elegant Latin, an abridgement of the hiſtory of Trogus Pompeius; comprehending the actions of almoſt all nations, from Ninus the founder of the Aſſyrian empire, to the emperor Auguſtus. The original work, to the regret of the learned, is loſt: this abridgement, being written in a polite and elegant ſtyle, was probably the reaſon why that age neglected the original. The beſt editions of Juſtin are, *ad uſum Delphini*, in 4to, and *cum notis variorum et Gronovii*, in 8vo.

Justin (St.) commonly called *Juſtin Martyr*, one of the earlieſt and moſt learned writers of the eaſtern church, was born at Neapolis, the ancient Sechem of Paleſtine. His father Priſcus, a Gentile Greek, brought him up in his own religion, and had him educated in all the Grecian learning. To complete his ſtudies he travelled to Egypt; and followed the ſect of Plato, with whoſe intellectual notions he was much pleaſed. But one day, walking by the ſea-ſide, wrapt in contemplation, he was met by a grave ancient perſon, of a venerable aſpect; who, falling into diſcourſe with him, turned the converſation by degrees from the excellence of Platoniſm to the ſuperior perfection of Chriſtianity; and reaſoned ſo well, as to raiſe in him an ardent curioſity to inquire into the merits of that religion; in conſequence of which inquiry, he was converted about the year 132. On his embracing that religion, he quitted neither the profeſſion nor the habit of a philoſopher: but a perſecution breaking out under Antoninus, he compoſed *An apology for the Chriſtians*; and afterwards preſented another to the emperor Marcus Aurelius, in which he vindicated the innocence and holineſs of the Chriſtian religion, againſt Creſcens, a Cynic philoſopher, and other calumniators. He did honour to Chriſtianity by his learning and the purity of his manners; and ſuffered martyrdom in 167. Beſides his two Apologies, there are ſtill extant his *Dialogue with Trypho*, a Jew; two treatiſes addreſſed to the Gentiles, and another on the unity of God. Other works are alſo aſcribed to him. The beſt editions of St Juſtin are thoſe of Robert Stephens, in 1551 and 1571, in Greek and Latin: that of Morel, in Greek and Latin, in 1656; and that of Don Prudentius Marandus, a learned Benedictine, in 1742, in folio. His ſtyle is plain, and void of all ornament.

JUSTINIAN I. ſon of Juſtin the elder, was made Cæſar and Auguſtus in 527, and ſoon after emperor. He conquered the Perſians by Beliſarius his general, and exterminated the Vandals; regained Africa; ſubdued the Goths in Italy; defeated the Moors; and reſtored the Roman empire to its primitive glory. See (Hiſtory of) Constantinople, n° 98,—102. and Italy, n° 12. &c.

The empire being now in the full enjoyment of a profound peace and tranquillity, Juſtinian made the beſt uſe of it, by collecting the immenſe variety and number of the Roman laws into one body. To this end, he ſelected ten of the moſt able lawyers in the empire; who, reviſing the Gregorian, Theodoſian, and Hermogenian codes, compiled one body, called *Codex Juſtinianus*. This may be called the *ſtatute law*, as conſiſting of the reſcripts of the emperors. But the reduction of the other part was a much more difficult taſk: it was made up of the deciſions of the judges and other magiſtrates, together with the authoritative opinions of the moſt eminent lawyers; all which lay ſcattered, without any order, in no leſs than 2000 volumes and upwards. Theſe were reduced to the number of 50; but ten years were ſpent in the reduction. However, the deſign was completed in the year 553, and the name of *Digeſts* or *Pandects* given to it. Beſides theſe, for the uſe chiefly of young ſtudents in the law to facilitate that ſtudy, Juſtinian ordered four books of inſtitutes to be drawn up, containing an abſtract or abridgement of the text of all the laws: and, laſtly, the laws of modern date, poſterior to that of the former, were thrown into one volume in the year 541, called the *Novellæ*, or New Code.

This emperor died in the year 565, aged 83, in the 39th of his reign, after having built a great number of churches; particularly the famous Sancta Sophia at Conſtantinople, which is eſteemed a maſterpiece of architecture.

JUSTINIANI (St Laurence), the firſt patriarch of Venice, was born there, of a noble family, in 1381. He was a very pious prelate, and died in 1485; he left ſeveral pieces of piety, which were printed together at Lyons in 1568, in one volume folio, with his life prefixed by his nephew. Clement VII. beatified him in 1524, and he was canonized by Alexander VIII. in 1690.

Justiniani (Bernard), was born at Venice in 1408. He obtained the ſenator's robe at the age of 19, ſerved the republic in ſeveral embaſſies, and was elected procurator of St Mark in 1474. He was a learned man, and wrote *the hiſtory of Venice*, with ſome other works of conſiderable merit; and died in 1498.

Justiniani (Auguſtin), biſhop of Nebo, one of the moſt learned men of his time, was deſcended from a branch of the ſame noble family with the two foregoing; and was born at Genoa in 1480. He aſſiſted at the fifth council of Lateran, where he oppoſed ſome articles of the concordat between France and the court of Rome. Francis I. of France made him his almoner; and he was for five years regius profeſſor of Hebrew at Paris. He returned to Genoa in 1522, where he diſcharged all the duties of a good prelate; and learning and piety flouriſhed in his dioceſe. He periſhed at ſea in his paſſage from Genoa to Nebbio, in 1536. He compoſed ſeveral pieces; the moſt conſiderable of which is, *Pſalterium Hebræum, Græcum, Arabicum, et Chaldæum, cum tribus Latinis interpretationibus et gloſſis*. This was the firſt pſalter of the kind printed; and there is alſo aſcribed to the ſame prelate a tranſlation of Maimonides's *More Nevochim*.

JUTES, the ancient inhabitants of Jutland in Denmark.

JUTLAND, a large peninſula, which makes the principal part of the kingdom of Denmark. It is bounded on the ſouth-eaſt by the duchy of Holſtein, and is ſurrounded on the other ſides by the German ocean and the Baltic ſea. It is about 180 miles in length from north to ſouth, and 50 in breadth from eaſt to weſt. The air is very cold, but wholeſome; and the ſoil is fertile in corn and paſtures, which feed a great number of beeves, that are ſent to Germany, Holland, and elſewhere. This was anciently called the *Cimbrian Cherſoneſus*, and is ſuppoſed to be the country from whence the Saxons came into England. It is divided into two parts, called *North* and *South Jutland:* the latter is the duchy of Sleſwick, and lies between North Jutland and the duchy of Holſtein; and the duke of that name is in poſſeſſion of part of it, whoſe capital town is Gottorp, for which reaſon the ſovereign is called the *duke of Holſtein Gottorp*.

JUVENAL (Decius Junius), the celebrated Roman ſatyriſt, was born about the beginning of the emperor Claudian's reign, at Aquinum in Campania. His father was probably a freed-man, who, being rich, gave him a liberal education, and, agreeably to the taſte of the times, bred him up to eloquence; in which he made a great progreſs, firſt under Fronto the grammarian, and afterwards, as is generally conjectured, under Quintilian; after which he attended the bar, and made a diſtinguiſhed figure there for many years by his eloquence. In the practice of this profeſſion he had improved his fortune and intereſt at Rome before he turned his thoughts to poetry, the very ſtyle of which, in his ſatires, ſpeaks a long habit of declamation; *ſubactum redolent declamatorem*, ſay the critics. It is ſaid, he was above 40 years of age when he recited his firſt eſſay to a ſmall audience of his friends; but, being encouraged by their applauſe, he ventured a greater publication: which reaching the ears of Paris, Domitian's favourite at that time, though but a pantomime player, whom our ſatyriſt had ſeverely inſulted, that minion made his complaint to the emperor; who ſent him thereupon into baniſhment, under pretence of giving him the command of a cohort in the army, which was quartered at Pentapolis, a city upon the frontiers of Egypt and Libya.

After Domitian's death, our ſatiriſt returned to Rome, ſufficiently cautioned, not only againſt attacking the characters of thoſe in power, under arbitrary princes, but againſt all perſonal reflections upon the great men then living; and therefore he thus wiſely concludes the debate he is ſuppoſed to have maintained for a while, with a friend, on this head, in the firſt ſatire, which ſeems to be the firſt that he wrote after his baniſhment:

> *Experiar quid concedatur in illos*
> *Quorum Flaminia tegitur cinis atque Latina.*

"I will try what liberties I may be allowed with thoſe whoſe aſhes lie under the Flaminian and Latin ways," along each ſide of which the Romans of the firſt quality uſed to be buried.—It is believed that he lived till the reign of Adrian, in 128. There are ſtill extant 16 of his ſatires, in which he diſcovers great wit, ſtrength, and keenneſs in his language: but his ſtyle is not perfectly natural, and the obſcenities with which theſe ſatires were filled render the reading of them dangerous to youth.

JUVENCUS (Caius Vecticus Aquilinus), one of the firſt of the Chriſtian poets, was born of an illuſtrious family in Spain. About the year 320 he put the life of Jeſus Chriſt into Latin verſe, of which he compoſed four books. In this work he followed almoſt word for word the text of the four evangeliſts: but his verſes are written in a bad taſte; and his Latin is not pure.

JUXON (Dr William), born at Chiceſter in 1682, was bred at Merchant-Taylor's ſchool, and from thence elected into St John's college, Oxford, of which he became preſident. King Charles I. made him biſhop of London; and, in 1635, promoted him to the poſt of lord high treaſurer of England. The whole nation, and eſpecially the nobility, were greatly offended at this high office being given to a clergyman; but he behaved ſo well in the adminiſtration, as ſoon put a ſtop to all the clamour raiſed againſt him. This place he held no longer than the 17th of May 1641, when he prudently reſigned the ſtaff, to avoid the ſtorm which then threatened the court and the clergy. In the following February, an act paſſed depriving the biſhops of their votes in parliament, and incapacitating them from any temporal juriſdiction. In theſe leading ſteps, as well as the total abolition of the epiſcopal order which followed, he was involved with his brethren; but neither as biſhop nor as treaſurer was a ſingle accuſation brought againſt him in the long parliament. During the civil wars, he reſided at his palace at Fulham, where his meek, inoffenſive, and genteel behaviour, notwithſtanding his remaining ſteady in his loyalty to the king, procured him the viſits of the principal perſons of the oppoſite party, and reſpect from all. In 1648, he attended on his majeſty at the treaty in the iſle of Wight; and, by his particular deſire, waited upon him at Cotton-houſe, Weſtminſter, the day after the commencement of his trial; during which he frequently viſited him in the office of a ſpiritual father, and his majeſty declared he was the greateſt comfort to him in that afflictive ſituation. He likewiſe attended his majeſty on the ſcaffold, where the king taking off his cloak and George, gave him the latter: after the execution, our pious biſhop took care of the body, which he accompanied to the royal chapel at Windſor, and ſtood ready with the common prayer book in his hands, to perform the laſt ceremony for the king; but was prevented by colonel Whichcot, governor of the caſtle.—He continued in the quiet poſſeſſion of Fulham-palace till the enſuing year 1649, when he was deprived, having been ſpared longer than any of his brethren. He then retired to his own eſtate in Glouceſterſhire, where he lived in privacy, till the reſtoration, when he was preſented to the ſee of Canterbury; and in the little time he enjoyed it, expended, in buildings and reparations at Lambeth-palace and Croydon-houſe, near 15,000 l. He died in 1663; having bequeathed 7000 l. to St John's college, and to other charitable uſes near 5000 l. He publiſhed a *Sermon on Luke* xviiii. 31. and *Some conſiderations upon the act of uniformity*.

IVY, in botany. See HEDERA.

IXIA, in botany, a genus of the monogynia order, belonging to the triandria claſs of plants. There are ſeveral ſpecies, conſiſting of herbaceous, tuberous, and bulbous-rooted flowery perennials, from one to two feet high, terminated by hexpetalous flowers of different colours. They are propagated by off-ſets, which ſhould be taken off in ſummer at the decay of the

Ixion,
Jynx.

leaves: but as all the plants of this genus are natives of warm climates, few of them can bear the open air of this country in winter.

IXION, in fabulous hiſtory, king of the Lapithæ, married Dia the daughter of Deionius, to whom he refuſed to give the cuſtomary nuptial preſents. Deionius in revenge took from him his horſes: when Ixion, diſſembling his reſentment, invited his father-in-law to a feaſt, and made him fall through a trap-door into a burning furnace, in which he was immediately conſumed. Ixion being afterwards ſtung with remorſe for his cruelty, ran mad; on which Jupiter, in compaſſion, not only forgave him, but took him up into heaven, where he had the impiety to endeavour to corrupt Juno. Jupiter, to be the better aſſured of his guilt, formed a cloud in the reſemblance of the goddeſs, upon which Ixion begat the centaurs: but boaſting of his happineſs, Jove hurled him down to Tartarus, where he lies fixed on a wheel encompaſſed with ſerpents, which turns without ceaſing.

JYNX, in ornithology, a genus of birds belonging to the order of accipitres. Of this genus there is only one known ſpecies, called, from its ſingular manner of twiſting its head about, *wry-neck*. "Nature, (ſays Mr Pennant), by the elegance of its penciling the colours of this bird, hath made ample amends for their want of ſplendor. Its plumage is marked with the plaineſt kinds. A liſt of black and ferruginous ſtrokes divides the top of the head and back. The ſides of the head and neck are aſh-coloured, beautifully traverſed with fine lines of black and reddiſh brown. The quill-feathers are duſky; but each web is marked with ruſt-coloured ſpots. The chin and breaſt are of a light yellowiſh brown, adorned with ſharp pointed bars of black. The tail conſiſts of ten feathers, broad at their ends and weak; of a pale aſh colour, powdered with black and red, and marked with four equidiſtant bars of black. The tongue is long and cylindric; for the ſame uſe as that of the woodpecker. The toes are alſo diſpoſed the ſame way. The bill is ſhort, weak, and a little arcuate. The irides are of a yellowiſh hazel.

Jynx.

"The wry-neck we believe to be a bird of paſſage, appearing here in the ſpring before the cuckoo. The Welſh conſider it as the forerunner or ſervant of that bird, and call it *Gwas y gog*, or the cuckoo's attendant: the Swedes regard it in the ſame light. The food of this ſpecies is inſects; but chiefly ants, for on examination we found the ſtomach of one filled with their remains. As the tongue of this bird, like that of the ant-bear or tamandria, is of an enormous length; it poſſibly not only makes uſe of it to pick thoſe inſects out of their retreat, but like that quadruped may lay it acroſs their path, and when covered with ants draw it into its mouth. Its weight is one ounce and a quarter: the length ſeven inches; the breadth 11. It takes its name from a manner it has of turning its head back to the ſhoulders; eſpecially when terrified: it has alſo the faculty of erecting the feathers of the head like thoſe of the jay. Its note is like that of the keſtril, a quick-repeated ſqueak. Its eggs are white, and have ſo thin a ſhell that the yolk may be ſeen through it. This bird builds in the hollows of trees, making its neſt of dry graſs, in which we have counted nine young.

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